

## CV

### Mario A. Medina, Ph.D., P.E.

Associate Professor of Civil and Architectural Engineering, University of Kansas, USA  
Yuelu Millennium Scholar of Hunan University, China (2013)

**Address** Civil, Env. & Architectural Engineering Department, School of Engineering, University of Kansas  
2160F Learned Hall, Lawrence, KS 66045-7609  
Ph. (785) 864-3604, FAX (785) 864-5631, mmedina@ku.edu

### Education

Ph.D. Mechanical Engineering - Texas A&M University, 1992  
Area of Study Energy Systems  
Specialization Thermal Analysis of Buildings  
Transient Heat and Mass Transfer Modeling  
M.S., B.S. Mechanical Engineering (M.S. Minor: Mathematics), Texas A&I University, 1988, 1987

### Professional Registration

State of Kansas - Mechanical Engineer

### Work Experience

August 2005 - Present

**Associate Professor of Civil, Environmental, and Architectural Engineering.** The University of Kansas.  
Tenured.

May 2013 - June 2013

**Invited Professor of Civil Engineering.** College of Civil Engineering. Hunan University, Changsha, China.

May 2013

**Invited Professor of Building Energy.** School of Energy and Environment. Southeast University, Nanjing, China.

May 2012 - June 2012

**Invited Professor of Building Energy.** School of Energy and Environment. Southeast University, Nanjing, China.

May 2009 - June 2009

**Invited Professor of Building Physics.** Faculté des Sciences de l'Homme et de l'Environnement. Université de La Réunion, La Réunion, France.

August 2001 - August 2005

**Assistant Professor of Civil, Environmental, and Architectural Engineering.** The University of Kansas.

August 1998 - August 2001

**Assistant Professor of Architectural Engineering.** The University of Kansas.

August 1996 - August 1998

**Assistant Professor of Mechanical Engineering.** Texas A&M University-Kingsville.

January 1993 - August 1996

**Visiting Assistant Professor of Mechanical Engineering.** Texas A&M University-Kingsville.

January 1992 - January 1993

**Research Associate.** Energy Systems Laboratory. Texas Engineering Experiment Station.

January 1989 - January 1992

**Research Assistant.** Mechanical Engineering Department. Texas A&M University.

## **Related Experience**

October 2002 - December 2007

**Executive Board Member:** West-Central Wind Research Consortium (W2RC).

August 2005 - Present

**Advisor:** Tau Beta Pi Engineering Honor Society.

July 2000 - August 2005

**Chief Advisor:** Tau Beta Pi Engineering Honor Society.

September 1998 - July 2000

**Advisor:** Tau Beta Pi Engineering Honor Society.

September 1998 - Present

**Co-Advisor:** American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE).

November 1993 - October 1997

**Assistant Director:** Industrial Assessment Center (IAC), (formerly EADC).

February 1995 - February 1997

**Executive Committee Member:** Building Energy Institute, Texas Energy Coordinating Council.

December 1994

**Instructor:** Institute for International Education. U.S. Agency for International Development.

November 1994

**Instructor:** Texas Energy Extension Service. The University of Texas at Arlington.

May 1993 - December 1994

**Chairman:** Center for Innovation and Teaching Excellence (a focus group sponsored by the National Science Foundation).

## **Journal Editorships**

July 2013 - Present

**Associate Editor:** *Solar Energy*. Elsevier, Inc.

December 2012 - Present

**Member of the Editorial Board:** *Journal of Building Physics*. Sage Publications.

## **Proceeding Editorships**

Co-Editor of the *Proceedings of the APEC Conference on Low Carbon Towns and Physical Energy Storage*, Changsha, China, May 25-26, 2013.

## **Peer Reviewed Publications**

### **In Preparation**

- Sun, X., Zhang, Q., **Medina, M.A.**, and Lee, K., "Modeling and Validation of a Building Enclosure Outfitted with a Phase Change Material Board (PCMB)" *Energy Conversion and Management* (2014).
- Jin, X., Sun, X., **Medina, M.A.**, and Zhang, X., "A Validated Mathematical Model for Estimating the Optimal Location of a Thin Phase Change Material (PCM) Layer in Frame Walls for Enhancing Wall Thermal Mass." (2014).
- Jin, X., Sun, X., **Medina, M.A.**, and Zhang, X., "On the Placement of a Phase Change Material Thermal Shield within Building Walls for Heat Flux Reduction." (2014).

### **Submitted**

- Jean, A., Boyer, H., Adams, C., Fakra, A., **Medina, M.A.**, Miranville, F., "De la Simulation du Comportement Thermique d'une Paroi à l'observation d'état: L'assimilation de Données dans CODYRUN en Vue de la Validation des Propriétés Thermiques d'un Matériau." Abstract submitted for the CIFEM2014 Conference, Comoro Island, May 2014.

### In Peer Review

- Sun, X., Zhang, Q., **Medina, M.A.**, Liu, Y., and Liao, S., "Development of a Compressor-Free Air Cooling System for Telecommunications Base Stations Using Phase Change Materials: In-Situ and Numerical Studies." *International Journal of Thermal Sciences* (2013).
- Rendall, J., Adams, M., Eberhart, S., **Medina, M.A.**, Adams, C., "Thermal Disinfection in Urine-Diversion Dry Toilets." *Journal of Water, Sanitation and Hygiene for Development* (2013).

### In Press

- Jin, X., **Medina, M.A.**, Zhang, X., Zhang, S. "Phase Change Characteristic Analysis of Partially-Melted Sodium Acetate Trihydrate." *International Journal of Thermophysics*. (2014).
- Sun, X., Zhang, Q., **Medina, M.A.**, and Lee, K., "Energy and Economic Analysis of a Building Enclosure Outfitted with a Phase Change Material Board." *Energy Conversion and Management* (2014).
- Zhang, Y., Du, K., **Medina, M.A.**, He, J., Zhang, B., and Li, J., "An Experimental Method for Validating Mathematical Models of Transient Non-Linear Heat Transfer in Phase Change Materials (PCMs)." *Phase Transitions* (2014).
- Sun, X., Zhang, Q., **Medina, M.A.**, Lee, K., "On the Natural Convection Enhancement of Heat Transfer During Phase Transition Processes of Solid-Liquid Phase Change Materials (PCMs)." *Energy Procedia* (2014).

### Published

- Sun, X., Zhang, Q., **Medina, M.A.**, Liu, Y., and Liao, S., "A Study on the Use of Phase Change Materials (PCMs) in Combination with a Natural Cold Source for Space Cooling in Telecommunications Base Stations (TBSs) in China." *Applied Energy* 117 (2014) 95-103.
- **Medina, M.A.**, Lee, K., Xing, J., and Sun, X., "On the Use of Phase Change Materials (PCMs) in Building Walls for Heat Transfer Control and Enhanced Thermal Performance." *Proceedings of the APEC Conference on Low Carbon Towns and Physical Energy Storage*, Changsha, China, May 25-26, 2013.
- Sun, X., Zhang, Q., **Medina, M.A.**, Lee, K., "Energy and Economic Analysis on Building Envelope with Phase Change Materials in Summer." *Proceedings of the APEC Conference on Low Carbon Towns and Physical Energy Storage*, Changsha, China, May 25-26, 2013.
- Jin, X., **Medina, M.A.**, Zhang, X., "On the Importance of the Location of PCMs in Building Walls for Enhanced Thermal Performance." *Applied Energy* 106 (2013) 72-78.
- Varadarajan, K. and **Medina, M.A.**, "Estimation of Hourly Solar Loads on the Surfaces of Moving Refrigerated Tractor Trailers Outfitted with Phase Change Materials (PCMs) for Several Routes Across the Continental U.S." ASME Paper IMECE2012-85476. *Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition (IMECE2012)*. November 9-15, 2012, Houston, TX.
- Rendall, J., Adams, C., **Medina, M.A.**, Eberhart, S., Adams, M., "Design of Human Composting Latrines for Robust Solar Disinfection Including Inactivation of *Ascaris Lumbricoides*." *Proceedings of the International Water Association World Water Congress and Exhibition*, Busan, South Korea, September 19, 2012.
- **Medina, M. A.**, "A Comprehensive Review of Radiant Barrier Research Including Laboratory and Field Experiments." *ASHRAE Transactions*, Vol. 118, Part 1, 2012.
- Jin, X., **Medina, M.A.**, Reshmeen, S., and Zhang, X., "Experimental Study on the Thermal Performance of a Phase Change Material Thermal Shield for Wall and Ceiling Applications." *Proceedings of the World Renewable Energy Asia Regional Congress and Exhibition (WREC-Asia) in cooperation with the 5th International Conference on Sustainable Development in Building and Environment (SuDBE 2011)*. October 28-31, 2011, Chongqing, China.
- Jean, A.P., Adams, C., **Medina, M.A.**, and Miranville, F., "Experimental Method Calibration (MECr): A New Relative Method for Heat Flux Sensor Calibration." *Proceedings of the 24th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems*, July 4-7, 2011, Novi Sad, Serbia.
- Miranville, F., Lauret, P., **Medina, M.A.**, and Bigot, D., "A Simplified Model for Radiative Transfer in Building Enclosures with Low Emissivity Walls: Development and Application to Radiant Barrier Insulation." *ASME Journal of Solar Energy Engineering*. Vol. 133, No. 2., May 2011.
- Evers, A.C., **Medina, M.A.** and Fang, Y., "Thermal Performance of Frame Walls Enhanced with Paraffin and Hydrated Salt Phase Change Materials Using a Dynamic Wall Simulator." *Building and Environment*. Vol. 45, Issue 8, pp. 17672-1768 (2010).

- Ahmed, M., Meade, O., and **Medina, M.A.**, "Reducing Heat Transfer Across the Insulated Walls of Refrigerated Truck Trailers by the Application of Phase Change Materials. *Energy Conversion and Management*. Vol. 51, Issue 3, Pages 383-392 (2010).
- Fang, Y. and **Medina, M.A.**, "Proposed Modifications for Models of Heat Transfer Problems Involving Partially-Melted Phase Change Processes." *Journal of ASTM International*. Vol. 6, Issue 9 (2009).
- **Medina, M.A.** and Zhu, D., "A Comparative Heat Transfer Examination of Structural Insulated Panels (SIPs) With and Without Phase Change Materials (PCMs) Using a Dynamic Wall Simulator." *Proceedings of the Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates*, December 16-17, 2008, Plano, TX.
- **Medina, M.A.** and Stewart, R., "Phase-Change Frame Walls (PCFWs) for Peak Demand Reduction, Load Shifting, Energy Conservation and Comfort." *Proceedings of the Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates*, December 16-17, 2008, Plano, TX.
- Fang, Y., **Medina, M.A.**, and Evers, A., "An Experimental Study of the Performance of PCM-Enhanced Cellulose Insulation used in Residential Building Walls Exposed to Full Weather Conditions." *Proceedings of the Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates*, December 16-17, 2008, Plano, TX.
- **Medina, M.A.**, and Young, B., "Evaluating the Sensitivity of Attic Radiant Barrier Performance to Climate Parameters." *ASCE Journal of Energy Engineering*. Vol. 134, No. 1, pp. 2-5 (2008).
- **Medina, M.A.**, King, J.B., and Zhang, M., "On the Heat Transfer Rate Reduction of Structural Insulated Panels Outfitted with Phase-change Materials." *Energy - The International Journal*. Vol. 33, Issue 4, pp 667-678 (2008).
- Taghavi, R.R., Jin, W., and **Medina, M.A.**, "Experimental and Computational Analyses of Pressure Differentials in Flexible Ducts with Different Bent Angles," ASME Paper No. FEDSM2007-37652. *Proceedings of the 5th Joint ASME/JSME Fluids Engineering Conference*, July 30-August 2, 2007, San Diego, CA.
- **Medina, M.A.** and Young, B., "A Perspective on the Effect of Climate and Local Environmental Variables on the Performance of Attic Radiant Barriers in the United States." *Building and Environment*. Vol. 41, Issue 12, pp. 1767-1778 (2006).
- Zhang, M., **Medina, M.A.**, and King, J., "Development of a Thermally Enhanced Frame Wall With Phase-Change Materials for On-Peak Air Conditioning Demand Reduction and Energy Savings in Residential Buildings." *International Journal of Energy Research*. Vol. 29, No. 9, (2005) pp. 795-809.
- Zhang, M., **Medina, M.A.**, and King, J., "Phase-Change Frame Walls for On-Peak Demand Reduction and Energy Conservation in Residential Buildings: Development, Construction and Evaluation." *Proceedings of the Fourteenth Symposium on Improving Building Systems in Hot and Humid Climates*, May 17-19, 2004, Richardson, TX.
- **Medina, M.A.**, and Frempong, M., "Evaluation of Ceiling Heat Fluxes in Residential Buildings with Attic Radiant Barriers in Prevalent Climates Across the United States." *Proceeding of the Architectural Engineering 2003 Conference: Building Integration Solutions*, September 17 - 20, 2003, Austin, TX.
- **Medina, M. A.**, "On the Use of Equation Solvers, Interactive Software, and Hands-on Projects in Integrated Sophomore Engineering Courses." *2003 Proceedings of the American Society for Engineering Education Annual Conference*, June 22-25, 2003. Nashville, TN.
- Hernandez, M. and **Medina, M. A.**, and Schruben, D. L., "Verification of an Energy Balance Approach to Estimate Indoor Wall Heat Fluxes Using Transfer Functions and Simplified Solar Heat Gain Calculations." *Mathematical and Computer Modeling*. 37 (2003) 235-243.
- Kirsch, F. W. and **Medina, M.A.**, "Cost of Implementation of Energy-Efficiency Measures in Specific Industries," *The Journal of Energy and Development*. Vol. 27, No. 2 (2002) pp. 285-298.
- **Medina, M.A.**, "On the Performance of Radiant Barriers with Different Attic Insulation Levels," *Energy and Buildings* 33 (1) 2000, pp. 31-40.
- **Medina, M.A.**, "Effects of Shingle Absorptivity, Radiant Barrier Emissivity, Attic Ventilation Flowrate, and Roof Slope on the Performance of Radiant Barriers," *International Journal of Energy Research*. Vol. 24, No. 8, (2000) pp. 665-678.
- Kirsch, F. W. and **Medina, M.A.**, "Cost of Industrial Energy Efficiency: Its Effect Upon Their Implementation," *The Journal of Energy and Development*. Vol. 24, No. 1, (2000) pp. 83-108.
- **Medina, M.A.**, "A Quasi Steady State Heat Balance Model of Residential Walls," *Mathematical and Computer Modeling* 30 (1999) 103-112.
- **Medina, M.A.**, "Validation and Simulations of a Quasi Steady State Heat Balance Model of Residential Walls," *Mathematical and Computer Modeling* 30 (1999) 93-102.

- **Medina, M.A.** and Nutter, D.W., "A Semi-empirical Modeling Technique for Predicting Improved Performance of Water-cooled Chillers Used in Building Space Cooling Applications," ASME Paper No. RAES99-7621. *Proceedings of the ASME Conference on Renewable and Advanced Energy Systems for the 21st Century*, April 11-15, 1999, Maui, HI.
- Gonzales, M.A., **Medina, M.A.**, and Schruben, D.L., "Effects of Installing Economizers in Boilers Used in Space Heating Applications," ASME Paper No. RAES99-7608. *Proceedings of the ASME Conference on Renewable and Advanced Energy Systems for the 21st Century*, April 11-15, 1999, Maui, HI.
- Figueroa, I.E, **Medina, M.A.**, Cathey, M., and Nutter, D.W., "Modification and Validation of a Universal Thermodynamic Chiller Model Used to Evaluate the Performance of Water-cooled Centrifugal Chillers," *Proceedings of the Eleventh Symposium on Improving Building Systems in Hot and Humid Climates*, pp. 57-65, Fort Worth, Texas, May 1998.
- **Medina, M.A.**, O'Neal, D.L. and Turner, W.D., "A Transient Heat and Mass Transfer Model of Residential Attics Used to Simulate Radiant Barrier Retrofits - Part I: Development," *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 1, pp. 32-38. February 1998.
- **Medina, M.A.**, O'Neal, D.L. and Turner, W.D., "A Transient Heat and Mass Transfer Model of Residential Attics Used to Simulate Radiant Barrier Retrofits - Part II: Validation and Simulations," *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 1, pp. 39-44. February, 1998.
- **Medina, M.A.**, O'Neal, D.L., and Turner, W.D., "Development of a Transient Heat and Mass Transfer Model of Residential Attics Used to Simulate Radiant Barrier Retrofits," *ASME Solar Engineering: 1995 - Volume 1*, pp. 253-264.
- **Medina, M.A.**, Turner, W.D., and O'Neal, D.L., "Economic Evaluation of Insulation/Radiant Barrier Systems for the State of Texas," *Proceedings of the Ninth Symposium on Improving Building Systems in Hot and Humid Climates*, Dallas, Texas, May 1994.
- Ashley, R., Garcia, O., **Medina, M.A.**, and Turner, W.D., "Effect of Radiant Barrier Technology on Summer Attic Heat Load in South Texas," *Proceedings of the Ninth Symposium on Improving Building Systems in Hot and Humid Climates*, Texas, May 1994.
- **Medina, M.A.**, O'Neal, D.L. and Turner, W.D., "Effects of Attic Ventilation on the Performance of Radiant Barriers," *ASME Journal of Solar Energy Engineering*, Vol. 114, No. 1, pp. 234-239. November 1992.
- **Medina, M.A.**, O'Neal, D.L., and Turner, W.D., "Effects of Radiant Barrier Systems on Ventilated Attics in a Hot and Humid Climate," *Proceedings of the Eighth Symposium on Improving Building Systems in Hot and Humid Climates*, pp. 47-52, Dallas, Texas, May 1992.
- **Medina, M.A.**, O'Neal, D.L., and Turner, W.D., "Radiant Barrier Performance During the Heating Season," *Proceedings of the Eighth Symposium on Improving Building Systems in Hot and Humid Climates*, pp. 53-58, Dallas, Texas, May 1992.

#### **Other Publications in the Open Literature (First author unless indicated otherwise)**

- "Phase Change Materials in Combination with Existing Insulation for a Superior Thermal Performance of Building Walls." *Global Gypsum Magazine*. March 2013.
- "Solar-Disinfection Composting Latrines for Developing Countries." Engineers Without Borders Midwest Regional Conference, Rolla, MO, USA. November 5, 2011. (4<sup>th</sup> of 7 authors).
- "Development and Adoption of Solar-Disinfection Composting Latrines in Developing Nations." Water Technologies for Emerging Regions Conference, Norman, OK, USA. October 24, 2011. (3<sup>rd</sup> of 8 authors).
- "Study of Radiant Barriers in North America." *Proceedings of the 6<sup>th</sup> Global Conference and Exhibition*. September 26-27, 2011. Toronto, Canada.
- "Guide Specifications: Metal Ducts - Section 23 31 13." Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - (2009).
- "Guide Specifications: Dampers - Section 23 33 13." Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - (2009).
- "Guide Specifications: Duct Silencers - Section 23 33 19." Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - (2009).
- "Guide Specifications: Turning Vanes - Section 23 33 23." Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - (2009).
- "Guide Specifications: Duct Mounting Access Doors - Section 23 33 33." Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - (2009).
- "Accreditation Manual: Central American Agency for the Accreditation of Postgraduate Programs" (Agencia Centroamericana para la Acreditacion de Postgrados - ACAP). In Spanish. Version 4.08. - (2008). (One of 8 authors).



- "Development of Design Specifications, Details and Design Criteria for Traffic Light Poles." Bureau of Materials and Research, Kansas Department of Transportation Report No. KTRAN:KU-98-6. September 2006.
- "Radiant Barrier Effectiveness Depends on Where You Live." *Home Energy Magazine*. May/June 2003 Issue.
- "Adequate Attic Venting." In Diagnostics O&A Section of *Home Energy Magazine*. September/October 2001 Issue.
- "Radiant Barriers, Performance Revealed." *Home Energy Magazine*. September/October 2000 Issue.
- "Assessing the Viability of Composite Retrofitting in Severe Environments." *Proceedings of the Texas Section of ASCE Spring 1999 Meeting*. Longview, Texas. April, 1999. (One of 4 authors)
- "Predicting Improved Chiller Performance Through Thermodynamic Modeling." *Proceedings of the 20th Industrial Energy Technology Conference*. Houston, Texas. April, 1998.
- "Overview of LoanSTAR Chiller Monitoring and Analysis of In-Situ Chiller Diagnostics Using ASHRAE RP-827 Test Method." *Proceedings of the Cool Sense National Forum on Integrated Chiller Retrofits*, Lawrence Berkeley National Laboratory. University of California, Berkeley, California. September, 1997. (One of 4 authors)
- "Impact of the Texas A&M University-Kingsville's Industrial Assessment Center." *Proceedings of the 19th Industrial Energy Technology Conference*. Houston, Texas. April, 1997.
- "First Year Analysis of Industrial Energy Conservation/Management of the Texas A&M University-Kingsville Energy Analysis and Diagnostic Center." *Proceedings of the 17th Industrial Energy Technology Conference*. Houston, Texas. April, 1995.

### **Scholarly Presentations in the Past Five Years (2008 – 2013)**

- (Invited) "Next Generation Building Walls Using Nanotechnologies and Phase Change Materials for Energy Management and Conservation." Keynote speech, 57<sup>th</sup> Midwest Solid State Conference. September 28, 2013.
- (Invited) "HVAC Basics." Evansville, Indiana, USA SMACNA Chapter. August 20, 2013.
- (Invited) "On the Use of Phase Change Materials (PCMs) in Building Walls for Heat Transfer Control and Enhanced Thermal Performance." Keynote speech, APEC Conference on Low Carbon Towns and Physical Energy Storage, Changsha, China. May 25-26, 2013.
- (Invited) "RESNET, Home Raters, and Reflective Insulation Manufacturers: How All Can Work Together." RESNET Conference 2013, Orlando, FL. February 27-March 1, 2013. RESNET: Residential Energy Services Network.
- (Invited) "Climate-change driven building design in China: My experience in China. Tea and Talk Series. KU Center for East Asian Studies. October 4, 2012.
- (Invited) "Phase change materials in combination with existing insulation for a superior thermal performance of building walls." 7th Global Insulation Conference and Exhibition, Riga, Latvia. September 18-19, 2012. Presentation won "Best Presentation Award."
- (Invited) "Thermal performance evaluation of building walls outfitted with phase change materials (PCMs). Presented to the students and faculty of the School of Energy and Environment of Southeast University in Nanjing, China. May 30, 2012.
- (Invited) "Radiant Barrier Technology." Presented to the students and faculty of the School of Energy and Environment of Southeast University in Nanjing, China. May 29, 2012.
- (Invited) "Phase Change Materials Research at the University of Kansas. Presented to the students and faculty of the School of Energy and Environment of Southeast University in Nanjing, China. May 28, 2012
- (Invited) "Fundamentals of Thermal Simulation for the Understanding and Evaluation of Radiant Barriers and IRCCs Performance." International Reflective Insulation Manufacturers Conference. Fort Lauderdale, FL. May 1-2, 2012.
- (Invited) "A Summary of Fifty Years of Radiant Barrier Research." RESNET Conference 2012, Austin, Texas. February 27-29, 2012. RESNET: Residential Energy Services Network.
- (Invited) "A Comprehensive Study of Radiant Barrier Research Including Laboratory, Field Experiments, and Simulations." Building Enclosure Council, Kansas City. January 25, 2012.
- (Invited) "Study of Radiant Barriers in North America." Sixth Global Conference and Exhibition. September 26, 2011. Toronto, Canada.
- (Invited) "Performance of Attic Radiant Barriers (RBs): A Summary of Published Research." Building Enclosure Council, Held at ASHRAE headquarters, Atlanta, GA. May 11, 2011.
- (Invited – Keynote Speaker) "Performance of Attic Radiant Barriers (RBs) and Interior Radiation Control Coatings (IRCCs): A Summary of Published Research." Reflective Insulation Manufacturers' Association – International (RIMA-I) Bi-Annual Meeting. Anaheim, CA. April 10, 2011.

- (Invited) “White Paper: Attic Radiant Barriers (RBs) and Interior Radiation Control Coatings (IRCCs).” Reflective Insulation Manufacturers’ Association – International (RIMA-I) Bi-Annual Meeting. San Antonio, TX. November 10, 2010.
- “State of Renewable Energy in the U.S. Professional Development Series.” Burn and McDonnell. April 26, 2010.
- (Invited) “A Comprehensive Study of Radiant Barriers: Experiments, Modeling, and Simulation.” International Reflective Insulation Manufacturer’s (I-RIMA) Conference. Barcelona, Spain. June 21-23, 2010.
- (Invited) Five presentations to students and faculty of Université de La Réunion, La Réunion, France. Presentations given were on the topic of Phase Change Materials and Radiant Barriers. The presentations were given on May 12, May 15, May 19, May 22, and May 26, 2009.
- (Refereed) “Proposed Modifications for Models of Heat Transfer Problems Involving Partially-Melted Phase Change Processes.” Second Symposium of the American Society of Testing Materials (ASTM) International on Heat-Air-Moisture Transport: Measurements and Implications in Buildings. Vancouver, British Columbia, Canada. April 19-20, 2009.
- (Invited) “Increasing the Overall Efficiency of Commercial and Industrial Refrigerated Vehicles by the Application of a Phase Change Technology Developed at the University of Kansas.” Presented at the Transportation Research Institute for faculty of the University of Kansas. October 14, 2008.
- (Refereed) “Phase-Change Frame Walls (PCFWs) for Peak Demand Reduction, Load Shifting, Energy Conservation, and Comfort.” Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates. Plano, TX. December 15-17, 2008.
- (Refereed) “A Comparative Heat Transfer Examination of Structural Insulated Panels (SIPs) With and Without Phase Change Materials (PCMs) Using a Dynamic Wall Simulator.” Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates. Plano, TX. December 15-17, 2008.
- (Refereed) “An Experimental Study of the Performance of PCM-Enhanced Cellulose Insulation Used in Residential Building Walls Exposed to Full Weather Conditions.” Sixteenth Symposium on Improving Building Systems in Hot and Humid Climates. Plano, TX. December 15-17, 2008.
- (Invited – Keynote Speaker) “Radiant Barrier Technology – A Must in Green Architecture.” International (RIMA-I) Bi-Annual Meeting. Miami Beach, FL. September 27, 2008.

**Funded Research/Projects (Principal Investigator Unless Stated Otherwise)**

***-Research on the Application of Physical Energy Storage Technology with Renewable Energy in a Low Carbon Town***

Source: Asia Pacific Economic Cooperation/Changsha Maxxon High Tech Co. Ltd. (Changsha, Hunan, China)

Period: December 2012 - December 2013

Funding: \$2,000

***-Funding for University of Kansas Research and Educational Support for U.S. Army Programs and Initiatives at Fort Leavenworth, Kansas***

Source: Army Research Laboratory and Army Research Office

Period: March 2011 - March 2014

Total Funding: \$1,940,000

(Thrust 1 Co-Investigator)

ARO – Sanitation Project portion: \$250,688

(Co-Investigator)

***- Increasing the Overall Efficiency of Commercial and Industrial Refrigerated Vehicles by the Application of a Phase Change Technology Developed at the University of Kansas***

Source: KU Transportation Research Institute

Period: August 2006 – September 2008

Funding: \$100,000

***-Enhancing the Experimental Capabilities of the CEAE and AERO Engineering Departments***

Source: GRF/SOE

Period: August 2006 – July 2007

Funding: \$9,600

***-Improving Life Cycle Performance and Energy Consumption Prediction Using Aged Samples and Electron Microscopy to Examine Thermal and Moisture Performance Due to Natural Deterioration of Roofing Materials***

Source: Energy Research Center/ Kansas Geological Survey

Period: August 2006 – July 2007

Funding: \$8,800

(Co-Principal Investigator)

***-Reducing the Fuel Consumption of Refrigerated Vehicles Via a Phase Change Technology Developed at the University of Kansas***

Source: Energy Research Center/ Kansas Geological Survey

Period: August 2006 – July 2007

Funding: \$8,670

***- Solar Decathlon 2007***

Source: DOE/National Renewable Energy Laboratory

Period: January 2006 - September 2007

Funding: \$12,500

***- Evaluation of Radiant Barrier Technologies for Attic Applications Using a Dynamic Heat Transfer Simulator***

Source: Radiant Barrier Technologies, Inc.

Period: March 2006 - December 2006

Funding: \$11,186

***-Optimal Integration of Renewable and Phase Change Materials in Insulation Systems for the Reduction of Thermal Loads Across Building Walls and Ceilings***

Source: National Science Foundation

Period: September 2006 - November 2010

Funding: \$279,997

***- Evaluation of Coating Technologies for Attic Applications Using a Dynamic Heat Transfer Simulator***

Source: STS Coatings, Inc.

Period: December 2005 - June 2006

Funding: \$5,494

***- Phase-change Frame Walls to Reduce Peak Demand, Shift Load, and Reduce Energy Use in the Coastal Areas of California***

Source: California Energy Commission

Period: January 2005 - December 2005

Funding: \$74,863

***- Evaluation of PCM-SIP Concept on the Better Building Panels (BBP)***

Source: Better Building Products, LLC.

Period: June 1, 2004 - August 2005

Funding: \$5,000

***- Design Pressure Losses for As-Installed Flexible Ducts***

***(Grant in Aid for Amy L. Stadler)***

Source: American Society for Heating, Ventilating, and Air-conditioning Engineers, Inc. (ASHRAE)

Period: July 2004 - June 2005

Funding: \$10,000

***- Paraffin-Based Phase-Change Wall Panels (PCWP) for Building Applications: Mathematical and Computer Model Development***

***(Grant in Aid for Jennifer B. King)***

Sponsor: American Society of Heating, Refrigerating, and Air conditioning Engineers, Inc. (ASHRAE)

Period: July 2003 - June 2004

Funding: \$7,500

***- Development of Design Specifications, Details, and Design Criteria for Traffic Light Poles***

Source: Kansas Department of Transportation

Period: July 1, 2002 – June 30, 2003

Funding: \$49,945

(Reassignment of the PI position from Dr. Steve McCabe)

***- Development of a Biofluid Warming and Infusion Device for In-field and Emergency Room Use to Prevent and Reverse Hypothermia in Trauma Patients***

Source: GRF/SAUD

Period: July 1, 2001 – June 30, 2002

Funding: \$5,226

***- Characterization and Performance Evaluation of Phase-Change Building Materials -- Phase I: Experimental and Phase II: Modeling***

Source: GRF/SAUD.

Period: July 1, 2000 – December 31, 2001

Funding: \$11,186



***- Development of a Research Program in Phase-Change Building Materials (PCBM) for Energy Conservation and Management***

Source: Energy Research Center. Kansas Geological Survey.

Period: June 1, 2000 – December 31, 2001

Funding: \$4,868

***- Development of a Methodology that Utilizes the Second Law of Thermodynamics to Analyze Heating, Ventilating, and Air-Conditioning (HVAC) Systems***

Source: Research and Public Service. The University of Kansas.

Period: July 1, 1999 – August 31, 2000

Funding: \$5,400

***- Development of a National Database of Energy Savings in Space Cooling and Heating Loads Produced by Radiant Barrier Technology***

Source: Energy Research Center, Kansas Geological Survey.

Period: June 1, 1999 – August 31, 2000

Funding: \$7,579

***- Establishment of the Center for the Enhancement of Building Energy Performance***

Source: Custom Energy, LLC

Period: September 1, 1998 - August 31, 1999.

Funding: \$49,000

(Reassignment of the PI position from Dr. Clay Belcher)

***- Industrial Energy Technical Assistance to Two Mexican Universities***

Source: University City Science Center/U.S. Department of Energy.

Period: September 1, 1996 - August 31, 1998

Funding: \$28,000

***- Technical Assistance to Develop the State Agencies Natural Resources End-Use Data Base (SANRED) (Y 1- 2)***

Source: University of Texas' Center for Energy Study/Texas Energy Conservation Office

Period: September 1, 1994 - August 31, 1996

Funding: \$49,940

***- LoanSTAR Energy Program (Loan to Save Taxes And Resources) (Years 1- 3)***

Source: Energy Systems Laboratory/Texas State Energy Conservation Office.

Period: June 1, 1994 - August 31, 1997

Funding: \$537,057<sup>(\*)(\*\*)</sup>

***- Industrial Assessment Center (IAC) (Years 1- 4) formerly known as Energy Analysis and Diagnostic Center***

Source: University City Science Center/U.S. Department of Energy.

Period: October 1, 1993 - September 30, 1997

Funding: \$500,273<sup>(\*)</sup>

(One of two Co-Investigators with no Principal Investigator)

***- Experimental and Economic Evaluation of Radiant Barrier Technology in South Texas***

Source: Texas Center for Energy and Mineral Resources.

Period: September 1, 1993 - December 31, 1994

Funding: \$23,747<sup>(\*)(\*\*)</sup>

***- Model Institutions for Excellence***

Source: National Science Foundation.

Period: September 1, 1993 - June 30, 1994

Funding: \$74,945<sup>(\*)</sup>

(Co-Principal Investigator)

<sup>(\*)</sup> As non-tenure track visiting assistant professor.

<sup>(\*\*)</sup> Sole proposal writer and responsible for the project, but officially listed as Co-PI because of non-tenure track status.

**Patents**

- "Performance, Multi-fiber, Ecological Thermal Insulation System." with Professor Mark Bomberg, Syracuse University, Syracuse, NY. In preparation in 2014.

**Professional Affiliations**

- National Institute of Building Sciences (NIBS)
- Building Enclosure Technology and Environment Council (BETEC)
- Building Enclosure Council (BEC)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

- American Society for Testing and Materials International (ASTM International)
- American Society for Engineering Education (ASEE)

#### **Academic Affiliations**

- Tau Beta Pi National Engineering Honor Society.
- Pi Tau Sigma International Mechanical Engineering Honor Society
- Phi Alpha Epsilon Honor Society for Architectural Engineers

#### **Honors and Awards**

- Certificate of Honor: *A New Millennium Yuelu Visiting Scholar in 2013*. Given by the Yuelu Academy. Hunan University. May 2013.
- Best Presentation Award for the paper "Phase Change Materials in Combination with Existing Insulation for a Superior Thermal Performance of Building Walls." *Proceedings of the 7th Annual Global Insulation Conference and Exhibition*, Riga, Latvia, September 19, 2012.
- H.O.P.E. Award Finalist - Honor for an Outstanding and Progressive Educator. Top 5 finalist. Only award given for teaching excellence by the entire university student body.
- Bellows Scholar Award 2006 for Outstanding Achievement in Research and Service. University of Kansas School of Engineering - 2006.
- Appointed Chief Advisor to Kansas Alpha: Tau Beta Pi Engineering Honor Society Chapter at the University of Kansas. July 2000.
- "Outstanding Service Award" -- Office of Industrial Technologies, U.S. Department of Energy. August 1997.
- Selected to Chair the Center for Innovation and Teaching Excellence focus group - National Science Foundation's Model Institution for Excellence Program - 1993 - 1994.
- Elected to Tau Beta Pi Engineering Honor Society - 1987.
- Elected to Pi Tau Sigma Mechanical Engineering Honor Society – 1987.