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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. Retiring from KU, after 30+ years, 12-22.

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.

“Founding an Architectural Engineering Degree Program: Need and Curriculum,” *ASCE Journal of Architectural Engineering*, vol. 26, no. 4, December 2020.

“Comparing Building Surfaces’ Orientations to Optimize Solar Energy Collection”, *Journal of Green Building*, vol. 15, no. 2, Spring 2020.

“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