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Professional Preparation

The University of Kansas. *Bachelor of Science in Architectural Engineering*, May 1985. A 5-yr. ABET-accredited engineering degree, HVAC/Solar option. *Bachelor of Environmental Design*, May 1985, a 4-yr. architecture degree, Environmental Systems option.

The University of Texas at Austin. *Master of Science in Engineering*, December 1986. Major: Energy & Fluids, Minor: Engineering Mathematics. MS topic: energy source options

University of Colorado at Boulder. *Doctor of Philosophy*, Civil, Environmental, and Architectural Engineering Department's Building Systems Program, May 1992. Dissertation topic: building HVAC and indoor air quality performance modeling.

Professional Engineer, by the mechanical exam, Kansas

Appointments

The University of Kansas, Lawrence, Kansas. *Associate Professor of Civil, Environmental, and Architectural Engineering*, with continuous tenure, 8-98 to present. *Assistant Professor of Architectural Engineering*, 8-92 to 7-98.

National Renewable Energy Laboratory (NREL, formerly SERI), Golden, Colorado. 1-90 to 7-92.

Graduate Co-op, Thermal Sciences and Engineering Branch, Industrial Technologies Division.

The University of Texas at Austin. 10-85 to 12-88. *Teaching Assistant* for M.E. Fluid Mechanics, Thermodynamics, and Energy Systems Lab. *Research Assistant* to Profs. Vliet and Matthews.

Sample Products

“Interim ABET Self-Study Report,” for the KU Bachelor of Science in Architectural Engineering degree program, January 21, 2015. For a major curriculum change from five to four years. 124 pages.

“ABET Self-Study Report,” for the KU B.S. ARCE degree program, June 25, 2012. 268 pages.

“Thermal Zoning for HVAC Design; Art or Science?” *ASHRAE Journal*, v. 60, n. 12, pp. 20-30, Dec. 2018.

“Tiny Houses, Big HVAC? Loads and Energy”, *ASHRAE Journal*, vol. 60, no.1, pp. 20-28, January 2018.

“Ups and Downs of Stairtowers: Improving Comfort and IAQ”, with Jonathan D. MacDonald, *ASHRAE Journal*, vol. 59, no. 10, pp. 12-20, December 2017.

“Heat Gains from Passenger Vehicles Parked in Residential Attached Garages”, invited for the *ASCE Journal of Architectural Engineering*, vol. 23, no. 3, September 2017.

“Ventilation and Infiltration”, with Steve Emmerich and Steve Taylor, chapter revision for the 2017 Fundamentals volume of the *ASHRAE Handbook*, published July 2017.

“Mini-Split: Two Story Houses and Stratification”, *ASHRAE Journal*, vol. 59, no. 2, pp. 44-54, Feb. 2017.

“The Prospect of Using Airside Economizers in China”, with Zhang Chunzhi. *ASCE Conference on Sustainable Design & Construction*, Kansas City, MO, pp. 240-247, Mar. 23-25, 2011.

“Thermal and Economic Evaluation of Slab-on-Grade Insulation in Wood-Framed Buildings”. *ASCE Journal of Architectural Engineering*, vol. 15.1, pp. 14-25, March 2009.

“Passive Solar Thermal” and “Active Solar Thermal”; two new “GreenTips” in the *ASHRAE Green Guide, 2nd Ed.* Butterworth-Heinemann, ISBN 1-933742-07-0, 2006.

“A User-Friendly Model and Coefficients for Slab-on-Grade Load and Energy Calculations.” *ASHRAE Transactions*, vol. 111(2), pp. 122-136, 2005.

Designer's Guide to Ceiling-Based Air Diffusion, with Dandan Zhu. ASHRAE, ISBN 1-931862-11-7, soft cover, 154 pages, 2002.

“Placement of Ventilation Air Intakes for Improved IAQ (RP-806),” with Kelly A. Moylan. *ASHRAE Transactions*, vol. 105(1), pp. 71-79, 1999.

“Performance of Fixed, Air-Side Economizer, and Neural-Network Demand Control Ventilation in CAV Systems,” with C. T. Wu. *ASHRAE Transactions*, vol. 104(2), pp. 234-245, 1998.

“Impact of Daylight Saving Time on Residential Energy Consumption and Cost.” *Energy and Buildings*, vol. 25, issue 1, pp. 63-68, 1997.

“A Sensitivity Study of Floor and Ceiling Plenum Energy Model Parameters (RP-787),” with Don Wolfe. *ASHRAE Transactions*, vol. 103(1), pp. 16-30, 1997.

“Post-Occupancy Indoor Environmental Quality Evaluation of an Institutional Building,” with Craig A. Hillman. *The ASCE Journal of Architectural Engineering*, vol. 2, no. 3, pp. 88-94, Sept. 1996.

Synergistic Activities

U.S. DOE's Energy Analysis and Diagnostic Center (EADC)/Industrial Assessment Center (IAC).

Acting Director, 25 audits/reports, #397 to #421 (many authors), June to November 1993.

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Fellow, and member of the College of Fellows; KU Student Branch Advisor; member of the Kansas City Chapter; voting member and past chair of TC 4.3 (Ventilation Requirements and Infiltration), corresponding member of TC 5.3 (Room Air Distribution) and TC 4.1 (Load Calculation Data and Procedures); 2004 Distinguished Service Award recipient; 2007-8 chair of the Society's Handbook Committee. Recipient of the ASHRAE New Investigator Award.

Journal of Green Building, member of the Editorial Board. College Publishing. 2019 to current.

Senior Design/Construction Projects (funded primarily by ASHRAE):

"Fan and System Effects Experimental Apparatus"

"Direct Digital and Pneumatic Control of Ventilation and Energy Systems"

"Analysis, Design, and Construction of an Active Solar Thermal Energy System"

"Full-Scale Variable Air and Water Flow Wet Cooling Tower for Class Experiments"

New Faces in Engineering (early career recognition program; former undergraduate students):

Amanda (Curry) Bogner, 2005. ASHRAE finalist.

Cynthia Cogil, 2004. First National New Faces in Engineering winner.

Areas of Expertise Related to Energy Efficient Designs, Technologies, and Improvements

Load and Energy Calculations: Thermal comfort, psychrometrics, and energy management

HVAC&R Systems Design: Ventilation/IAQ, air distribution, fans, central equipment, insulation

Heat and Mass Transfer: Heat exchangers, heat recovery, coil/chiller/cooling tower performance

Plumbing, Piping, and Fire Protection Systems: Pump performance, optimal sizing, life safety

Solar-Thermal and PV Energy Systems: Site evaluation, system analysis and design, economics

Courses Taught at KU

HVAC&R science/systems/equipment/applications, fire protection, hydronic systems (plumbing/piping/pumps), solar energy systems, automatic controls, advanced energy analysis, engineering economics, introduction to architectural engineering, and an F.E. exam prep short-course on instrumentation, programming, and controls