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### EDUCATION

Ph.D., 1986, Civil Engineering, University of Colorado at Boulder.  
M.S., 1981, Civil Engineering, University of Colorado at Boulder.  
B.S., 1978, Architectural Engineering, University of Colorado at Boulder.

### PROFESSIONAL REGISTRATION

2014 – Present, Professional Engineer Inactive (Mechanical), State of Texas #67618.  
1990 – 2014, Registered Professional Engineer (Mechanical), State of Texas #67618.

### EXPERIENCE

2009-2017 Associate Department Head for Research, Department of Architecture, Texas A&M University, College Station, Texas.  
2003–present Professor, Department of Architecture, Texas A&M University, College Station, Texas.  
1995–present Associate Director, Energy Systems Laboratory, Texas A&M University, College Station, Texas.  
1995–2003 Associate Professor, Department of Architecture, Texas A&M University, College Station, Texas.  
1990–1994 Assistant Professor, Mechanical Engineering Department, Texas A&M University, College Station, Texas.  
1989–1990 Research Engineer, Energy Systems Laboratory, Mechanical Engineering Department, Texas A&M University, College Station, Texas.  
1988–1989 Post-Doctorate Research, Center for Energy and Environmental Studies, Princeton University, Princeton, New Jersey.  
1984–1988 Graduate Research Assistant, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Colorado.  
1983–1985 Instructor, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Colorado.  
1982–1983 Engineering Intern, Rockwell International, Facilities Engineering and Construction, Rocky Flats Plant, Golden, Colorado.  
1981 Engineering Intern, Swanson Rink and Associates, Denver, Colorado.  
1979 Engineering Intern, Colorado Office of Energy Conservation, Denver, Colorado.  
1978–1980 Graduate Research Assistant, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Colorado.

### HONORS, AWARDS AND SPECIAL RECOGNITION

2020 ASHRAE eSociety Special Recognition, “Analysis of zone-by-zone indoor environmental conditions and electricity savings from the use of a smart thermostat: A residential case study”, *Science and Technology for the Built Environment*, (June).  
2018 ASHRAE eSociety Special Recognition, “Literature Review of Building Peak Cooling Load Design Methods for Commercial Buildings in the United States”, *Science and Technology for the Built Environment* (March).  
2015 Center Fellow, Texas Engineering Experiment Station (TEES), Texas A&M University System, College Station, Texas.  
2013 Fellow, International Building Performance Simulation Association – IBPSA.  
2010 ASHRAE Appreciation Award, Performance Metrics Proctotols Committee Chair, and Guideline 14 participation.  
2008 Listed in Who’s Who (Strathmore’s Who’s Who Ltd., and Strathmore’s World Wide Who’s Who Directory, 26 Bond Street, Westbury, NY, 11590; Lexington’s Who’s Who, 300 Garden City Plaza, Suite 430, Garden City, New York, 11530; 1999 Listed in Marquis Who’s Who, 121 Chanlon Road, New Providence, NJ, 07974).  
2007 U.S.E.P.A. National Center of Excellence on Displaced Emissions Reductions (CEDER).  
2006 Fellow, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, Georgia.  
2003 Fellow, International Performance Measurement and Verification Organization, Washington, D.C.  
2002 ASHRAE Appreciation Award, Guideline 14 Committee Participation.  
2002 Listed in International Biographical Centre’s Who’s Who in the 21<sup>st</sup> Century, St. Thomas Place, Ely, Cambridgeshire, CB7 4GC, England.  
2002 U.S.D.O.E. Letter of Appreciation from IPMVP Executive Committee Chair, Shirlie Hansen, for serving on the International Performance Monitoring and Verifications Protocol’s Technical Committee (2001 IPMVP).  
2001 ASHRAE Distinguished Service Award, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, Georgia.  
2001 ASHRAE Appreciation Award, Standard 140-2001 Committee Participation.  
1998 U.S.D.O.E. Letter of Appreciation from Secretary Frederico Pena for co-authoring the International Performance Monitoring and Verifications Protocols (1997 IPMVP).  
1997 U.S.D.O.E. Letter of Appreciation from Secretary Hazel O’Leary for co-authoring the North American Energy Monitoring and Verifications Protocols (1996 NEMVP).  
1997 ASHRAE Appreciation Award, Houston Chapter.  
1995 Discovery Channel, “U.S.D.O.E. Innovative Programs,” Broadcast, October 1995.

- 1995 U.S.D.O.E. Special Recognition Award, National Awards Program for Energy Efficiency and Renewable Energy -- The Texas LoanSTAR program.
- 1995 U.S.E.P.A. Award, Innovative State Energy Conservation Program -- The Texas LoanSTAR program.
- 1995 ASME Solar Energy Division Best Paper Award, "The U.S.D.O.E. Forrestal Building Lighting Retrofit: Preliminary Analysis of Electricity Savings," J. Haberl, T. Bou-Saada, E. Vajda, M. Schincovich, L. D'Angelo, L. Harris.
- 1995 KBTX Television, "The Texas LoanSTAR Program," News Broadcast.
- 1995 CNN Home Front News, "The Texas LoanSTAR Program," Broadcast, March 1995.
- 1995 Discovery Channel, "Innovative Program - The Texas LoanSTAR Program," Broadcast, January 1995.
- 1993 Popular Science, "Measuring Energy Efficiency," article highlighting Texas LoanSTAR program.
- 1992 National Endowment for the Arts, Federal Design Achievement Award, Entry #2505, "Metered Analysis for Building Operation and Maintenance - Forrestal Building," with Jim Vajda.
- 1990 General Services Administration - 1990 GSA Design Award, "Continuous Analysis of Metered Data."
- 1989 United States Department of Energy - Special Recognition Award, "U.S.D.O.E. Forrestal Building, Administrative Services, Operation and Maintenance Improvements."
- 1987 United States Department of Energy - Program for Energy Innovation Award, Awarded to the University of Colorado Recreation Center and University Memorial Center, Boulder, Colorado.
- 1986 Boulder County Energy Conservation Award, "Development of an Artificial Intelligence System for Diagnosing Energy Operational Maintenance problems," University of Colorado Rec Center.
- 1985 KUSA. Television, Denver, Channel 9 News Presentation, "Energy Conservation at the University of Colorado Rec Center," Broadcast, December 28, 1985.
- 1978 Special Recognition Award, Department of Civil, Environmental and Architectural Engineering, University of Colorado, 1978.
- 1969-71 Member, United States Junior National Ski Team, Rocky Mountain Division.
- 1967 Eagle Scout.

## PUBLICATIONS

### 1. Pending Publications

- Ahn, J., Haberl, J. 2022. "Origins of Whole-building Energy Simulation Programs Used for High Performance Commercial Buildings: Contributions of the NATEOUS, SHEP, TACS, CP-26, CP-33 and RESPTK programs", in preparation.
- Ahn, J., Haberl, J. 2022. "Origins of Whole-building Energy Simulation Programs Used for High Performance Commercial Buildings: Contributions of the ASHRAE TGER Committee", in preparation.
- Li, Q., Haberl, J. 2022. "Prediction of Annual Daylighting Performance Using Inverse Models", in preparation (January).
- Kheiri, F., Haberl, J., Baltazar, J-C, 2022. "Analysis of the Degree-day Method to Estimate Building Energy Consumption Under Varying Humidity conditions", in preparation, (January).
- Kim, C., Haberl, J. 2022. "Occupancy-based Building Energy Models for Commercial Buildings: Impact of Thermal Zoning.", in preparation (January).
- Jung, S., Haberl, J. 2022. "Analysis of Residential Building Energy Code Compliance Based on New and Existing Building Energy Simulation", in preparation, (January).
- Haberl, J., Landsberg, D., Baltazar, J.C., Cheung, H., Perez-Cortines, Rafael, Kim, H., Moha mm ed, A.Q., Shonder, J., West, S. 2022. "ASHRAE's Guideline 14-2022 for Measurement of Energy, Demand, and Water Savings: How to Determine What was Really Saved by the Retrofit", *ASHRAE Journal*, submitted for publication (January).
- Oh, S., Baltazar, J-C., Haberl, J. 2022. "Analysis of a Calibrated Building Energy Simulation for a Residence Using Smart Thermostat Data", *Science and Technology for the Built Environment*, submitted for publication (August).

### 2. Refereed Journal Publications

- Shin, M., Haberl, J. 2022. "Development of a Procedure for Automated Thermal Zoning for Building Energy Simulation", *Journal of Building Engineering*, (January).
- Claridge, D.E., Culp, C.C., Liu, W., Pate, M., Haberl, J., Bynum, J., Tansky, O., Schaff, F. 2021. "A Performance Analysis of the Claridge-Culp-Liu Dehumidification Process: a Novel Approach for Drying Moist Air Based on Membrane Separation, Vacuum Compression and Sub-atmospheric Condensation", *International Journal for Refrigeration*, accepted for publication (November).
- Azizkhani, M., Haberl, J. 2021. "Assessment and discussion of the level of application of passive/natural systems and daylighting systems by practitioners in the US", *Science and Technology in the Built Environment*, Vol. 26, No. 9, ESL-PA-20-06-02 (July).
- Miller, C., Balbach, C., Haberl, J. 2020. "The ASHRAE Great Energy Predictor III Competition: Overview and Results", *Science and Technology for the Built Environment*, Vol 26, No. 10, ESL-PA-20-07-02 (August).
- Oh, S., Haberl, J. Baltazar J-C. 2020. "Analysis methods for characterizing energy savings opportunities from home automation devices using smart meter data", *Energy and Buildings*, Vol. 216, ESL-PA-20-03-01 (June).
- Oh, S., Baltazar, J.C., Haberl, J. 2020. "Analysis of zone-by-zone indoor environmental conditions and electricity savings from the use of a smart thermostat: A residential case study", *Science and Technology for the Built Environment*, Vol. 26, No. 3, ESL-PA-20-03-02 (March).
- Haberl, J., Comstock, S., Hallstrom, A., Stamper, G. 2020. "The Evolution of ASHRAE's Electronic Communication and Publication Technology", *ASHRAE Transactions Research*, Vol. 126, Issue 1, ESL-PA-20-01-01 ( January).
- Shin, M., Baltazar, J.C., Haberl, J.S., Frazier, E., Lynn, R. 2019, "Evaluation of the energy performance of a net-zero energy building in a hot and humid climate", *Energy and Buildings*, Vol. 204, No. 1, ESL-PA-19-12-01 (December).

9. Claridge, D., Culp, C., Liu, W., Pate, M., Haberl, J., Bynum, J., Tansky, O., Schaff, F. 2019. "A New Approach for Drying Moist Air: The Ideal Claridge-Culp-Liu Dehumidification Process with Membrane Separation, Vacuum Compression and Sub-atmospheric Condensation", *International Journal for Refrigeration*, Vol. 101, pp. 211-217, ESL-PA-19-05-01 (May)
10. Farias, F., Kota, S., Jeong, W., Kim, J.B., Bermudez Alcocer, J. L., Haberl, J.S., Clayton, M., Yan, W., 2019. "Development of a Reference Building Information Model (BIM) for Thermal Model Compliance Testing: Part II – Test Cases and Analysis (AT-19-013)", *ASHRAE Transactions Research*, Vol. 125, Issue 1, ESL-PA-19-01-01 (January).
11. Mao, C., Baltazar, J.C, Haberl, J. 2018. "Comparison of Building Envelop Peak Load Design Methods", *Science and Technology for the Built Environment*, Vol. 25, Issue 2 (October).
12. Mao, C., Baltazar, J.C., Haberl, J.S., 2018. "Literature Review of Building Peak Cooling Load Methods in the United States", *Science and Technology for the Built Environment*, Volume 24, No. 3, pp. 228-237, ESL-PA-18-03-01 (March).
13. Kim, H., Haberl, J. 2017. "Field Test of the ASHRAE/CIBSE/USGBC Performance Measurement Protocols: Part I - Intermediate Level Protocols", *Science and Technology for the Built Environment*, Vol. 24, Issue 3, ESL-PA-17-09-02 (September).
14. Kim, H., Haberl, J. 2017. "Field Test of the ASHRAE/CIBSE/USGBC Performance Measurement Protocols: Part II – Advanced Level Protocols", *Science and Technology for the Built Environment*, Vol. 24, Issue 3, ESL-PA-09-03 (September).
15. Song, S., Haberl, J. 2017. "Simplified Field Measurement and Verification of Global Solar Transmittance for Glazing Samples Under Natural Clear-Sky Conditions", *Solar Energy*, Vol. 155, pp. 706 – 714, ESL-PA-17-07-30 (July).
16. Do, S.L., Haberl, J. 2017. "Development of a Ground-coupled Heat Pump System Simulation Model Using G-function Approximation for a Residential Code-compliant Tool", *Building Simulation*, Tsinghua University Press, Vol. 11, No.1, ESL-PA-17-04-01.
17. Do, S.L, Haberl, J.S. 2016. "Development and Validation of a Custom-built Ground Heat Exchanger Model for a Case-Study Building", *Energy and Buildings*, Vol. 119, pp. 242-255, ESL-PA-16-05-01 (May).
18. Clayton, M., Kota, S., Farias, F., Jeong, W., Kim, J.B., Bermudez-Alcocer, J.L., Yan, W., and Haberl, J., 2016, "Development of a Reference Building Information Model (BIM) for Thermal Model Compliance Testing (RP-1468) Part I: Guidelines for Generating Thermal Model Input Files (OR-16-020)", *ASHRAE Transactions Research*, ESL-PA-16-01-01 (January).
19. Oh, S., Haberl, J. 2016. "Origins of the Methods for Simulation of Building Energy Simulation: Part I: Whole Building Energy Use", *Science and Technology for the Built Environment*, Volume 22, Issue 1, pp.118-137, ESL-PA-16-01-02 (January).
20. Oh, S., Haberl, J. 2016. "Origins of the Methods for Simulation of Building Energy Simulation: Part II: Lighting and Daylighting Simulation", *Science and Technology for the Built Environment*, Volume 22, Issue 1, pp. 107-117, ESL-PA-16-01-03 (January).
21. Oh, S., Haberl, J. 2016. "Origins of the Methods for Simulation of Building Energy Simulation: Part III: Solar Thermal, PV and Passive Solar Simulation", *Science and Technology for the Built Environment*, Volume 22, Issue 1, pp. 87-106, ESL-PA-16-01-04 (January)
22. Kota, S., Farias, F., Jeon, W., Kim, J.B., Bermudez, J.L., Clayton, M., Yan, W., Haberl, J. 2016. "Development of a Reference Building Information Model for Thermal Compliance Testing – Part I: Guidelines for Generating Thermal Model Input Files", *ASHRAE Transactions Research*, Vol. 122, No. 1., pp. 256-266, ESL-PA-16-01-05 (January).
23. Do, S.L., Haberl, J. 2016, "Development procedure of an air-source heat pump, base-case simulation model for a code-compliant 6-residential building", *Energy and Buildings*, Vol. 107, pp. 11 – 25, ESL-PA-16-08-01 (August).
24. Kim, A., Haberl, J., Anderson, S. 2015. "Comparisons Between Current Industry Methods and Calibrated As-built, Whole-building Simulation Model for Quantifying Energy Service Projects", *ASCE Journal of Architectural Engineering* ESL-PA-15-12-10 (December).
25. Kim, A., Haberl, J., Anderson, S. (2015). "The Current Industry Methods of Quantifying Energy Service Projects: Key Findings and Lessons Learned", *ASCE Journal of Architectural Engineering* ESL-PA-15-12-01 (December).
26. Kim, K. and Haberl, J. (2015). "Development of a Home Energy Audit Methodology for Determining Energy-Efficient, Cost-effective Measures in Existing Single-Family Houses Using an Easy-to-Use Simulation", *Building Simulation* , Vol. 8, No. 5, pp. 515-528, ESL-PA-15-06-03 (June).
27. Kim, K. and Haberl, J. (2015). "Development of A Methodology for Calibrated Simulation In Single-Family Residential Buildings using Three-Parameter Change-point Model", *Energy and Buildings*, Vol. 99, pp. 140 - 152, ESL-PA-15-04-02 (April).
28. Jeong, W., Kim, J., Clayton, M., Haberl, J., and Yan, W. (2015). "A Framework to Integrate Object-Oriented Physical Modelling with Building Information Modelling for Building Thermal Simulation", *Journal of Building Performance Simulation*, Taylor & Francis, ESL-PA-15-02-01 (February).
29. Kim, J., Jeong, W., Clayton, M., Haberl, J., and Yan, W. (2015). Developing a Physical BIM Library for Building Thermal Energy Simulation, *Automation in Construction*, Elsevier. Volume 50, ESL-PA-14-11-01 (February).
30. Kim, H., Haberl, J., Baltazar, J-C, 2015. "Methodology for Adjusting Residential Cooling and Heating Seasonal Performance Ratings to Exclude Supply Fan Energy", *ASHRAE HVAC&R Journal*, ESL-PA-15-02-03 (February).
31. Kim, H., Haberl, J. 2015. "Improving Monthly Weather-Normalized Energy use Model: Building Energy Use Classification Based on Occupancy", *ASHRAE Transactions-Research*, Vol. 121, Pt.1, ESL-PA-15-01-04 (January).
32. Kim, K., Baltazar, J-C, Haberl, J.S. (2014). "Evaluation of Meteorological Base Models for Estimating Hourly Global Solar Radiation in Texas", *Energy Procedia: 2013 ISES Solar World Conference*, Vol. 57, pp. 1189 – 1198, ESL-PA-14-06-04 (June).
33. Baltazar, J.C., Mao, C., Haberl, J. 2014. "Verification of the Energy Savings From the Implementation of the Residential Building Codes in Texas", *ASHRAE Transactions-Research*, Vol. 120, Pt. 2, ESL-PA-14-06-05 (June).
34. Mukhopadhyay, J., Haberl. 2014. "Reducing Energy Consumption in Grocery Stores" Energy Efficiency Measures for Grocery Stores", *ASHRAE Transactions-Research*, Vol. 120, Pt. 1, ESL-PA-14-01-01 (January).
35. Kota, S., Haberl, J. S., Clayton, M. J., & Yan, W. (2014). Building Information Modeling (BIM)-Based Daylighting Simulation and Analysis. *Energy and Buildings*, Elsevier. Volume 81, October 2014, ESL-PA-14-10-01 pp. 391-403.
36. Jeong, W., Kim, J., Clayton, M., Haberl, J., and Yan, W. (2014). Translating Building Information Modeling to Building Energy Modeling Using Model View Definition, *The Scientific World Journal*, vol. 2014, Article ID 638276, 21 pages, 2014. doi:10.1155/2014/638276, ESL-PA-14-09-01 (September).
37. Song, S., Haberl, J.S. 2013. "Analysis of the Impact of Using Synthetic Data Correlated With Measured Data on the Calibrated As-Built Simulation of a Commercial Building", *Energy and Buildings*, Vol. 67, pp. 97-107, ESL-PA-13-12-01 (December).

38. Mukhopadhyay, J., Haberl, J., 2013. "Reducing Energy Consumption in Grocery Stores: Calibration of a Grocery Store Model", *ASHRAE Transactions-Research*, Vol. 119, Pt. 2, ESL-PA-13-06-01 (June).
39. Kim, H., and Haberl, J. 2012. "Field-Test of the New ASHRAE/CIBSE/USGBC Performance Measurement Protocols: Intermediate and Advanced Level Indoor Environmental Quality Protocols", *ASHRAE Transactions-Research*, Vol. 118, Pt. 2, ESL-PA-12-06-02 (June).
40. Kim, H. and Haberl, J. 2012. "Field-Test of the New ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings: Basic Level", *ASHRAE Transactions-Research*, Vol. 118, Pt. 1, ESL-PA-12-01-03 (January).
41. Akleman, E., Haberl, J., Parke, F., Skaria, S., Halstead, J., Andrews, M. 2010. "Demonstration of the use of Multimedia Electronic Information Enhancements for a Chapter Handbook CD-ROM: Rotating Cylinder & Scroll Compressor Animations (1017-RP)," *ASHRAE Transactions-Research*, ESL-PA-10-01-01 (January).
42. Song, S., Haberl, J. 2008. "A Procedure for the Performance Evaluation of a New Commercial Building: Part II – Overall Methodology and Comparison of Results", *ASHRAE Transactions-Research*, Vol. 114, Pt. 2, pp. 389 – 403; ESL-PA-08-06-02 (June).
43. Song, S., Haberl, J. 2008. "A Procedure for the Performance Evaluation of a New Commercial Building: Part I – Calibrated As-built Simulation", *ASHRAE Transactions-Research*, Vol. 114, Pt. 2, pp. 375-388; ESL-PA-08-06-01 (June).
44. Yuill, G., Haberl, J. 2006. "Accuracy Tests for Simulations for Single Zone, Two Pipe, Four Pipe and Induction Air Handling Systems" *ASHRAE Transactions-Research*, Vol. 112, Pt. 1, ESL-PA-06-01-01 (January).
45. Yuill, G., Haberl, J. 2005. "Accuracy Tests for Simulations of Constant Volume, Dual Duct and Variable Volume Air Handling Systems (4796)," *ASHRAE Transactions-Research*, Vol. 111, Pt. 2, pp. 137-153, ESL-PA-05-06-01 (June).
46. Sreshtaputra, A., Haberl, J., Andrews, M. 2004. "Improving Building Design and Operation of a Thai Buddhist Temple," *Energy and Buildings*, Vol. 36, pp. 481-494. ESL-PA-04-06-01 (June).
47. Claridge, D., Abushakra, B., Haberl, J. 2003. "Electricity Diversity Profiles for Energy Simulation of Office Buildings (1093-RP)," *ASHRAE Transactions-Research*, Vol. 110, Pt. 1, pp. 365-377. ESL-PA-04-02-01 (February).
48. Abushakra, B., Haberl, J., Claridge, D. 2004. "Overview of Literature on Diversity Factors and Schedules for Energy and Cooling Load Calculations (1093-RP)," *ASHRAE Transactions-Research*, Vol. 110, Pt. 1, pp. 164-176. ESL-PA-04-01-01 (January).
49. Kissock, K., Haberl, J., Claridge, D. 2003. "Inverse Model Toolkit (1050RP): Numerical Algorithms for Best-Fit Variable-Base Degree-Day and Change-Point Models," *ASHRAE Transactions-Research*, Vol. 109, Pt. 2, pp. 425-434. ESL-PA-03-07-03 (July).
50. Haberl, J., Claridge, D., Kissock, K. 2003. "Inverse Model Toolkit (1050RP): Application and Testing," *ASHRAE Transactions-Research*, Vol. 109, Pt. 2, pp. 435-448, 2003. ESL-PA-03-07-02 (July).
51. Akleman, E., Haberl, J., Parke, F., Skaria, S., Halstead, J., Andrews, M. 2003. "Demonstration of the use of Multimedia Electronic Information Enhancements for a Chapter Handbook CD-ROM Overview (1017-RP)," *ASHRAE Transactions-Research*, Vol. 109, Pt. 1, pp. 143-150 ESL-PA-03-01-01 (January).
52. Beasley, R., Haberl, J., Turner, D., Claridge, D. 2002. "Development of a Methodology for Baseline the Energy Use of Large Multi-building Central Plants," *ASHRAE Transactions-Research*, Vol. 108, Pt. 1, pp. 251 – 259 ESL-PA-02-01-03 (January).
53. Reddy, T., Elleson, J., Haberl, J. 2002. "Methodology Development for Determining Long-Term Performance of Cool Storage Systems From Short-term Tests," *ASHRAE Transactions-Research*, Vol. 108, Pt. 1, pp. 1085 – 1103 ESL-PA-02-01-02 (January).
54. Elleson, J., Haberl, J., Reddy, T. 2002. "Field Monitoring and Data Validation for Evaluating the Performance of Cool Storage Systems," *ASHRAE Transactions-Research*, Vol. 108, Pt. 1, pp. 1072 - 1084 ESL-PA-02-01-01 (January).
55. Akleman, E. Malek, Z., Haberl, J. 2001 "Functional Based Flow Modeling and Animation," *Journal of Visualization and Computer Animation*, Vol. 12, pp. 181 – 189. ESL-PA-01-07-03 (July).
56. Sreshtaputra, A., Haberl, J., Andrews, M.J. 2001. "3-D Studies of Heat Transfer and Air Flow in an Unconditioned Thai Buddhist Temple," *Journal of Energy, Heat and Mass Transfer*, Vol. 23, pp. 455 – 471. ESL-PA-01-01-02 (January).
57. Reddy, T., Haberl, J., Elleson, J. 1999. "Engineering Uncertainty Analysis in the Evaluation of Energy and cost Savings of Cooling System Alternatives Based upon Field Monitored Data," *ASHRAE Transactions-Research*, Vol. 105, Pt. 2, pp. 1047 - 1057 ESL-PA-99-07-01 (June).
58. Haberl, J., Bou-Saada, T. 1998. "Procedures for Calibrating Hourly Simulation Models to Measured Building Energy and Environmental Data," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 193 - 204 ESL-PA-98-08-06 (August).
59. Haberl, J., Abbas, M. 1998. "Development of Graphical Indices for Viewing Building Energy Data: Part 2," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 162 – 167 ESL-PA-98-08-05 (August).
60. Haberl, J., Abbas, M. 1998. "Development of Graphical Indices for Viewing Building Energy Data: Part 1," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 156 - 161 ESL-PA-98-08-04 (August).
61. Haberl, J., Thamilsaran, S., Reddy, T., Claridge, D., O'Neal, D., Turner, D. 1998. "Baseline Calculations for Measuring and Verification of Energy and Demand Savings in a Revolving Loan Program in Texas," *ASHRAE Transactions-Research*, Vol. 104, Pt. 2, pp. 841 - 858 ESL-PA-98-07-01 (July).
62. Haberl, J., Thamilsaran, S. 1998. "Predicting Hourly Building Energy Use: The Great Energy Predictor Shootout II: Measuring Retrofit Savings," *ASHRAE Journal*, Vol. 40, No. 1, pp. 49 - 56 ESL-TR-95-09-02 (January).
63. Reddy, T., Haberl, J., Saman, N., Turner, W., Claridge, D., Chalifoux, A. 1997. "Baselining Methodology for Facility-Level Monthly Energy Use - Part 2: Application to Eight Army Installations," *ASHRAE Transactions-Research*, Vol. 103, Pt. 2, pp. 348 - 359 ESL-PA-97-07-02 (June).
64. Reddy, T., Haberl, J., Saman, N., Turner, W., Claridge, D., Chalifoux, A. 1997. "Baselining Methodology for Facility-Level Monthly Energy Use - Part 1: Theoretical Aspects," *ASHRAE Transactions-Research*, Vol. 103, Pt. 2, pp. 336 - 347 ESL-PA-97-07-01 (June).
65. Haberl, J., Sparks, R., Culp, C. 1996. "Exploring new Techniques for Displaying Complex Building Energy Consumption Data," *Energy and Buildings*, Vol. 24, pp. 27 – 38. ESL-PA-96-10-01 (October).
66. Haberl, J., Thamilsaran, S. 1996. "Predicting Hourly Building Energy Use: The Great Energy Predictor Shootout II: Measuring Retrofit Savings -- Overview and Discussion of Results," *ASHRAE Transactions-Research*, Vol. 102, Pt. 2, pp. 419 – 435 ESL-PA-96-07-03 (July).
67. Kreider, J., Claridge, D., Curtiss, P., Dodier, R., Haberl, J., Krarti, M. 1995. "Building Energy Use Prediction and System Identification Using Recurrent Neural Networks," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 161 - 166 ESL-PA-95-08-06 (August).

68. McWatters, K., Haberl, J.S. 1995. "A Procedure for Plotting of a Sun-Path Diagram, and Shading Mask Protractor," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 153 - 156 ESL-PA-94-07-04 (July).
69. Haberl, J., Bronson, D., O'Neal, D. 1995. "An Evaluation of the Impact of Using Measured Weather Data versus TMY Weather Data in a DOE-2 Simulation of an Existing Building in Central Texas," *ASHRAE Transactions-Research*, Vol. 101, Pt. 2, pp. 558 - 576 ESL-PA-95-07-03 (July).
70. Liu, M., Athar, A., Reddy, T., Claridge, D., Haberl, J., White, E. 1995. "Reducing Building Operating Costs Using Improved Operation Strategies for Constant Volume Air-Handling Systems," *ASHRAE Transactions-Research*, Vol. 101, Pt. 2, pp. 688 - 700 ESL-PA-95-07-02 (July).
71. Kreider, J., Haberl, J. 1994. "Predicting Hourly Building Energy Usage: The Results of the 1993 Great Energy Predictor Shootout Identify the Most Accurate Method for Making Hourly Energy Use Predictions," *ASHRAE Journal*, Vol. 35, No. 3, pp. 72 - 81 ESL-PA-94-06-02 (June).
72. Kreider, J., Haberl, J. 1994. "Predicting Hourly Building Energy Usage: The Great Energy Predictor Shootout: Overview and Discussion of Results," *ASHRAE Transactions-Research*, Vol. 100, Pt. 2, pp. 1104 - 1118 ESL-PA-94-06-01 (June).
73. Ruch, D., Chen, L., Haberl, J., Claridge, D. 1993. "A Change-Point Principal Component Analysis (CP/PCA) Method for Predicting Energy Usage in Commercial Buildings: The PCA Model," *ASME Journal of Solar Energy Engineering*, ASME, New York, N.Y., Vol. 115, pp. 77 - 84 ESL-PA-93-05-04 (May).
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#### e. Patents and Copyrights

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2. Patent: 8,685,142, "System and method for efficient air dehumidification and liquid recovery with evaporative cooling", U.S. Patent Office, April 1, 2014 (w/C.Culp, D.Claridge).
3. Patent: 8,685,144, "System and method for efficient air dehumidification and liquid recovery", U.S. Patent Office, April 1, 2014 (w/C.Culp, D.Claridge).
4. Patent: 7,962,536, "System and method for remote monitoring and controlling of facility energy consumption", 37 claims, - U.S. Patent Office, June 14, 2011, (w/C.Culp, D.Claridge, D.Turner).
5. Patent Application: 20120118146 "System and Method for Efficient Air DeHumidification and Liquid Recovery", 20 claims, filed with U.S. Patent Office, November 12, 2010, (w/C. Culp, D. Claridge).
6. Patent: 7,552,033 B1, "System and Method for Diagnostically Evaluating Energy Consumption Systems and Components of a Facility", 39 claims – U.S. Patent Office, June 23, 2009, (w/C.Culp, D.Claridge, D.Turner, M.Liu).
7. Patent: 7,356,548 B1, "System and Method for Remote Monitoring and Controlling of Facility Energy Consumption", 45 Claims – U.S. Patent Office, April 8, 2008, (w/C.Culp, D.Claridge, D.Turner).
8. Patent: 7,225,089 B2, "System and Method for Remote Identification of Energy Consumption Systems and Componets", 26 Claims - U.S. Patent Office, May 29, 2007 (w/C.Culp, D.Claridge, D.Turner).

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10. Patent: 6,937,946, "System and Method for Remote Identification of Energy Consumption Systems and Components – Part 1", 21 Claims – U.S. Patent Office, August 30, 2005, (w/C.Culp, D.Claridge, D.Turner).
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## RESEARCH PROJECTS

1979 to present: \$2,902,294 as P.I.

1979 to present: \$41,218,610 as Co P.I.

### 1. External

1. "Measurement and Verification of ESPC Monitoring for Fort Hood Army Base", Co-PI, ½ research associate, 1 graduate student, U.S. Army, Juan-Carlos Baltazar, CoPI, Fort Hood, Texas, \$125,000 October 2021 – April 2022.
2. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2021 to August 2022.
3. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2021 to August 2023.
4. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2019 to August 2021.
5. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2019 to August 2021.
6. Haberl, J.S., Baltazar, J.C., Yazdani, B. 2019, Task 3: "Development of Guidelines for Air Quality Projects", Report for Technical Support Services for the Ohio Air Quality Development Authority, Columbus, Ohio (August). \$75,000, August 2019 to March 2020.
7. Haberl, J.S., Baltazar, J.C., Yazdani, B. 2019, Task 1: "Application Evaluation of the Market Square Project, Cleveland, Ohio", Report for Technical Support Services for the Ohio Air Quality Development Authority, Columbus, Ohio (August). \$75,000, June 2019 to August 2019.
8. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2018 to August 2019.
9. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2018 to August 2019.
10. "Measurement and Verification of Net Zero Building and ESPC Monitoring for Fort Hood Army Base", PI, ½ research associate, 1 graduate student, U.S. Army through Mason & Hanger, Juan-Carlos Baltazar, CoPI, Fort Hood, Texas, \$125,000 September 2018 – December 2019.
11. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2017 to August 2018.
12. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2017 to August 2018.
13. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2016 to August 2017.
14. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2016 to August 2017.

15. "Development of Energy Performance Monitoring and Verification for the T-AKE Vessels", U.S. Navy through Innovative Decisions, Inc., Juan-Carlos Baltazar, CoPI, 1/3 faculty equivalent, 1 graduate student, \$145,000, July 2015 to June 2017.
16. "Measurement and Verification of Net Zero Building and ESPC Monitoring for Fort Hood Army Base", PI, ½ research associate, 1 graduate student, U.S. Army through Mason & Hanger, Juan-Carlos Baltazar, CoPI, Fort Hood, Texas, \$145,371 December 2015 – January 2017.
17. "Hospitality "Building Measurement and Verification for Energy Savings and Indoor Air Quality", Samsung Electronics through Catholic University, PI, March 2015 to December 2016, \$27,678.
18. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Commission on Environmental Quality (TCEQ), Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2015 to August 2016.
19. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Juan-Carlos Baltazar, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$462,043 per year, September 2015 to August 2016.
20. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2014 to August 2015.
21. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$475,000 per year, September 2014 to August 2015.
22. "Benchmarking and Profiling Airport Terminal Energy End Use", PI, ½ research associate, 1 graduate student, National Academy of Sciences, Transportation Research Board, \$387,142, August 2013 – September 2015.
23. "Measurement and Verification of ESPC for Fort Hood Army Base", PI, ½ research associate, 1 graduate student, U.S. Army, Fort Hood, Texas, \$123,441, September 2013 – June 2015.
24. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2013 to August 2014.
25. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$475,000 per year, September 2013 to August 2014.
26. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$475,000 per year, September 2012 to August 2013.
27. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2012 to August 2013.
28. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$475,000 per year, September 2011 to August 2012.
29. "Development of Energy Performance Monitoring and Verification for the T-AKE Vessels", U.S. Navy, 1/3 faculty equivalent, 1 graduate student, \$145,553, May 2012 to December 2013.
30. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2011 to August 2012.
31. "Cost-Effective Energy Efficiency Measure for above 2003 and 2009 IECC Code-Compliant Residential and Commercial Buildings in the City of Arlington", 1 faculty equivalent, 1 graduate student. Bahman Yazdani, CoPI, \$125,000, March 2011 to December 2011.
32. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2010 to August 2011.
33. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2010 to August 2011.
34. "Development of a Reference Building Information Model (BIM) for Thermal Model Compliance Testing", sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 1468-RP, M. Clayton, W. Yan, J. Haberl, Co-P.I., ½ faculty equivalent, 2 graduate students, Texas A&M University, \$175,311, March 2010 to August 2011.
35. "Physical Building Information Modeling for Solar Building Design and Simulation (PBIM)", National Science Foundation, Wei Yan, PI, Mark Clayton, CoPI, 1 faculty equivalent, 3 graduate students, \$300,000, March 2010 to February 2012.
36. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2009 to August 2010.
37. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2009 to August 2010.
38. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2008 to August 2009.
39. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, ½ administrative secretary, ½ faculty equivalent, 1 graduate students, \$216,000 per year, September 2008 to August 2009.
40. "Outdoor Monitoring and High Voltage Bias Testing of Thin Film PV Modules in Hot and Humid Climates," sponsored by the Midwest Research Institute – National Renewable Energy Lab, W.D. Turner, J. Haberl, M. Davis, Co-P.I., 1 research associate, \$30,000 September 2007 to September 2008.

41. "Continuous Commissioning of Dallas Ft. Worth Airport", DFW Airport Authority, Bahman Yazdani, Dan Turner, Charles Culp, \$1,000,000, April 2007 to April 2010.
42. "Technical Assistance to Advance Quantification of Energy and Environmental Benefits from Clean Air", USEPA, Charles Culp, Bahman Yazdani, CoPI, March 2007 to March 2010
43. "Texas Climate Vision", USDOE through the Texas SECO, a joint project with the City of Austin, Bahman Yazdani (PI), Charles Culp (CoPI), Malcolm Verdict (CoPI), \$497,500, 2 research associates, 2 graduate students, September 2007 to August 2008.
44. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2007 to August 2008.
45. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, 1/2 administrative secretary, 1/2 faculty equivalent, 1 graduate students, \$216,000 per year, September 2007 to August 2008.
46. "Continuation of Outdoor Monitoring and High Voltage Bias Testing of Thin Film PV Modules in Hot and Humid Climates," sponsored by the Midwest Research Institute – National Renewable Energy Lab, W.D. Turner, J. Haberl, Co-P.I., 1/4 research associate, \$30,000 June 2007 to March 2008.
47. "Continuation of M&V Technical Assistance- Training Fort Hood; US Army- Fort Hood; Jeff Haberl, PI, \$50,000, 1/2 research engineer, 1/2 research assistant, December 2007 to October 2008.
48. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, 1/2 administrative secretary, 1/2 faculty equivalent, 1 graduate students, \$216,000 per year, September 2006 to August 2007.
49. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2006 to August 2007.
50. "Statewide Air Emissions Calculations from Wind and Other Renewables", funded by the Texas Commission on Environmental Quality (TCEQ) through the Texas Environmental Research Consortium (TERC), Bahman Yazdani, Charles Culp, CoPI, 1 research associate, 1/2 administrative secretary, 1/2 faculty equivalent, 1 graduate students, \$216,000 per year, September 2005 to August 2006.
51. "Senate Bill 5 Energy Program", State of Texas Research & General funds, Bahman Yazdani, Charles Culp, CoPI, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$952,019, September 2005 to August 2006.
52. "Continuation of M&V Technical Assistance- Training Fort Hood; US Army- Fort Hood; Jeff Haberl, PI, \$30,000, 1/4 research engineer, 1/2 research assistant, September 2005 to April 2006.
53. "Savings Analysis Report for Fort Hood", US ARMY- Construction Engineering Research Laboratory; Jeff Haberl, PI, \$5,563, 1/8 research engineer, September 2004 to September 2005.
54. "Advanced Building Efficiency Testbed Initiative," Carnegie Mellon University, D. Claridge, D. Turner, G. Wei, C. Culp, M. Verdict, Co-P.I., \$143,000, 1 research engineer, 2 research assistants, June 2004 to August 2005.
55. "Senate Bill 5 Energy Program," State of Texas Research & General funds, W.D. Turner, B. Yazdani, C. Culp, J. Haberl, Co-P.I., 2 research engineers, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$1,200,000, September 2004 to August 2005.
56. "Senate Bill 5 Energy Program," sponsored by the State of Texas Research & General funds, W.D. Turner, B. Yazdani, C. Culp, J. Haberl, Co-P.I., 2 research engineers, 2 research associates, 3 administrative and secretaries, 1 faculty equivalent, 6 graduate students, \$950,421, September 2003 to August 2004.
57. "Texas Energy Efficiency Calculation Project 2003," sponsored by the Texas Commission on Environmental Quality, J. Haberl, C. Culp, Co-P.I., 1 research engineer, 6 graduate students, \$250,000, November 2003 to August 2004.
58. "Outdoor Monitoring and High Voltage Bias Testing of Thin Film PV Modules in Hot and Humid Climates," sponsored by the Midwest Research Institute – National Renewable Energy Lab, W.D. Turner, J. Haberl, M. Davis, Co-P.I., 1 research associate, \$356,594, September 2003 to September 2006.
59. "Development of Default Costs For Measurement and Verification Cost Estimating Tool," sponsored by the United States Army– Construction Engineering Research Laboratory, J. Haberl, P.I., 1/4 research associate, 1 graduate student, \$32,895, February 2003 to December 2003.
60. "Metering and Monitoring Services for Port Arthur Independent School District," sponsored by the Port Author Independent School District, D. Turner, Co-P.I., 1 research engineer, 1 research associate, 1 graduate student, \$297,759, August 2000 to December 2004.
61. "Senate Bill 5 Energy Program," sponsored by the State of Texas Research & General funds, W.D. Turner, B. Yazdani, C. Culp, J. Haberl, Co-P.I., 1 research engineer, 1 research associate, 3 administrative and secretaries, 1/2 faculty equivalent, 4 graduate students, \$285,000 September 2002 to August 2003.
62. "Metering and Monitoring of GSC's LoanSTAR Loan," sponsored by the Texas General Services Commission, D. Turner, C. Ortiz, Co-P.I., 1/2 research engineer, 1/2 research associate, \$96,322, April 2000 to December 2004.
63. "Interagency Contract with Del Mar College," sponsored by Del Mar College, D. Turner, Co-P.I., 1/8 research associate, \$9,906, January 2001 to June 2002.
64. "Metering and Monitoring Service Agreement with United Independent School District," sponsored by United Independent School District, D. Turner, Co-P.I., 1/4 research associate, \$47,594, March 2001 to August 2005.
65. "Service Agreement between TEES and Federal Reserve Bank of Dallas," sponsored by the Federal Reserve Bank of Dallas, J. Haberl, P.I., 1/2 research engineer, \$46,202, February 2002 to December 2002.
66. "Metering and Monitoring for North Lake College," sponsored by North Lake College, D. Turner, C. Ortiz, Co-P.I., ; Carlos Ortiz; 1/4 research associate, \$39,066, November 1999 to January 2003.
67. "Research Agreement between TEES & CSISD," sponsored by the College Station Independent School District, D. Turner, D. Claridge, Co-P.I., 1 research associate, \$195,000, June 1999 to May 2002.
68. "Energy Management Baseline Measurement and Monitoring Agreement," sponsored by Dallas County Commissioners' Court, D. Claridge, D. Turner, Co-P.I., 2 research associates, \$195,093, November 1997 to December 2003.

69. "Rebuild Texas Plus," sponsored by the U.S.D.O.E. through the Texas State Energy Conservation Office, D. Turner, B. Yazdani, C. Culp, Co-P.I., 1 research engineer, ½ research associate, \$190,000, May 2001 to July 2002.
70. "Rebuild America Grant for Brazos Valley Energy Conservation Coalition," sponsored by the U.S.D.O.E. through the Texas State Energy Conservation Office, D. Turner, D. Claridge and J. Haberl, Co-P.I., 4 research engineers, 3 research associate, 2 graduate students, Texas A&M University, \$499,552, September 1996 to December 2003.
71. "Interagency Cooperation Contract – Alamo Community College District (ACCD) for their Campus – Wide Energy Management Program Rebuild America Initiative," sponsored by the Alamo Community College District, W. Mills, D. Turner, D. Claridge, B. Yazdani, M. Verdict, Co-P.I., 3 research engineers 2 research associates, 4 graduate students, \$1,180,000, January 2002 to November 2004.
72. "Rebuild – Model Communities," sponsored by the Texas State Energy Conservation Office, D. Turner, B. Yazdani, C. Culp, Co-P.I., 1½ research associate, \$100,010, November 2002 to August 2003.
73. "Technical Assistance," sponsored by the Texas State Energy Conservation Office, D. Turner, Co-P.I., 1 research associate, Texas A&M University, \$83,100, September 2002 to August 2003.
74. "Texas LoanSTAR Monitoring and Analysis Program" sponsored by the Texas State Energy Conservation Office, D. Turner, D. Claridge and J. Haberl, Co-P.I., ½ research associate, 1 graduate student, Texas A&M University, \$55,460, September 2002 to August 2003.
75. "Develop M&V System and Baseline at Ft. Hood," sponsored by the U.S. Army Construction Engineering Laboratory, S. Mills, D. Turner, D. Schneider, Co-P.I., J. Haberl, P.I., ½ research engineer, ½ graduate student, \$113,462, May 2001 to December 2003.
76. "Installation of Monitoring and Analysis System and Baseline Analysis," sponsored by the Federal Reserve Bank of Dallas, J. Haberl, D. Claridge, and D. Turner, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$96,000, January 2002 to December 2002.
77. "Legislative Support for Senate Bill 5," sponsored by the Texas State Legislature, C. Culp, B. Yazdani and J. Haberl, Co-P.I., 1 research engineer, 1 research associate, 2 graduate students, 1 secretary, Texas A&M University, \$181,855, September 2001 to August 2002.
78. "Buildings-Related Energy Efficiency RD&D," sponsored by the California Energy Commission through ADM and Associates, J. Haberl, D. Turner, K. Sylvester, C. Culp, Co-P.I., 1 graduate student, Texas A&M University, \$91,313, June 2001 to April 2005.
79. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 1 research associate, ½ graduate student, Texas A&M University, \$261,000, September 2001 to August 2002.
80. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, Texas A&M University, \$40,000, September 2001 to August 2002.
81. "Installation of Monitoring and Analysis System and Baseline Analysis," sponsored by the Federal Reserve Bank of Dallas, J. Haberl, D. Claridge, D. Turner, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$153,000, January 2001 to December 2001.
82. "Development of M&V Costing Toolkit," sponsored by the U.S. Army Construction Engineering Laboratory, J. Haberl, P.I., 1 graduate student, Texas A&M University, \$23,000, August 2001 to December 2001.
83. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 1 research engineer, 1 graduate student, Texas A&M University, \$95,000, September 2000 to August 2001.
84. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, ½ graduate student, Texas A&M University, \$40,000, September 2000 to August 2001.
85. "Installation of Metering System for Central Plant 87018 at Ft. Hood, Texas," sponsored by the U.S. Army Construction Engineering Laboratory, J. Haberl, P.I., ½ research associate, ½ graduate student, Texas A&M University, \$75,602, November 1999 to December 2001.
86. "Technical Support for Analysis of the R.E. Johnson Building," sponsored by the Texas State Energy Conservation Office, J. Haberl, K. Sylvester, D. Turner, Co-P.I., 1 graduate student, Texas A&M University, \$75,000, September 2000 to December 2001.
87. "Development of Monitoring and Analysis Plan and Workshop on Monitoring and Commissioning," sponsored by the Federal Reserve Bank of Dallas, J. Haberl, D. Claridge, D. Turner, Co-P.I., Texas A&M University, \$34,918, February 2000 to April 2001.
88. "Development of a Toolkit for Calculating Linear, Change-point Linear, and Multiple-linear Regression," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 1050-RP through the University of Dayton, D. Claridge and J. Haberl, Co-P.I., 1 graduate student, Texas A&M University, \$23,964, February 1999 to March 2001.
89. "Commissioning Contract with Texas Tech University," sponsored by Texas Tech University, D. Turner, D. Claridge, and J. Haberl, Co-P.I., 2 research associates, 1 graduate student, Texas A&M University, \$294,400, July 1998 to June 2001.
90. "Compilation of Diversity Factors and Schedules for Energy and Cooling Load Calculations," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 1093-RP, D. Claridge, and J. Haberl, Co-P.I., 1 graduate student, Texas A&M University, \$65,082, January 1999 to March 2001.
91. "Demonstration of the use of Multimedia Electronic Information Enhancements for a Chapter Handbook CDROM," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 1017-RP, E. Akleman, J. Haberl, F. Parks, Co-P.I., 2 graduate students, Texas A&M University, \$75,713, February 1999 to February 2001.
92. "Methodology Development to Determine the Long Term Performance of Cool Storage Systems from Short Term Measurements," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 1004-RP, J. Haberl, P.I., 1 graduate student, Texas A&M University, \$86,963, August 1997 to March 2001.
93. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 1 research associate, 1 graduate student, Texas A&M University, \$105,000, September 1999 to August 2000.

94. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, ½ graduate student, Texas A&M University, \$45,000, September 1999 to August 2000.
95. "Monitoring to Support the Montana Rebuild America Program," sponsored by the National Center for Appropriate Technology, J. Haberl, P.I., Texas A&M University, \$12,000, March 1998 to September 2000.
96. "Verification of Retrofit Energy Savings for Brazos County," sponsored by the Brazos County Commissioners, D. Turner, D. Claridge, J. Haberl, Co-P.I., ½ graduate student, Texas A&M University, \$14,993, January 1998 to June 2000.
97. "Utility System Opportunity Assessment and Utilities Strategic Plan," sponsored by the Penn State University System through E<sup>A</sup>3 Consultants, D. Turner, D. Claridge, J. Haberl, Co-P.I., 1 research engineer, 1 research associate, Texas A&M University, \$126,336, September 1997 to March 1999.
98. "Revised Outside Air Quantities at New Brooke Army Medical Center," sponsored by the U.S. Army through Johnson Controls, D. Turner, D. Claridge, J. Haberl, Co-P.I., 2 research engineers, 2 research associates, 2 graduate students, Texas A&M University, \$339,490, December 1998 to February 1999.
99. "Monitoring and Reporting Services for Harwood, St. Paul's, Gessner, and Richmond Buildings," sponsored by Enershop, Inc. through Brazos Energy Systems and Technologies, D. Claridge, J. Haberl, Co-P.I., ½ research associate, Texas A&M University, \$18,100, July 1997 to September 1999.
100. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$75,000, September 1998 to August 1999.
101. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, ½ graduate student, Texas A&M University, \$50,000, September 1998 to August 1999.
102. "Energy Management Baseline Measurement and Monitoring Agreement," sponsored by the Brazos County Commissioners, D. Turner, D. Claridge, and J. Haberl, Co-P.I., 2 research engineers, 2 graduate students, Texas A&M University, \$196,500, November 1997 to November 1999.
103. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 1 research engineer, 2 graduate students, Texas A&M University, \$125,000, September 1997 to August 1998.
104. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, ½ graduate student, Texas A&M University, \$50,000, September 1997 to August 1998.
105. "Rebuild America Grant for Brazos Valley Energy Conservation Coalition," sponsored by the U.S.D.O.E., D. Turner, D. Claridge, J. Haberl, Co-P.I., 5 research engineers, 5 graduate students, Texas A&M University, \$449,552, September 1996 to August 2001.
106. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge and J. Haberl, Co-P.I., 1 research engineer, 2 research associates, 2 graduate students, Texas A&M University, \$266,903, September 1996 to August 1997.
107. "Texas LoanSTAR Monitoring and Analysis Program: Task C – Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., 1 research associate, 1 graduate student, Texas A&M University, \$100,000, September 1996 to August 1997.
108. "Development of Accuracy Tests for HVAC System Models," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 865-RP through Penn State University, J. Haberl, P.I., ½ research associate, Texas A&M University, \$25,000, April 1996 to August 2002.
109. "Support Work for the U.S.D.O.E. National Energy Monitoring and Verification Protocols (NEMVP), sponsored by the U.S.D.O.E., through Lawrence Berkeley National Laboratory (LBNL), J. Haberl, P.I., Texas A&M University, \$4,600, September 1995 to December 1995.
110. "Advise United States Army on Energy Consumption Baseline procedures for Ft. Hood: Part II," sponsored by the U.S. Army Construction Engineering Laboratory, J. Haberl, D. Claridge, D. Turner, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$60,000, October 1995 to December 1995.
111. "Transfer of LoanSTAR Monitoring and Analysis to TESCOR," sponsored by Tamblyn Engineering Services Corp., Toronto, Ontario, Canada, J. Haberl, D. Claridge, D. Turner, Co-P.I., 1 research associate, Texas A&M University, \$50,000, September 1995 to August 1997.
112. "Advise United States Army on Energy Consumption Baseline procedures for Ft. Hood: Part I," sponsored by the U.S. Army Construction Engineering Laboratory, J. Haberl, D. Claridge, D. Turner, Co-P.I., ½ research associate, 1 graduate student, Texas A&M University, \$56,000, June 1995 to September 1995.
113. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 2 research associate, 1 research engineer, 3 graduate students, Texas A&M University, \$257,900, September 1995 to August 1996.
114. "Texas LoanSTAR Monitoring and Analysis Program: Task C - Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., 1 research associate, 2 graduate students, Texas A&M University, \$100,000, September 1995 to August 1996.
115. "State of Minnesota/Northern States Power Monitoring Project," sponsored by the State of Minnesota and Northern States Power, D. Turner, D. Claridge, D. O'Neal, J. Haberl, Co-P.I., 2 research associates, 2 graduate students, Texas A&M University, \$153,999, June 1995 to June 2000.
116. "Special Proprietary Software Development Project," sponsored by Honeywell, Inc., J. Haberl, D. Claridge, Co-P.I., Texas A&M University, \$45,000, June 1995 to December 1995.

117. "Support Work for Pacific Gas and Electric Contract for Statewide Measure Performance Study," sponsored by the Pacific Gas and Electric Company through Proctor Engineering, J. Haberl, P.I., Texas A&M University, \$2,520, January 1995 to December 1995.
118. "LoanSTAR Monitoring and O&M Workshop," sponsored by the Western Area Power Authority, J. Haberl, M. Liu, Co-P.I., Texas A&M University, \$5,500, May 1995.
119. "Calibrated Simulation Work for the U.S.E.P.A. Energy Star Buildings Program," sponsored by the U.S.E.P.A. through EnviroManagement Consultants, Washington D.C., D. Claridge, M. Liu, J. Haberl, Co-P.I., Texas A&M University, \$24,950, June 1994 - September 1994.
120. "Development of Pennsylvania Green Buildings Program Quality Assurance System," sponsored by the Pennsylvania Green Buildings Program through the National Center for Appropriate Technology (NCAT), D. Claridge, J. Haberl, Co-P.I., Texas A&M University, \$10,273, December 1995 to January 1995.
121. "FlaSTAR - Development of monitoring program for the State of Florida's revolving loan program," sponsored by the Florida Energy Conservation Office, D. Turner, D. Claridge, J. Haberl, Co-P.I., ½ research associate, Texas A&M University, \$41,500, January 1995 to December 1995.
122. "Development of Computerized Energy Management System," sponsored by the Texas Department of Criminal Justice, D. Turner, D. Claridge and J. Haberl, Co-P.I., 2 research associates, 1 research engineer, 1 graduate student, Texas A&M University, \$387,147, January 1995 - August 1995.
123. "Advanced Audit/Prescreening Methods," sponsored by Oak Ridge National Laboratory, J. Haberl, P.I., 2 graduate students, Texas A&M University, \$65,000, January 1995 to December 1995.
124. "PRISM analysis and support work," sponsored by the Texas Department of Housing and Community Affairs, D. Claridge and J. Haberl, Co-P.I., ½ graduate student, Texas A&M University, \$7,500, September 1994 to April 1995.
125. "Support Work for the U.S.E.P.A. Energy Star Buildings Program," sponsored by the U.S.E.P.A. through EMC Consultants, Washington D.C., D. Claridge, J. Haberl, Co-P.I., ½ research associate, Texas A&M University, \$25,000, June 1994 to September 1994.
126. "Support Work for the U.S.E.P.A. Energy Star Buildings Program," sponsored by the U.S.E.P.A. through ICF Consultants, Washington D.C., J. Haberl, P.I., Texas A&M University, \$5,000, July 1994 to September 1994.
127. "Special Proprietary Diagnostics Project," sponsored by Honeywell, J. Haberl, D. O'Neal, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$40,000, June 1994 to December 1994.
128. "Monitoring of the Old Executive Office Building to Verify the Greening of the White House," sponsored by the U.S.D.O.E. through Sandia National Laboratory, J. Haberl, D. Claridge, D. Turner, Co-P.I., ½ research associate, Texas A&M University, \$17,000, March 1994 to August 1995.
129. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$35,000, September 1994 to August 1995.
130. "Texas LoanSTAR Monitoring and Analysis Program: Task C - Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., ½ research associate, 1 graduate student, Texas A&M University, \$75,000, September 1994 to August 1995.
131. "Methodology Development to Measure *in-situ* Chiller, Fan, and Pump Performance," sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Research Project 827-RP, through the University of Colorado, J. Haberl and D. Claridge, Co-P.I., ½ graduate student, Texas A&M University, \$17,549, May 1994 - December 1995.
132. "Preliminary Study of O&M Opportunities," sponsored by the University of Texas Medical Branch Galveston, D. Claridge, J. Haberl, Co-P.I., ½ research associate, ½ graduate student, Texas A&M University, \$25,440, February 1994 - July 1994.
133. "Special Proprietary Software Development Project," sponsored by Honeywell, J. Haberl, D. Claridge, Co-P.I., 1 graduate student, Texas A&M University, \$25,000, January 1994 to December 1994.
134. "Analysis of Thermal and Electrical Savings from the Forrestal Third Party Lighting Retrofit," sponsored by the U.S.D.O.E. through Sandia National Laboratory, J. Haberl, P.I., 1 research associate, Texas A&M University, \$33,440, February 1994 to December 1994.
135. "Advanced Audit/Prescreening Methods," sponsored by the U.S.D.O.E. through Martin Marietta, Oak Ridge National Laboratory, J. Haberl, P.I., 1 graduate student, Texas A&M University, \$35,000, November 1993 to November 1994.
136. "An Evaluation of Energy Savings from LoanSTAR Retrofits and Improved Commercial Air Conditioning Systems," sponsored by the U.S.E.P.A., J. Haberl, D. O'Neal, D. Claridge, Co-P.I., 2 research associates, 2 graduate students, Texas A&M University, \$194,278, October 1993 to May 1996.
137. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas State Energy Conservation Office, D. Claridge, J. Haberl, Co-P.I., 1 research associate, Texas A&M University, \$35,000, September 1993 to August 1994.
138. "Texas LoanSTAR Monitoring and Analysis Program: Task C - Data Collection and Archiving," sponsored by the Texas State Energy Conservation Office, J. Haberl, P.I., 1 research associate, 1 graduate student, Texas A&M University, \$75,000, September 1993 to August 1994.
139. "Monitor the Effectiveness of a Thermal Storage System at the Austin Convention Center," sponsored by the City of Austin, J. Haberl, D. O'Neal, D. Claridge, Co-P.I., 1 graduate student, Texas A&M University, \$33,191, March 1993 to March 1994.
140. "Energy Audit Review and Development," sponsored by the Texas Governor's Energy Office, J. Haberl, P.I., 1 graduate student, Texas A&M University, \$35,000, December 1992 to August 1994.
141. "Texas LoanSTAR Monitoring and Analysis Program: Task D – Analysis and Planning," sponsored by the Texas Governor's Energy Office, D. Claridge, J. Haberl, Co-P.I., Texas A&M University, 1 research associate, 1 graduate student, \$72,627, September 1992 to August 1993.
142. "Texas LoanSTAR Monitoring and Analysis Program: Task C - Data Collection and Archiving," sponsored by the Texas Governor's Energy Office, J. Haberl, P.I., Texas A&M University, 2 research associates, 2 graduate students, \$131,629, September 1992 to August 1993.

143. "Special Proprietary Software Development Project," sponsored by Honeywell, J. Haberl, D. Claridge, Co-P.I., Texas A&M University, 1 research associate, 1 graduate student, \$50,000, January 1993 to December 1993.
144. "Evaluate and Report on the Effectiveness of the Energy Conservation Options at the U.S.D.O.E. Headquarters Daycare Center," sponsored by the U.S.D.O.E., through Sandia National Laboratory, J. Haberl, D. Claridge, Co-P.I., 1 graduate student, Texas A&M University, \$26,728, June 1992 to May 1993.
145. "Special Proprietary Software Development Project," sponsored by Honeywell, J. Haberl, D. Claridge, Co-P.I., 1 graduate student, Texas A&M University, \$30,000, May 1992 to December 1992.
146. "Development of Monitoring Requirements for Measuring Energy-Saving Retrofits in Commercial Buildings," sponsored by the U.S.D.O.E., through Martin Marietta, Oak Ridge National Laboratory, J. Haberl, P.I., 1 research associate, Texas A&M University, \$32,773, September 1991 to August 1992.
147. "Texas LoanSTAR Monitoring and Analysis Program: Task 6: Improved Energy Audit," sponsored by the Texas Governor's Energy Office, J. Haberl, D. Claridge Co-P.I., 2 graduate students, Texas A&M University, \$64,000, September 1991 to August 1992.
148. "Texas LoanSTAR Monitoring and Analysis Program: Task 4: Systems Communications Testing," sponsored by the Texas Governor's Energy Office, J. Haberl, P.I., 2 research associates, 2 graduate students, Texas A&M University, \$195,000, September 1991 to August 1992.
149. "Use of Energy Management and Control Systems for Performance Monitoring of Retrofit Projects," sponsored by the U.S.D.O.E., J. Haberl, D. Claridge, Co-P.I., 2 graduate students, Texas A&M University, \$91,717, September 1990 to August 1992.
150. "Analysis of Historical Energy Consumption for the Texas Prairie View A&M Campus," sponsored by the Texas Governor's Energy Management Center, J. Haberl, D. Claridge, Co-P.I., Texas A&M University, \$10,000, March 1990 to August 1990.
151. "Texas LoanSTAR Monitoring and Analysis Program: Task 4: Systems Communications Testing," sponsored by the Texas Governor's Energy Management Center, J. Haberl, P.I., 1 research associate, Texas A&M University, \$122,000, September 1990 to August 1991.
152. "Texas LoanSTAR Monitoring and Analysis Program: Task 4: Systems Communications Testing," sponsored by the Texas Governor's Energy Management Center, J. Haberl, D. Claridge Co-P.I., 1 research associate, 1 graduate student, Texas A&M University, \$75,000, September 1989 to August 1990.
153. "Exploratory Analysis Toward Extending the Princeton Scorekeeping Method (PRISM H/C) for Application to Commercial Buildings," sponsored by the New Jersey Energy Conservation Laboratory (NJECL), M. Fels, C. Reynolds, L. Norford, A. Reddy, P. Komor, J. Haberl, Co-P.I., Princeton University, \$100,000, August 1988 to June 1989.
154. "Development of Advanced Graphics as Feedback to Building Operators," sponsored by the New Jersey Energy Conservation Laboratory (NJECL), P. Komor, L. Norford, W. Kempton, J. Haberl, Co-P.I., Princeton University, \$10,000, September 1988 to June 1989.
155. "Development of a Data-driven Commercial Building Energy Audit," sponsored by the New Jersey Energy Conservation Laboratory (NJECL), J. Haberl, L. Norford, P. Komor Co-P.I., Princeton University, \$50,000, October 1988 to June 1989.
156. "Development of a Quasi-real Time Expert System for a Commercial Office Building," sponsored by the New Jersey Energy Conservation Laboratory (NJECL), J. Haberl, L. Norford Co-P.I., Princeton University, \$10,000, March 1988 to December 1988.
157. "Development of a Microcomputer Monitoring and Forecasting System for the U.S.D.O.E. Forrestal and Germantown Facility," sponsored by the U.S.D.O.E., Contract: AP-0187-MA-60741 (J. Vajda), J. Haberl, P.I., Management Information Systems, \$10,000, October 1986 to February 1988.
158. "Feasibility Study of an Automated Information System for Restaurants," sponsored by The Bailey Company (Mr. Ray Mueller), J. Haberl, P.I., J.S. Haberl & Associates, Management Information Support, \$7,500, effort, 1987.
159. "Building Energy Computer Simulation Training Programs Support," sponsored by Rockwell International, Rocky Flats Plant, and Contract: ASC-60908-PB (A. Eden), J. Haberl, P.I., J.S. Haberl & Associates, \$16,000, 1985 to 1987.
160. "The Design Scheduling Software System," U.S.D.O.E., sponsored by Rockwell International, Rocky Flats Plant, Contract: ASC-60908-PB (D. Kava), J. Haberl, P.I., J.S. Haberl & Associates, \$12,000, 1983 to 1985.

## 2. Internal

1. "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, CoPI, 09-01-05/08-31-06; \$999,500
2. "Contract for Engineering Services for FY04-05," Sponsored by the Texas A&M University, Physical Plant; S. Deng, D. Claridge, W.D. Turner, J. Haberl, Co-P.I., 6 research associates, 3 graduates students, \$700,000, July 2004 to July 2005.
3. "Contract for Engineering Services for FY03-04," Sponsored by the Texas A&M University, Physical Plant; S. Deng, D. Claridge, W.D. Turner, J. Haberl, Co-P.I., 8 research associates, 4 graduates students, \$850,000, July 2003 to July 2004.
4. "Intrasystem Agreement Between TEES and Prairie View A&M University," sponsored by Prairie View A&M University, D. Turner, D. Claridge, B. Yazdani, Co-P.I., 2 research engineers, 2 research associates, 2 graduate students, \$1,342,650, June 2002 to August 2006.
5. "Electric Deregulation Project: the Texas A&M University System Admin. & General Offices," sponsored by Texas A&M University System, D. Turner, Co-P.I., ½ research engineer, 1 graduate student, \$70,000, January 2002 to December 2002.
6. "Intrasystem Agreement for Engineering Services," sponsored by Texas A&M University – Physical Plant, D. Turner, D. Claridge, J. Haberl, Co-P.I., 1 research engineers, 3 research engineers, 2 graduate students, \$425,000, September 2002 to August 2003.
7. "Physical Plant Engineering Services Agreement," sponsored by Texas A&M University, D. Turner, D. Claridge, D. O'Neal, J. Haberl, Co-P.I., 2 research engineers, 6 research engineers, 3 graduate students, \$850,000, Texas A&M University, September 2001 to August 2002.
8. "Support for the Study of Energy Efficient Religious Temples in Thailand," sponsored by the Texas A&M University College of Architecture, J. Haberl, P.I., 1 graduate student, \$1,100, Texas A&M University, 1999 to 2001.



9. "Support for the Study of Energy Efficient Housing in Texas," sponsored by the Texas A&M College of Architecture, J. Haberl, P.I., 1 graduate student, \$641, Texas A&M University, 1999 to 2001.
10. "Physical Plant Engineering Services Agreement," sponsored by Texas A&M University, D. Turner, D. Claridge, D. O'Neal, J. Haberl, Co-P.I., 5 research associates, 2 research engineers, 6 graduate students, \$1,250,000, Texas A&M University, August 1998 to July 2000.
11. "Development of Energy Efficient Housing for Low Income Texas Residents," sponsored by the Texas A&M Center for Energy and Mineral Resources, J. Haberl, P.I., 1 graduate student, \$24,733, Texas A&M University, June 1997 to June 2002.
12. "Physical Plant Engineering Services Agreement," sponsored by Texas A&M University, D. Claridge, D. Turner, M. Liu, J. Haberl, Co-P.I., 5 research engineers, 3 graduate students, \$625,000, Texas A&M University, August 1998 to July 1999.
13. "Baseline and Modeling Project for Prairie View A&M," sponsored by Prairie View A&M University, D. Claridge, J. Haberl, Co-P.I., 1 graduate student, \$10,000, Texas A&M University, September 1997 to December 1998.
14. "Engineering Evaluation of the Central Utility Plant," sponsored by Texas A&M University, D. Turner, D. Claridge, J. Haberl, Co-P.I., 1 research engineer, 2 research associates, 6 graduate students, \$225,000, Texas A&M University, March 1997 to March 1998.
15. "Commissioning and Engineering Services for the TAMU Physical Plant Energy Office," sponsored by Texas A&M University, D. Turner, D. Claridge, D. O'Neal, J. Haberl, Co-P.I., 1 research engineer, 2 research associates, 6 graduate students, \$341,000, Texas A&M University, September 1996 to August 1997.
16. "Monitoring and Operational Improvements on A&M Campus Buildings," sponsored by Texas A&M University, D. Turner, D. Claridge, D. O'Neal, J. Haberl Co-P.I., 3 graduate students, 3 research associates, \$1,750,000, Texas A&M University, June 1995 to March 1998.
17. "Development of whole-campus energy consumption indices for the Princeton University Campus," sponsored by the Facilities Engineering Department, J. Haberl, P.I., \$10,000, Center for Energy and Environmental Studies, Princeton University, Spring 1989.
18. "Energy Conservation Study for the University of Colorado Memorial Center," University of Colorado Memorial Center, P. Brothers, J. Haberl, Co-P.I., four graduate students, \$30,000, University of Colorado, 1986 to 1987.
19. "Energy Conservation Study for the University of Colorado Student Housing Administration," University of Colorado Student Housing Administration, P. Brothers, J. Haberl, Co-P.I., four graduate students, University of Colorado, \$20,000, 1986 to 1987.
20. "Energy Conservation Study for the University of Colorado Rec Center," University of Colorado Student Recreation Center, J. Dow, D. Claridge, J. Haberl, Co-P.I., four graduate students, \$60,214, University of Colorado, 1979 to 1987.

**3. Support from Research or Other Funds**

Year	Fall	Spring	Summer
2021	Full-time Teaching	Full-time Teaching	Full-time Research
2020	Full-time Teaching	Full-time Teaching	Full-time Research
2019	Full-time Teaching	Full-time Teaching	Full-time Research
2018	Full-time Teaching	Full-time Teaching	Full-time Research
2017	Full-time Teaching	Full-time Teaching	Full-time Research
2016	Full-time Teaching	Full-time Teaching	Full-time Research
2015	Full-time Teaching	Full-time Teaching	Full-time Research
2014	Full-time Teaching	Full-time Teaching	Full-time Research
2013	Full-time Teaching	Full-time Teaching	Full-time Research
2012	Full-time Teaching	Full-time Teaching	Full-time Research
2011	Full-time Teaching	Full-time Teaching	Full-time Research
2010	Full-time Teaching	Full-time Teaching	Full-time Research
2009	Full-time Teaching	Full-time Teaching	Full-time Research
2008	Full-time Teaching	Full-time Teaching	Full-time Research
2007	Half-time Research	Full-time Teaching	Full-time Research
2006	Full-time Teaching	Full-time Teaching	Full-time Research
2005	Full-time Teaching	Full-time Teaching	Full-time Research
2004	Full-time Teaching	Full-time Teaching	Full-time Research
2003	Full-time Teaching	Full-time Teaching	Full-time Research
2002	Full-time Teaching	Half-time Research	Full-time Research
2001	Half-time Research	Full-time Teaching	Full-time Research
2000	Full-time Teaching	Full-time Teaching	Full-time Research
1999	Full-time Teaching	Full-time Teaching	Full-time Research
1998	Full-time Teaching	Full-time Teaching	Full-time Research
1997	Half-time Research	Full-time Teaching	Full-time Research
1996	Full-time Research	Full-time Teaching	Full-time Research
1995	Half-time Research	Half-time Teaching	Full-time Research
1991-94	Half-time Research	Half-time Teaching	Full-time Research
1990	Half-time Research	Half-time Teaching	Full-time Research

**TEACHING ACTIVITIES**

TAMU – ARCH 620	“Building Performance Measurement”	Performance measurement strategies for buildings, including: instrumentation and sensors, data collection and data management, weather data requirements, regression or inverse data analysis methods, calibrated whole-building energy simulation, calibrated simplified HVAC system simulation; measurement and analysis of indoor environmental conditions and building water use; baseline strategies; state and federal standards; case studies of commercial building applications.
TAMU – ARCH 681	“Ph.D., M.S. Seminar”	Discussion and review of current practice of Ph.D., and M.S. studies in Architecture.
TAMU – ARCH 435	“Integrated Systems”	An understanding of how to integrate sustainable environmental systems into a building through good design: lectures are provided as a support to studio; systems faculty participate in studio critiques throughout the project.
TAMU – ARCH 335	“Fundamentals of Environmental Systems”	Fundamentals of building environmental systems, including: plumbing, electricity design, lightning protection, acoustics, drainage systems, psychrometrics, solar shading, heating, cooling, lighting and transportation systems.
TAMU – ARCH 621	“Energy Optimization in Building Design”	Simulation of building HVAC systems using the DOE-2 computer simulation program, including the calibrated simulations using data gathered from actual buildings.
TAMU – ARCH 633	“Architectural Systems II”	Building environmental systems, including: site analysis, psychrometrics, comfort, daylighting, shading, acoustics, and economics.
TAMU – ARCH 619	"Special Topics in Applied Solar Energy"	Fundamentals of Solar Energy and its conversion, including: solar radiation, fluid mechanics, heat transfer, methods of solar collection and thermal conversion, system analysis, components and economics.
TAMU- ARCH 334	“Architectural Systems I”	Fundamentals of building environmental systems, including: plumbing, electricity design, lightning protection, acoustics, and transportation systems, and drainage systems.
TAMU – ARCH 333/233	“Environmental Systems Concepts”	Fundamentals of building environmental systems, including: psychrometrics, solar shading, heating, cooling and lighting systems.
TAMU – ARCH 615	“Elements of Environmental Control Systems”	Fundamentals of building environmental systems, including: plumbing, electricity design, lightning protection, acoustics, drainage systems, psychrometrics, solar shading, heating, cooling and lighting systems.
TAMU – MEEN 665	“Application of Energy Management”	Calculate energy saving opportunities in commercial buildings using the DOE-2 energy simulation program: includes calibrated simulations using data gathered from actual buildings.
TAMU – MEEN 630	"Intermediate Heat Transfer"	Intermediate heat transfer covering conduction heat transfer using separation of variables, and lumped systems, convection boundary conditions, convection integral solutions, numerical methods, heat and mass transfer, convection correlations, radiation, view factors, and heat exchangers.
TAMU – MEEN 461	"Heat Transfer"	Fundamentals of Heat Transfer, including: 1-D, 2-D, and 3-D steady-state and transient conduction, radiation, view factors, convection, heat exchangers, boiling and condensation.
TAMU – MEEN 462	"Applied Solar Energy"	Fundamentals of Solar Energy and its conversion, including: fundamentals of solar radiation, fluid mechanics, heat transfer,

		methods of solar collection and thermal conversion, system analysis, components and economics.
TAMU – MEEN 436	"Principles of Heating, Ventilating, and Air Conditioning"	Fundamentals of refrigeration, cryogenics, psychrometrics, fluids analysis, piping design, fans, pumps, AHUs, cooling towers, and heat exchangers.
TAMU – MEEN 437	"Principles of Building Energy Analysis"	Fundamentals of heat transfer in buildings, cooling/heating load calculations, building simulation, and building energy analysis techniques.
Univ. of Colorado Arch. Eng. 350	"Mechanical Systems for Buildings – Part I"	Fundamentals of electrical system, plumbing, mechanical systems, and fire safety.
Univ. of Colorado Arch Eng. 508	"Advanced Building Energy Analysis"	Fundamentals of building energy simulation using the DOE-2 computer simulation program and the SERIRES program, including: BDL language understanding, engineering fundamentals of program algorithms, and advanced programming features.

**STUDENT RESEARCH ADVISING**

**1. Masters**

**Chair or CoChair of M.S. Committee (20 completed)**

Jounghwan Ahn	“Origins of Whole-Building Energy Simulation Programs Used for High Performance Commercial Buildings: Contributions of the MATEUS, SHEP, TACS, CP-26, CP-33 and RESPTK Programs”, Department of Architecture	August 2019
Jong-Hyo Choi	“Analysis of the Impact of Using Improved Multi-layer Window Models for Code-Compliant Residential Building Energy Simulation in Texas”, Department of Architecture	December 2014
Hongyun Zhou	“High-Rise Residential Building Energy Analysis in Shanghai, China”, Department of Architecture	August 2014
Sukjoon Oh	“Origins of Analysis Methods in Energy Simulation Programs used for High Performance Commercial Buildings” Now a Ph.D. Student , Texas A&M	August 2013
Eduardo Ramirez	“Engineering Design, Construction, Operation and Analysis of the 2007 Texas A&M University Solar Decathlon House” (Final Examination Report), Co-chair with D.Turner.	May 2008
Mini Malhotra	“An Analysis of Maximum Residential Energy-Efficiency in Hot and Humid Climates” Department of Architecture. Now a Ph.D. Student, Texas A&M.	December 2005
Jaya Mukopadhyay	“Analysis of Improved Fenestration for Code-Compliant Residential Buildings in Hot and Humid Climates” Department of Architecture. Now a Ph.D Student, Texas A&M.	August 2005
Piljae Im	“A Methodology to Evaluate Energy Savings and NOx Emissions Reductions From the Adoption of the 2000 International Energy Conservation Code (IECC) to New Residences in Non-attainment and Affected Counties in Texas,” Department of Architecture. Now a Ph.D. Student, Texas A&M.	December 2003
Nayarat Rungchareonrat	“An Analysis of Energy Reductions from the Use of Daylighting in Low-cost Housing,” Department of Architecture.	August 2003
Pattarayut Chulsukon	“Development and Analysis of a Sustainable Low Energy House in a Hot and Humid Climate,” Department of Architecture.	August 2002
Peter Klima	“Improving the Reliability and Accuracy of a Multipyranometer Array Measuring Solar Radiation,” Department of Architecture.	December 2000

Rodney Beasley	“A Methodology for Baseline Energy Use at Large Campus Utility Plants for the Purpose of Measurement of Retrofit Savings,” Mechanical Engineering Department, Co-Chair w/D. Turner.	August 1999
David Landman	“Development of Pre-Screening Indices to Improve Energy Analysis of Public K-12 Schools”, Mechanical Engineering Department.	May 1998
Bryce Munger	“An Improved Multipyranometer Array for the Measurement of Direct and Diffuse Solar Radiation,” Mechanical Engineering Department, Co-Chair w/D. Turner.	December 1997
Jim Watt	“Development of Empirical Temperature and Humidity-based Degraded-condition Indicators for Low-tonnage Air Conditioners,” Mechanical Engineering Department, Co-Chair w/D. O’Neal.	December 1997
Fleming, Jason	“Simplified Thermoeconomic Approach to Cost Allocation in a Combined Cycle Cogeneration and District Energy System,” Mechanical Engineering Department, Co-Chair w/D. Claridge.	May 1997
Michelle Schmode	“Performance of Energy Management Control Systems (EMCS) in Selected LoanSTAR Buildings,” Department of Mechanical Engineering, Co-Chair w/D. Claridge.	August 1995
Tarek Bou-Saada	“An Improved Procedure for Developing a Calibrated Hourly Simulation Model of an Electrically Heated and Cooled Commercial Building,” Department of Mechanical Engineering.	December 1994
Mustafa Abbas	“Development of Graphical Indices for Building Energy Data,” Department of Mechanical Engineering.	December 1993
Ralph Cox	“An Analysis of Grocery Store Energy Use,” Department of Mechanical Engineering.	December 1993

## B. Doctorate

### Chair or CoChair of Ph.D. Committee (30 completed)

Sungkyun Jung	“Analysis of Residential Building Energy Code Compliance for New and Existing Buildings Based on Building Energy Simulation”, Department of Architecture.	December 2020
Qinbo Li	“Analysis of Optimal Façade System Design in High Performance Buildings”, Department of Architecture.	December 2020
Farshad Kheiri	“An Improved Method for the Estimation of the Energy Consumption and Savings of Code-Compliant Office Buildings in Different Climates”, Department of Architecture.	December 2020
Chul Kim	“A Study of Occupancy-Based Smart Building Controls in Commercial Buildings”, Department of Architecture.	December 2020
Sandeep Kota	“Development of a Prototype for Integrating Building Information Model (BIM) with Daylighting Simulation Tools for Designing High-Performance Buildings”, Department of Architecture.	June 2020
Mehdi Azizkani	“Investigating the Level of Application of Passive/Natural Systems in the Design of Sustainable Buildings in the U.S.”, Department of Architecture	June 2019
Minjae Shin	“Development of a Procedure for Automating Thermal Zoning for Building Energy Simulation”, Department of Architecture	August 2018
Sukjoon Oh	“Quantifying the Electricity Savings from the use of Home Automation Devices in a Residence”, Department of Architecture	December 2017

Chunliu Mao	“Analysis of Building Peak Cooling Load Calculation Methods for Commercial Buildings in the United States”, Department of Architecture	April 2016
Georgina Davis	“A Study of Remote, Cold Regions Habitations and Design Recommendations for New Dormitory Buildings in McMurdo Station, Antarctica”, Department of Architecture	June 2015
Jose Bermudez	“An Analysis of a Low-Energy, Low-Water Use Community in Mexico City”, Department of Architecture	August 2014
Kee Han Kim	“Development of an Improved Methodology for Analyzing Existing Single-Family Residential Energy Use”, Department of Architecture	August 2014
Sung Lok Do	“Development and Application of a Ground-Coupled Heat Pump Simulation Model for Residential Code-Compliant Simulation in Texas”, Department of Architecture	May 2014
Amy Kim	“A Comparative Analysis of Predicting Energy Savings From Energy Service Projects”, Civil Engineering Department (Co-Chair w/Stuart Anderson)	May 2014
Jaya Mukhopadhyay	“An Analysis of Energy Consumption in Grocery Stores in a Hot and Humid Climate”, Department of Architecture	August 2013
Hyojin Kim	Methodology for Rating a Building’s Overall Performance Based on ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings	December 2012
Mini Malhotra	“An Analysis of Off-grid, Off-pipe Housing in Six U.S. Climates”, Department of Architecture, now at Oak Ridge National Laboratory, Oak Ridge, TN.	December 2009
Piljae Im	“Methodology for the Preliminary Design of High Performance Schools in Hot and Humid Climates”, Department of Architecture, now at Oak Ridge National Laboratory, Oak Ridge, TN.	December 2009
Soolyeon Cho	“Methodology to Develop and Test an Easy-to-use Procedure for the Preliminary Selection of High-performance Systems for Office Buildings in Hot and Humid Climates”. Department of Architecture, now Assistant Professor Catholic University, Washington, D.C.	August 2009
Sopa Visitsak	“An Evaluation of the Bioclimatic Chart for Choosing Design Strategies for a Thermostatically-controlled Residence in Selected Climates”, Department of Architecture, Now Assistant Professor, Kasetsart University, Thailand. ASHRAE Grand-in-Aid Recipient. Caudill Research Fellowship.	December 2007
Amr Bagneid	“The Creation of a Courtyard Microclimate Thermal Model for the Analysis of Courtyard Houses”, Department of Architecture, ASHRAE Grant-in-Aid Recipient, AIA/AAF Scholarships for Advanced Research recipient. Now Assistant Professor, Prairie View A&M University, Texas.	August 2006
Suwon Song	“Development of New Methodologies for Evaluating the Energy Performance of New Commercial Buildings”, Department of Architecture, Now Research Professor, Yonsei University, South Korea.	August 2006
Seongchan Kim	“An Analysis of International Energy Conservation Code (IECC) – Compliant Single-Family Residential Energy Use”, Department of Architecture, Now Assistant Professor, Western Illinois University, Ill.	August 2006
Sakkara Rasisuttha	“An Investigation of Methods for Reducing the Use of Non-Renewable Energy Resources for Housing in Thailand,” Department of Architecture. Now Assistant Professor, Khon Kaen University, Thailand.	May 2005
Yong Hoon Sung	“Development of a Comprehensive Community NOx Reduction Methodology,” Department of Architecture.	August 2004

Victor Kootin-Sanwu	“Development of Energy Efficient Housing for Low-Income Families,” Department of Architecture, ASHRAE Grant-in-Aid Recipient.	May 2004
Atch Sreshthaputra	“Building Design and Operation for Improving Thermal Comfort in Naturally Ventilated Buildings in a Hot and Humid Climate,” Department of Architecture, Co-Chair w/M. Andrews (MEEN), ASHRAE Grant-in-Aid Recipient, 2004 ARCC King Metal. Now Assistant Professor, Chulalongkorn University, Thailand.	May 2003
Kie Whan Oh	“Development and Validation of a Computer Model for Energy-efficient Shaded Fenestration Design,” Department of Architecture, Co-Chair w/L. Degelman, ASHRAE Grant-in-Aid Recipient. Now Assistant Professor, Dongseo University, S. Korea.	May 2000
Keith Sylvester	“An Analysis of the Benefits of Photovoltaic-Coated Glazing on Owning and Operating Costs of High Rise Commercial Buildings,” Department of Architecture, Co-Chair w/L. Degelman, ASHRAE Grant-in-Aid Recipient. 2000 ARCC King Metal.	December 1999
Sabaratham Tamilseran	“An Inverse Bin Methodology to Measure the Savings from Energy Conservation Retrofits in Commercial Buildings,” Mechanical Engineering Department, Co-Chair w/D. Claridge. Now at ADM Assc., Sacramento, CA.	May 1999

## SERVICE

### 1. Professional Service

#### **American Concrete Institute, ACI Convention, Dallas, Modeling for Energy Conservation in Buildings: Part I: Texas, March 2012.**

“Thermal Mass Modeling: How we got to where we are today”

#### **American Council for an Energy Efficient Economy (ACEEE), 1988 – 1996.**

“Panel 5: Commissioning, Operating and Maintenance,” Panel Leader, ACEEE Summer Study, Asilomar, CA. August 1996.

“Panel 5: Commissioning, Operating and Maintenance,” Panel Leader, ACEEE Summer Study, Asilomar, CA, August 1994.

“Panel 3: Commercial Performance: Analysis and Measurement,” Panel Leader, ACEEE Summer Study, Asilomar, CA, August 1992.

#### **American Society of Architectural Engineers, 1978 – 1981.**

Student President, University of Colorado Chapter, 1978 – 1981.

#### **American Solar Energy Society, Member, 1996 – 2010.**

#### **American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), 1980 – present.**

ASHRAE College of Fellows, 2006 – present, member.

ASHRAE Performance Measurement Steering Committee, Member, 2007-present.

ASHRAE Performance Measurement Protocols Project, Chair, 2006-2010.

ASHRAE Scoping Study of Measuring the Performance of Commercial Buildings, Chair, 2005-2006.

ASHRAE Electronic Communications Committee, Member, 2004 – 2006.

ASHRAE Historical Committee, 2013 – present, 125<sup>th</sup> Anniversary Sub-Committee, Chair of Transactions submissions.

ASHRAE Think Tank member, 2002 – present.

Electronics Advisory Group, August 1997 – August 1998.

GPC 14R – Guideline for Measurement of Energy and Demand Savings, revision committee, 2008 – present.

GPC 14R – Guideline for Measurement of Energy and Demand Savings, voting member and author of Section 6, 1996–2001.

Journal/Insights Committee member, Section 5.0 Liaison - Ventilation and Air Distribution, New member training, June 1992–1995.

Presidential Think Tank member, 2001–2002.

Society-wide committee to develop a Worldwide Electronic Communications Network for ASHRAE, June 1995, June 1997.

Student Chapter Faculty Advisor, Texas A&M University, September 1991 – present.

SPC 140P - A Standard Method of Test for Evaluation of Building Energy Computer Programs, voting member, 1991–2001.

Standards Committee: SSPC 140 - A Standard Method of Test for Evaluation of Building Energy Computer Programs, voting member, 2001–2002.

TC 4.7 - Algorithms Committee, Chair, 2010 – 2012, vice-chair, 2008 – 2009, chair 2009 – 2011, research chair 2011 – 2019, Honors and Awards 2021.

- TC 1.5 - Computer Applications Committee, Handbook Chairman for Chapter #60 – Computer Applications, KBS Subcommittee member, RP-642 & RP-808 Monitoring Committee Member.
- TC 1.8 - Owning and Operating Committee, Handbook contributor for Chapter #49 - Owning and operating, 1989–1995.
- TC 1.7 - Operation and Maintenance Management Committee, Research Subcommittee member, Handbook contributor to Chapter #35 - Operation and Maintenance Management, 1989–1995.
- TC 9.6 - Systems Energy Utilization Committee, Handbook contributor to Chapter #32 – Energy Management, and Chapter #37 - Building Energy Monitoring, 1990 – present.
- Technical Paper Session 2: Commemorating ASHRAE’s 125<sup>th</sup> Anniversary: Progress of Key Industries, Orlando, 2020, Seminar Chair.
- Technical Paper Session 2: Commemorating ASHRAE’s 125<sup>th</sup> Anniversary: Progress of Key Industries, “The Evolution of ASHRAE’s Electronic Communications and Publication Technology”, Orlando, 2020, Seminar Chair.
- Seminar 23: The Great Energy Predictor Shootout III, Seminar Chair, Orlando, 2020.
- Technical Paper Session 3: Commemorating ASHRAE’s 125<sup>th</sup> Anniversary: Progress of Key Industries, Orlando, 2020, Seminar Chair.
- Technical Paper Session 4: Analysis of Building Systems, “Development of a Reference Building Information Model (BIM) for Thermal Model Compliance Testing (RP-1468) Part-II: Test Cases and Analysis (AT-2019-012)”, Atlanta 2019.
- Seminar 11: Building Energy Modeling for Power Grids and Energy Code Compliance, Chicago 2018
- Conference Paper Session 4 – Increasing Building Efficiency with Modeling and Controls, “Improving Monthly Weather-Normalized Energy Use Model: How to Classify Building Energy Use Based on Occupancy”, Chicago, 2015 (w/H.Kim).
- Seminar 52 – Peak Envelope Cooling Loads: How Did We Get to Today? Is This Where We Want to be? (Chair), “History of Peak Envelope Load Methods in the U.S.”, Orlando, 2016.
- Technical Paper Session 7 – Advancements in Energy Modeling, “Development of a Reference Building Information Model (BIM) for Thermal Model Compliance Testing (RP-1468), Part I: Guidelines for Generating Thermal Model Input Files (OR-16-020), Orlando, 2016.
- Technical Paper Session 6 - Energy Efficient, Hydronic HVAC Systems, “Reducing Energy Consumption in Grocery Stores: Assessing the Performance of CHP Systems”, Chicago, 2015 (w/J.Mukopadhyay).
- Seminar 32 – Data Visualization 101, “Data Visualization 101 – Getting the Right Graph for Your Purpose”, Dallas, 2013.
- Conference Paper Session 3 – Performance and Operation Measurement, “Field Test of the new ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings: Part 1 – Intermediate and Advanced Level Indoor Environmental Quality Protocols (SA-12-C008), San Antonio, 2012.
- Conference Paper Session 5 – Performance Measurement Protocols, “Field Test of the new ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings: Basic Level (CH-12-C017), Chicago, 2012.
- Poster Session – “Demonstration of the Use of Multimedia Electronic Information Enhancements for Chapter Handbook CD-ROM (1017-RP), Orlando, January 2010.
- Seminar 43 – Enhancing Your Chapters for ASHRAE Handbook CD+, “Example of an Enhanced Chapter”, Chicago, Ill, January 2009.
- Seminar 4 – An Introduction to Mesoscale Weather Models and Their Application to ASHRAE Building Issues, “Prediction of Hourly Wind Speed at a Wind Farm From Hourly Weather Data From the Nearest NWS Site using Artificial Neural Nets”, Chicago, Ill, January 2009.
- Seminar 45 – Performance Based Energy Labels for Buildings, “Making Building Performance Metrics Meaningful: Texas Residential Certificate Program”, Salt Lake City, UT, June 2008.
- Seminar 67 – Actual Building Energy Performance: Measurement, Benchmarking and Labeling, “ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings, Salt Lake City, UT, June 2008.
- Poster Session - “An Enhanced Methodology for Energy Performance Evaluation of New Commercial Buildings: Part I - Methodology”, Salt Lake City, UT, June 2008.
- Poster Session - “An Enhanced Methodology for Energy Performance Evaluation of New Commercial Buildings: Part II – Results from Case Study”, Salt Lake City, UT, June 2008.
- Seminar 9 – Application of Simulation in the 2007 Solar Decathlon Competition, “Use of Computer Simulation in the Design of the Texas A&M University Solar Decathlon House”, Long Beach, CA, June 2007.
- Symposium QC-06 – Validation of Building Simulation Programs, “Accuracy Tests for Simulations of VAV Dual-duct, Single-zone, Four Pipe fan Coil and Four Pipe Induction Air Handling Systems (865-RP), Quebec City, Quebec, Canada, June 2006.
- Seminar 7 – Web-based Simulations for Design: Give me a Minute and Your Analysis is done. “Development of Web-based Residential (IECC), and Commercial (ASHRAE) Code Compliance Calculator for Texas, J.Haberl, C.Culp, B.Yazdani, Quebec City, Quebec, Canada, June 2006
- Seminar 48 – Skip the Plane and Make the Meeting, presentation title: “Virtual Design Studio”, J.Haberl, G. Vasquez de Velasco, Denver, and June 2005.
- Seminar 1 – A Vision of eASHRAE: Or How to Give a Seminar in Your Pajamas, presentation title: “A Day in the Life of an ASHRAE member at the ASHRAE Winter Meeting, Chicago, Ill, January 2014”, J.Haberl, Nashville, June 2004.
- Seminar 18 – Establishing Cost Effective Energy Baselines for Measurement and Verification, presentation title: “Developing an M&V Plan and Baseline for the Ft. Hood ESPC Project”, Kansas City, June 2003.
- Seminar 24 – Practical Aspects of Measuring Humidity in Commercial Buildings, presentation title: “Managing Thousands of Financially-critical Humidity Sensors – The LoanSTAR Experience”, Atlantic City, January 2003.
- Seminar 46 – Pattern Recognition Based Fault Detection and Diagnostics for Building Operation, presentation title: “HVAC Data Visualization: Past, Present and Future, Cincinnati, OH, June 2001.

Seminar 42 – Use of the Internet for Collaborative Efforts in HVAC, presentation title: “Use of the Internet for Monitoring and Analysis in the Texas LoanSTAR Program”, Toronto, June 1998.

Seminar – How to Avoid Becoming Roadkill on the Information Super Highway, presentation title: “Welcome to ASHRAE Home Page on the World Wide Web”, Atlanta, Georgia, June 1996.

Seminar - Error Analysis Techniques to Ensure Data Quality in Monitoring Projects, presentation title: “Error Analysis Techniques in the Texas LoanSTAR Program”, San Diego, CA, June 1995.

Seminar – Experiences with Simulation, presentation title: “Procedures for Calibrating a Simulation Model to Whole-building Measured Data from a Heated/Cooled Commercial Building”, San Diego, CA, June 1995.

Seminar – Analysis Methods for Building Energy Retrofits, presentation title: “U.S.D.O.E. Forrester Lighting Retrofit: Preliminary Analysis of the Electrical Savings”, San Diego, CA, June 1995.

Seminar – Inverse Analysis Methods, presentation title: “Energy Calculations for Analyzing Energy Savings from HVAC Modifications”, New York, NY, January 1995.

Seminar – Analysis Methods for Measured Building Energy Use Data, presentation title: “The Texas LoanSTAR Program: Current Availability of Data and Improved Graphical Indices for Browsing through Hourly Data”, New Orleans, January 1994.

Seminar – What’s the Future Hold for ASHRAE Members? Presentation title: "A Day in the Life of a Building Operator in Central Texas: 2002 A.D.", Denver, Colorado, June 1993.

Seminar - Measured Energy Performance Data Analysis and Presentation: Pitfalls, Problems and Solutions, presentation Title: “The Texas LoanSTAR Program.", St. Louis, MO, and June 1990.

Technical Paper Session – ASHRAE 125<sup>th</sup> Anniversary: Retrospective on Geothermal Heat Pumps and Refrigerant Properties, Kansas City, MO January 2019.

Seminar - Building Energy Modeling for Power Grids and Energy Code Compliance, “Development of a Web-Based, Code Compliant 2015 IECC Residential Simulator for Texas”, Chicago, January 2018.

Seminar Chair: New Advances in Simulating Fenestration Systems, Chair, Houston, TX, June 2018

Seminar – Peak Envelope Cooling Loads: How Did We Get to Today? Is This Where We Want to be? (Chair), Orlando, 2016.

Symposium Chair: “Application of Inverse Models”, Symposium, ASHRAE Winter Meeting, Chicago, Ill, January, 2006.

Symposium Chair: “The Great Energy Predictor Shootout II - Measuring Energy Savings,” Symposium, ASHRAE Annual Meeting, San Antonio, TX, June 1996.

Symposium Chair: "The Great Energy Predictor Shootout: The Aftermath," Symposium, ASHRAE Annual Meeting, Orlando, FL, June 1994.

Seminar Chair: "The Great Energy Predictor Shoot-out," Seminar, ASHRAE Annual Meeting, Denver, CO, June 1993. \

Symposium Chair: “Application of Calibrated Building Energy Simulation Models,” Symposium, ASHRAE Annual Meeting, Denver, CO, June 1993.

Symposium Chair: “Characterizing Steam and Chilled Water use for a 40,000 Student Campus in Central Texas,” Symposium, ASHRAE Annual Meeting, June 1993.

Symposium Chair: “Application of Artificial Intelligence and Advanced Computing Concepts to HVAC Systems,” Symposium, ASHRAE Annual Meeting, Indianapolis, IN, June 1991.

Symposium Chair: “Artificial Intelligence and Advanced Topics for HVAC System Diagnostics,” Symposium, ASHRAE Annual Meeting, St. Louis, MO, June 1990.

Seminar Chair: “Demonstrations of Knowledge Base Systems for the HVAC Industry,” Seminar, ASHRAE Winter Meeting, Chicago, IL, January 1989.

Seminar Chair: “Applications of Knowledge Base Systems to the HVAC Industry,” Seminar, ASHRAE Annual Meeting, Nashville, TN, June 1987.

#### **American Society of Mechanical Engineers (ASME), 1985 – 1996.**

Conservation and Solar Buildings Chairperson - 5/93 - 4/96.

Panel Leader: “Space Conditioning in Sports Arenas,” Panel, ASME Meeting, New Orleans, LA, December 1993.

#### **Chi Epsilon, member 1978 to present.**

Chapter President, University of Colorado Chapter, 1978.

#### **Clean Air Through Energy Efficiency (CATEE) Conferences**

Plenary Session Updates, “EE/RE Impacts on Emissions Reductions”, Various Cities in Texas, 2004 - 2017

#### **Texas Energy Summit (previously Clean Air Through Energy Efficiency (CATEE),**

Plenary Session Updates, “EE/RE Impacts on Emissions Reductions”, Various Cities in Texas, 2018 -2019

#### **CLIMA 2000 Conference, University of Liege, Belgium**

Technical Committee, Summer 1997.

#### **FWF Der Wissenschaftsfonds (Austrian National Science Foundation), Vienna, Austria, 2002 - Present.**

Reviewer for a proposals (2002, 2005).

#### **Illumination Engineering Society of North America, Associate Member, 1995 to 2010.**

#### **International Building Performance Simulation Association - Charter member 1985 to present.**



Presentation, IBPSA USA Meeting, San Antonio, TX, 2012, “Thermal Mass Calculations/Modeling”  
 Member, Board of Directors, IBPSA USA, 2010 to present.  
 President, IBPSA USA, 2008 to 2010.  
 Member Services Bureau, 1998 to present.  
 Secretary, 1992 to 1994.  
 Scientific Review Committee member 1987 to present.  
 IBPSA-US “SimBuild 2004,” Conference Organizing Committee, Boulder, Colorado, August, 2004.  
 IBPSA-US “SimBuild 2006,” Conference Technical Co-Chair, Boston, Mass, August, 2006.  
 IBPSA-US “SimBuild 2008,” Conference Organizing Committee, Berkely, Calif, August, 2008.

**1<sup>st</sup> International Conference for Enhanced Building Operation (ICEBO)**

Technical Chair, 2010 – 2012  
 Paper presentation, Kuwait, 2010  
 Session Chair, and paper presentation, Austin, Texas, 2009  
 Session Chair, and paper presentation, Berlin, Germany, 2008  
 Session Chair, and paper presentation, Pittsburg, PA, 2005  
 Advisory Committee member, 2001, 2002, 2003, 2004.  
 Session Chair, and paper presentation, Dallas, Texas 2002.  
 Session Chair, and paper presentation, Austin, Texas 2001.

**National Science Foundation, Washington, D.C., 1995 to present.**

NSF Panel Member (2014).  
 Reviewer for proposals (1995).

**USDOE Office of Technology Transitions (OTT)**

Independent Merit Reviewer (2021 TCF).

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

Technical Program Chair, Session Chair, and paper presentation, Austin, 2010.  
 Technical Program Chair, Session Chair, and paper presentation, Dallas, 2008.  
 Technical Program Chair, Session Chair, and paper presentation, San Antonio, 2007.  
 Technical Program Chair, Session Chair, and paper presentation, Orlando, Florida, 2006.  
 Technical Program Chair, Session Chair, and paper presentation, Richardson, Texas, 2004.  
 Technical Program Chair, Session Chair, and paper presentation, Houston, Texas, 2002.  
 Technical Program Chair, Session Chair, and paper presentation, San Antonio, Texas, 2000.  
 Technical Program Chair, Session Chair, and paper presentation, Austin, Texas, June 1998.  
 Technical Program Chair, Session Chair, and paper presentation, Ft. Worth, Texas, 1996.  
 Reviewer, Session Chair, paper presentation, and Master of Ceremonies, Arlington, Texas, May 1994.  
 Reviewer, Session Chair, and paper presentation, May 1992.  
 Reviewer, Session Chair, and paper presentation, Fort Worth, Texas, October 1990.  
 Reviewer, Session Chair, and paper presentation, Dallas, Texas, October 1989  
 Paper presentation, Fifth Symposium, Houston, Texas, September 1988.

**Reviewer for Additional Publications:**

ACEEE Summer Study Conference Proceedings, ASHRAE Journal, ASHRAE Transactions, ASHRAE Research Journal, ASME Journal of Solar Energy Engineering, ASME Solar Engineering Conference Proceedings, Energy and Buildings, Energy and Environment, Journal of Building Engineering, IBPSA Conference Proceedings, IBPSA Journal, ICEBO Conference Proceedings, Solar Energy, and the Symposium on Improving Building Systems Efficiency in Hot and Humid Climates.

**Invited Significant Seminars or Lectures**

Airports Council International, North America, Invited Presentation, “ACRP/TRB Project Report: Development of Benchmarks for Airport Terminal Buildings (w/Juan-Carlos Baltazar), Austin, April 2016  
 Invited presentation, IBPSA USA Meeting, “The History of Building Simulation and Modeling: How we Got to Where We Are Today”, San Antonio, Texas June 2012.  
 Invited presentation, Texas A&M Student ASHRAE Chapter, “The History of Building Simulation and Modeling: How we Got to Where We Are Today”, Texas A&M University, College Station, April 2012.  
 Invited seminar presentation, Department of Architecture, Engineering and Technology Lecture Series, “Quantification of Energy and Emissions Saved in Energy Efficiency/Renewable Energy (EE/RE) Programs in Texas, Oklahoma State University, Still water Oklahoma, March 2012.  
 Invited presentation, American Concrete Institute, The Art of Thermal Mass modeling for Energy Conservation in Buildings – Part I: “The History of Building Simulation and Modeling: How we Got to Where We Are Today”, Spring ACI Convention, Dallas, Texas, February 2012.  
 Invited presentation, City of Arlington City Council meeting, Development of above Code Measures for Residential and Commercial Buildings, Arlington, Texas, February 22<sup>nd</sup>, 2012.  
 Invited presentation, U.S.E.P.A., Electricity Generation-Environment Workshop, Dallas, Texas, February 16, 2012.

- Invited presentation, City of Arlington Builder's Council meeting, Development of above Measures for Small Retail Buildings, Arlington, Texas, November 28<sup>th</sup>, 2011.
- Invited presentation, City of Arlington Builder's Council meeting, Development of above Measures for Restaurants, Arlington, Texas, October 5<sup>th</sup>, 2011.
- Invited presentation, City of Arlington Builder's Council meeting, Development of above Measures for Small Office Buildings, Arlington, Texas, August 25<sup>th</sup>, 2011.
- Invited presentation, City of Arlington Builder's Council meeting, Development of above Measures for Residential Buildings, Arlington, Texas, August 4<sup>th</sup>, 2011.
- Invited presentation, Texas Comptroller's Office, "Assess Improve Measure (AIM)" software to help homeowners reduce their energy use, Austin, Texas, March 2010.
- Invited presentation, Texas Comptroller's Office, "2009 IECC Code Hearings", Austin, Texas, and January 28<sup>th</sup>, 2010.
- Invited presentation, Texas Comptroller's Office, "Development of Easy to Use Software for Code Compliance", Austin, Texas, August 2009.
- Invited presentation, "Accounting for Carbon Emissions from Energy Efficiency and Renewable Energy in the Texas", Senate Hearings for Proposed Legislation, Committee Chaired by Senator Ellis, April 2009.
- Invited presentation, "NOx Emissions Reductions from EE/RE in Texas", ASHRAE Lubbock Chapter, April, 2009.
- Invited presentation, "Quantification of Energy and Emissions Saved in Energy Efficiency/Renewable Energy (EE/RE) Programs in Texas", EPA Sustainable Skyways, Dallas, TX, March 2009. Invited testimony, "NOx Emissions Reductions from EE/RE Programs", Texas Senate Natural Resources Committee, Austin, Texas, March 2009.
- Invited presentation, "Quantification of Energy and Emissions Saved in Energy Efficiency/Renewable Energy (EE/RE) Programs in Texas", EPA Blue Skyways Conference, Omaha, Neb, September 2008.
- Invited presentation, "Quantification of Energy and Emissions Saved in Energy Efficiency/Renewable Energy (EE/RE) Programs in Texas", University of Texas, Department of Architecture, September 2008.
- Invited presentation, "Accounting for Energy Efficiency and Renewable Energy in the Texas SIP", Texas Senate Committee on Natural Resources, September, 2008.
- Invited presentation, "Calculation of Emissions Reductions from Energy Efficiency and Renewable Energy," ASHRAE Region VII Meeting, Huntsville, Alabama, August, 2007.
- Featured presentation, "Calculation of Emissions Reductions from Energy Efficiency and Renewable Energy," 2006 Emissions Reduction and Energy Leadership Summit, Texas A&M and Houston Council of Governments, Houston, TX, October, 2006.
- Invited presentation, "Quantification of NOx Emissions Reductions from Energy Efficiency and Renewable Energy Projects in Texas", Civil Engineering Seminar, Rice University, Houston, Texas, September 2006.
- Invited presentation, "Calculating Creditable NOx Emissions Reductions from Green Power Purchases in Texas", USEPA Air Innovations Conference, Denver, Co., September 2006.
- Invited presentation, "Calculating Creditable NOx Emissions Reductions from Energy Efficiency and Renewable Energy Projects (EE/RE) in Texas", USEPA Air Innovations Conference, Chicago, Ill., August 2005.
- Featured presentation, "Calculation of Emissions Reductions From Energy Efficiency and Renewable Energy," 2005 Emissions Reduction and Energy Leadership Summit, Texas A&M and North Central Texas Council of Governments, Fort Worth, TX, October, 2005.
- Featured presentation, "Calculation of Emissions Reductions from Energy Efficiency and Renewable Energy," 2004 Emissions Reduction and Energy Leadership Summit, Texas A&M and the Metropolitan Partnership for Energy, San Antonio, TX, December 2004.
- Invited presentation, "Energy System Laboratory's 2003 Annual Report," Commissioner Briefing (Commissioner White), Texas Commission on Environmental Quality, December 2003.
- Invited presentation, "The Texas Emissions Calculator and NOx Emissions Reductions from Implementation of the 2000 IECC/IRC Conservation Code in Texas," presented at the Texas Energy Partnership Workshop, Texas State Energy Conservation Office, Austin, TX, September 2003.
- Invited presentation, "Energy System Laboratory's Progress with Senate Bill 5," presented to the Texas Emissions Reduction Plan Advisory Committee, Texas Natural Resources Conservation Commission, Houston, TX, November 2002.
- Invited presentation, "Energy System Laboratory's Progress with Senate Bill 5," presented to the Texas Emissions Reduction Plan Advisory Committee, Texas Natural Resources Conservation Commission, Dallas, TX, August 2002.
- Invited presentation, "Energy System Laboratory's Progress with Senate Bill 5," presented to the Texas Emissions Reduction Plan Advisory Committee, Texas Natural Resources Conservation Commission, Austin, TX, June 2002.
- Invited speaker, "ASHRAE-sponsored Research at Texas A&M University," ASHRAE Houston Chapter, April 2002.
- Invited presentation, "Buildings-Related Energy Efficiency RD&D," presentation to the California Energy Commission, Sacramento, CA, November 2001.
- Invited interview, "Conditions Must be Right for Energy-Saving 'Green-Roof', Concept to Become Fertile in U.S., Says Expert," PlanetSave.com, Community Discussion Group, July 2001.
- Invited interview, "Fence Climbing and Skirt Lifting in College Station," Interview with Debora Snoonian, Senior Editor, Architectural Record, April 2001.
- Invited participant, "Bracken Bat Cave Charette," Sponsored by the U.S.D.O.E. Rebuild America Program through Overland Partners, San Antonio, TX, November 2000.
- Invited presentation, "The Texas LoanSTAR Program, M&V and Continuous Commissioning," Oxford University, Oxford, England, July 2000.
- Invited presentation, "The Texas LoanSTAR Program, M&V and Continuous Commissioning," KPF and Associates, London, England, July 2000.

- Invited on-line discussion, "The New Architectural Graphic Standards Material," Vol. 5 Chatroom, [www.volume5.com](http://www.volume5.com), March 2000.
- Invited speaker, "A Day in the Life of Tony Lopez: A Building Operation in 2009 A.D.," ESOURCE Conference, Colorado Springs, CO, November 1999.
- Invited presentation, "Measuring Energy and Environmental Conditions in Buildings," College Station Independent School District 4<sup>th</sup> Grade Science Classes, College Station, TX, March 1998.
- Invited speaker, "Deregulation and Free Market Energy Conservation Programs," Texas Energy Coordination Council, Austin, TX, January 1998.
- Invited lecture, "Development and Testing of a Multi-pyranometer Array," Department of Architecture, MIT, July 1997.
- Invited presentation, "The NEMVP and How it Can Help You Make Informed Energy Conservation Purchases," Texas State Agency Energy Administrators Group, Austin, TX, June 1996.
- Invited presentation, "Teaching Solar Energy to Elementary-aged School Children," presented to the Bryan Independent School District, sponsored by the Department of Education, Texas A&M University, College Station, TX, June 1996.
- Invited speaker, "Measuring the Performance of Residential and Small Commercial Buildings," American Institute of Architects – Brazos Valley Chapter, College Station, TX, May 1996.
- Invited speaker, "How Continuous Monitoring and Analysis can Improve the Energy Services Business," Johnson Controls, Inc., Milwaukee, WI, September 1995.
- Invited speaker, "The value of Performance Based Architecture and the Texas LoanSTAR Program," American Institute of Architects Student Chapter, Texas A&M University, College Station, TX, September 1995.
- Invited presentation, "How the Texas LoanSTAR Program Can be Used in Canada," the International Council on Local Environmental Initiatives (ICLEI), Toronto, Ontario, Canada, August 1995.
- Invited video conference participant, "Discussion of the Energy Passport Concept for Russian Buildings," by the U.S. Department of Energy and the National Resources Defense Council, May 1995.
- Invited speaker, "How to Achieve 150% of Audit Estimated Energy Savings: The Texas LoanSTAR Program," Third National Conference on Commissioning, Milwaukee, WI, May 1995.
- Invited speaker, "How to Achieve 150% of Audit Estimated Energy Savings: The Texas LoanSTAR Program," Energy-University-Environment Conference, sponsored by the European Community, University of Bordeaux, Bordeaux, France, March 1995.
- Invited speaker, "Advanced Data Displays for Building Energy Data," California Institute for Energy Efficiency, San Francisco, CA, March 1995.
- Invited brown bag seminar, "How to Achieve 150% of Predicted Energy Savings -- the Importance of Measurement and Feedback," Honeywell, Inc., Arlington Heights, IL, January 1995.
- Invited presentation, "Measured Energy Savings from CV to VAV Retrofits in the Texas LoanSTAR," U.S. Environmental Protection Agency, Washington, D.C., December 1994.
- Invited speaker, "Advanced Building Systems Integration Consortium," Center for Building Performance and Diagnostics, Carnegie Mellon University, Pittsburgh, PA, November 1994.
- Invited speaker, "Development of an Advanced Monitoring System for the Federal Reserve Bank System," Federal Reserve System Energy Task Group, Dallas, TX, October 1994.
- Invited speaker, "The day in the life of a building operator: 2004 A.D.," ASHRAE St. Louis Chapter, St. Louis, MO, October 1994.
- Invited participant, "National Monitoring and Verification Protocols Meeting," U.S. Department of Energy, Washington, D.C., September 1994.
- Invited panelist, "Advanced Building Operations Workshop," Office of Buildings and Community Systems, U.S. Department of Energy, held at the University of Colorado, Boulder, CO, August 1994.
- Invited presentation, "Development of a Monitoring and Analysis Program for the State of Minnesota," Northern States Power and the State of Minnesota, Minneapolis, MN, May 1994.
- Invited presentation, "Development of Advanced Data Displays for Honeywell's Proprietary Software," Honeywell, Inc., Arlington Heights, IL, April 1994.
- Invited presentation, "Advanced Display's for EMCS Operators," Lawrence Berkeley National Lab, San Francisco, CA, March 1994.
- Invited presentation, "The Texas LoanSTAR Program and the U.S. Army," Energy Management Division, U.S. Army Construction Engineering Laboratory, Champagne, IL, October 1993.
- Invited presentation, "The Texas LoanSTAR Program and the Federal Reserve Bank," Federal Reserve Bank of Dallas, Dallas, TX, July 1993.
- Invited presentation, "The Texas LoanSTAR Program and its Application to Northern States Power's DSM Programs," Minneapolis, MN, July 1993.
- Invited presentation, "How the Texas LoanSTAR Program Can Help the Public Service Company of Colorado and the Colorado Governor's Energy Office With Their DSM Program," Colorado Governor's Energy Office, Denver, CO, July 1993.
- Invited presentation, "The Texas LoanSTAR Program," U.S. Army Construction Engineering Research Laboratory, Champagne, IL, June 1993.
- Invited briefing, "The Texas LoanSTAR Program, Texas Office of State-Federal Relations, Legislative Delegation Briefing, Washington, D.C., April 1993.
- Invited briefing, "The Texas LoanSTAR Program as a Model for DOD's Energy Conservation Programs," U.S. Department of Defense, Pentagon Building, Washington, D.C., April 1993.
- Invited briefing, "Assisting EPA's Energy Star Buildings Program with Data from the Texas LoanSTAR Program," U.S. Environmental Protection Agency, Washington, D.C., April 1993.
- Invited briefing, "The Texas LoanSTAR Program as a Model for the FEMP," Office of Buildings and Community Systems, U.S. Department of Energy, Washington, D.C., April 1993.

- Invited briefing, "The Texas LoanSTAR Program as a Model for Federal Buildings," White House Science Office, Old Executive Office Building, Washington, D.C., April 1993.
- Invited presentation, "Advanced Data Display's for Honeywell's Common Software Documentation Methodology," Honeywell, Inc., Arlington Heights, IL, March 1993.
- Invited brown bag seminar, "Advanced Data Displays and EMC Systems," Honeywell Inc., Arlington Heights, IL, January 1993.
- Invited presentation, "Texas LoanSTAR Program," Hewlett Packard Measurement Systems Department, Palo Alto, CA, October 1992.
- Invited presentation, "Texas LoanSTAR Program," Western Load Research Group (WLRG) Conference, San Francisco, CA, October 1992.
- Invited presentation, "Air-side Efficiency Program," Office of Buildings and Community Systems, U.S. Department of Energy, Washington, D.C., August 1992.
- Invited presentation, "Texas LoanSTAR Program," Alliance to Save Energy, Washington, D.C., July 1992.
- Invited presentation, "Advanced Data Display for Energy Management and Control Systems," Honeywell, Inc., Arlington Heights, IL, April 1992.
- Invited testimony, "Use of Continuous Monitoring and Analysis to Improve Reliability and Persistence," presented to Wisconsin Public Utility Commission through Wisconsin's Environmental Decade, Madison, WI, January 1992.
- Invited presentation, "Texas LoanSTAR Program," Energy Committee, Wisconsin State Legislator, Madison, WI, January 1992.
- Special presentation, "Texas LoanSTAR Program," Deputy Assistant Secretary John Millhone, Office of Buildings and Community Systems, U.S. Department of Energy, Washington, D.C., January 1992.
- Invited presentation, "Texas LoanSTAR Program," Western Load Research Group (WLRG) Conference, Phoenix, AZ, October, 1991.
- Invited presentation, "Grocery Store Energy Analysis," Food Marketing Institute (FMI), San Diego, CA, September 1991.
- Invited presentation, "Integrated Energy and Restaurant Management System," The Bailey Company (Arby's), Lakewood, CO, July 1991.
- Invited presentation, "Texas LoanSTAR Program," Colorado Governor's Energy Office, Denver, CO, July 1991.
- Invited presentation, "Texas LoanSTAR Program," North West Power Planning Association (NWPPA) Conference, Portland, OR, May 1991.
- Special presentation, "Texas LoanSTAR Program," Assistant Secretary for Conservation and Renewables, U.S. Department of Energy, Washington, D.C., March 1991.
- Invited speaker, "The Texas LoanSTAR Program," Buildings Research Group, Solar Energy Research Institute, Golden, CO, June 1990.
- Invited speaker, "Whole-Plant Energy Tracking and Monitoring Technologies," Rocky Flats Plant, Golden, CO, June 1990.
- Invited speaker, "The Texas LoanSTAR Program, Progress Report," United States Office of Technology Assessment (OTA), Washington, D.C., June 1990.
- Invited speaker, "Exploring the Service Industry/Building Monitoring Options," Honeywell, Inc., Arlington Heights, IL, February 1990.
- Invited speaker, "Energy Research Overview at Princeton's CEES," Siemens A/G Corporate Research Center, Princeton, NJ, March 1989.
- Invited speaker, "Obtaining Useful Information from a Building's Metered Energy Consumption Data," Honeywell, Inc., Arlington Heights, IL, February 1989.
- Invited speaker, "Energy Conservation in Commercial Buildings," IEA/CADDET visit, Office of Buildings and Community Systems, November 1988.
- Invited speaker, "Building Systems Seminar Series," Joint Center for Energy Management, University of Colorado, Boulder, CO, September 1988.
- Invited speaker, "Metered Data Analysis to Improve Building Operation and Maintenance," Oak Ridge National Laboratory, Oak Ridge, TN, September 1988.
- Invited presentation, "Obtaining Useful Information from a Building's Metered Energy Consumption Data," Johnson Controls Research Group, Milwaukee, WI, September 1988.
- Invited presentation, "Obtaining Useful Information from a Building's Metered Energy Consumption Data," Lawrence Livermore National Lab, CA, August 1988.
- Invited presentation, "President's Committee for Campus Energy Conservation," State University of New York, Stony Brook Campus, NY, July 1988.
- Invited briefing, "Expert Systems Work at the U.S.D.O.E. Forrestal and Germantown Facilities," United States Congressional Research Service, The Library of Congress, Science Policy Research Division, September 1987.
- Invited briefing, "Expert Systems Work at the U.S.D.O.E. Forrestal and Germantown Facilities," Committee on Energy and Natural Resources, Subcommittee on Energy Regulation and Conservation, United States Senate, Washington, D.C., September 1987.
- Invited panelist, "Conference on Cutting Energy Costs during Multifamily Rehab," National Association of Home Builders, U.S. Department of Housing and Urban Development, Washington, D.C., December 1986.
- Invited presentation, "Energy Conservation Analysis for the City of Denver Maintenance Center, Committee on Energy Conservation, Engineering and Maintenance Division, Denver, CO, 1986.
- Invited presentations, "Energy Conservation Analysis," University of Colorado Memorial Center Administration, Boulder Campus, 1984 – 1986.
- Invited presentations, "Energy Conservation Analysis," University of Colorado Recreation Center Administration, Boulder Campus, 1980 – 1986.

## 2. University Service

### University:

LMS Selection Committee, Representative for the College of Architecture, spring 2010.  
 Dean of Faculty Grievance Committee (special working group), College of Architecture Faculty Salary Dispute, spring 2003.  
 Legislative support for Senate Bill 5, includes briefings to Texas Energy Reduction Program Advisory Committee, and the Texas Senate Natural Resources Committee, 2001 – present.  
 Texas A&M University representative to the Texas Building Energy Institute, member of executive committee and committee chair, 1995 – 1997, 1995 – 2001.

### College:

College PhD Committee, Department of Architecture Representative, 2009 – 2010.  
 College Promotion and Tenure Committee, 2008 – 2010.  
 Dean's Finance Committee, 2004.  
 College Publications Committee, 2002 – 2003.  
 College Research and Interdisciplinary Council (CRIC), Appointed Member at Large, 1999 – 2002.  
 Responsible for creation of College-level archive of all M.S. and Ph.D. thesis and dissertations.  
 Facility Management Certificate Advisory Committee, 1999 – present.  
 Founding member and member of graduate advisory group.  
 Ph.D. Qualifying Exam Committee, Member, 1995 – 2001.  
 Reviewed qualifying exams for apx. 2-4 candidates annually.  
 Facility Management Industry Advisory Committee, Faculty Member, 1999 – 2002.  
 Founding member and member of advisor board.

### Department:

Associate Department Head for Research, 2009 to 2017.  
 Search Committee Chair, September 2012 – 2017; 2018.  
 Energy Caucus, Chair, 2008 – 2010.  
 Honors and Awards Committee, 2021 – present.  
 Graduate Student Selection Committee for Energy Option, Chair, 2002 – present.  
 Energy Undergraduate Instruction Committee, Member, 1995 – 2001.  
 Responsible for Coordinating Environmental Systems classes.  
 Graduate Instruction Committee, Member, 1995 – 2001.  
 Responsible for Coordinating Environmental Systems classes.  
 Promotion and Tenure Committee, Chair, 2010 – 2017, 2003 – 2006, member 1999 – 2019.  
 Helped prepared packages for 7 successful tenure candidates, 4 successful promotion candidates.  
 Faculty Search Committee, 1997 – present.  
 Responsible for Environmental Systems Faculty search.  
 Departmental Ph.D., and M.S. Coordinator, 2007 – Present.  
 Responsible for coordinating review and admission of incoming students.

## 3. Professional Outreach

"Measurement and Verification Workshop," sponsored by the Energy Systems Laboratory, Austin, TX, October 2009.  
 "Commercial Requirements of the International Energy Conservation Code and ASHRAE Standard 90.1," sponsored by the Texas State Energy Conservation Office, Corpus Christi, TX, July 2003 (w/ T. Fitzpatrick).  
 "Measurement and Verification Techniques Workshop," sponsored by the Texas State Energy Conservation Office, Houston, TX, October 2002 (w/ C. Culp).  
 "Measurement and Verification Techniques Workshop," sponsored by the Texas State Energy Conservation Office, Houston, TX, May 2002 (w/ C. Culp).  
 "Measurement and Verification Techniques Workshop," sponsored by the Texas State Energy Conservation Office, Austin, TX, July 2001 (w/ C. Culp).  
 "Workshop on Energy Measurement, Verification, and Analysis Technology," sponsored by the Energy Conservation Task Force of the Subcommittee on Administrative Services of the Federal Reserve Bank of Dallas, Dallas, TX, April 2000 (w/ D. Claridge).  
 "Workshop on the Texas Guidelines for Performance contracting," sponsored by the Texas Energy Coordinating Council, Houston, TX, March 1999.  
 "Workshop on the Texas Guidelines for Performance contracting," sponsored by the Texas Energy Coordinating Council, Austin, TX, September 1998.  
 "LoanSTAR Monitoring and O&M Workshop," sponsored by the Western Area Power Authority, San Francisco, CA, May 1995.  
 "2<sup>nd</sup> Texas LoanSTAR Monitoring Workshop," sponsored by the Texas State Energy Conservation Office, Austin, TX, August 1994.  
 "Improved Energy Information for Building Operators," Texas Energy Intern Training Workshop, sponsored by the Texas State Energy Conservation Office, Texas A&M University, May 1993.  
 "Texas LoanSTAR Monitoring Workshop," sponsored by the State of Minnesota Institutional Building Energy Conservation Program, Minneapolis, MN, May 1993.

“1<sup>st</sup> Texas LoanSTAR Monitoring Workshop,” sponsored by the Texas State Energy Conservation Office, Austin, TX, August 1992.

“Improved Energy Information for Building Operators,” Texas Energy Intern Training Workshop, sponsored by the Texas Energy State Energy Conservation Office, Texas A&M University, May 1992.

#### 4. Consulting

Fairmont Press, update of (1) new chapter for Energy Management Handbook, 9<sup>th</sup> edition, New York, NY, 2018.

Fairmont Press, update of (1) new chapter for Energy Management Handbook, 8<sup>th</sup> edition, New York, NY, 2012.

Fairmont Press, update of (1) new chapter for Energy Management Handbook, 7<sup>th</sup> edition, New York, NY, 2009.

Fairmont Press, update of (1) new chapter for Energy Management Handbook, 6<sup>th</sup> edition, New York, NY, 2007.

John Wiley, updating of pages for the AIA Architect’s Graphic Standards 11<sup>th</sup> edition, Washington, D.C., 2008.

Fairmont Press, creation of (1) new chapter for Energy Management Handbook, 5<sup>th</sup> edition, New York, NY, 2003.

John Wiley, creation of (7) new pages for 2003 AIA Residential Graphics Standards, Washington, D.C., 2002 – 2003.

American Institute of Architects, creation of 6 new pages for the 2000 AIA Architect’s Graphic Standards 10<sup>th</sup> edition, Washington, D.C., 1998 – 1999.

John Wiley, review of text books, New York, NY, 1999.

American Institute of Architects, creation of 5 new pages for the 1998 AIA Architect’s Graphic Standards 9<sup>th</sup> edition Supplement, Washington, D.C., 1996 - 1997.

Energshop, Inc., monitoring and analysis support work, through Brazos Energy Systems and Technologies, College Station, TX, 1997 – 2002.

NEOs Corp., consulting work for the California Energy Commission, Sacramento, CA, 1996.

Proctor Engineering, consulting work for the California Energy Commission, San Rafael, CA, 1996.

W. D. Turner and Associates, consulting work, College Station, TX, 1995.

GARD Analytics, consulting work involving DOE-2 programming for ARI calculator, Niles, IL, 1995.

Portland Energy Conservation Inc., review of O&M manual, Portland, OR, 1995.

Wisconsin Public Utility Commission, Support Work and Written Testimony Prepared for Wisconsin’s Environmental Decade, Madison, WI, 1994 – 1995.

Paperback Software Company, beta-tester for VP-planner, and VP-expert, Berkeley, CA, 1987 – 1989.

The Bailey Company (DBA: Arby’s), 57 store Restaurant Automation Project, through Management Information Support, Lakewood, CO, March 1987 – March 1988.

The Bailey Company (DBA: Arby’s), 57 store Utility Monitoring Project (UMPIRE), through Management Information Support, Lakewood, CO, March 1987 – March 1988.

U.S. Department of Energy, Office of Administrative Services, development of a microcomputer utility energy use monitoring and forecasting program, 1987.

Rockwell International, engineering software and DOE-2 support work, Rocky Flats Plant, Golden, CO, 1983 – 1987.

Nathan Thompson, energy conservation analysis and passive solar design of private residence, Boulder, CO, 1986.

Jeff S. Haberl and Associates, development and sale of DOE-2 Video and Training Manual, Boulder, CO, 1985 – present,

John McKnight, passive solar design and construction of private residence, Broomfield, CO, 1985.

Jan F. Kreider and Associates, software support for fluids engineering textbook, Boulder, CO, 1985.

Norris Getty, design of passive solar heating system for private residence, Lakewood, CO, 1985.

Charles Metz, design of active and passive solar systems for private residence, Idaho Springs, CO, 1984.

Amber Enterprises, analysis and repair of an active solar system on an apartment complex, Dillon, CO, 1984.

Frank J. Haberl, design and installation of active solar retrofit system for a private residence, Golden, CO, 1983.

The Bailey Company (DBA: Arby’s), energy conservation analysis of restaurants, Denver, CO, 1982.

Swanson Rink and Associates, solar and energy conservation design and analysis, Denver, CO, 1981.

Robert Nelson, design and construction of passive solar design for private residence, Breckenridge, CO, 1979.