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Department of Mechanical Engineering
University of Louisiana at Lafayette

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RESEARCH INTERESTS

Building energy, HVAC&R systems, energy conversion and efficiency

ACADEMIC POSITIONS

- 01/2016 – Present **University of Louisiana at Lafayette**, Lafayette, LA
Assistant Professor, Department of Mechanical Engineering
- 08/2015 – 12/2015 **Baylor University**, Waco, TX
Postdoc Research Associate, School of Engineering and Computer Science

EDUCATION

- 08/2010 – 08/2015 **Texas A&M University**, College Station, TX
Ph.D. in Mechanical Engineering
Dissertation: “*Duct Design Impacts on Energy Consumptions and Life Cycle Costs for Residential Central Heating and Cooling Systems*”
Committee: Michael B. Pate (Chair), Dennis L. O’Neal, Bryan P. Rasmussen, Jorge L. Alvarado
- 08/2008 – 08/2010 **Texas A&M University**, College Station, TX
Master of Science in Mechanical Engineering
Thesis: “*Modeling of ECM Controlled Series Fan-Powered VAV Terminal Units*”
Committee: Dennis L. O’Neal (Chair), Michael B. Pate, Jorge L. Alvarado, Warren M. Heffington
- 09/2004 – 06/2008 **Shanghai Ocean University**, Shanghai, China
Bachelor of Science in Thermal Energy and Power Engineering
Thesis: “*Numerical Simulation and Thermal Comfort Analysis of a Clean Operating Room*”
Committee Chair: Kezhi Yu

AWARDS AND HONORS

- 02/2017 2016 ASHRAE Technical Paper Award (J. 7) (Four awarded per year)
- 02/2017 2016 ASHRAE Willis H. Carrier Award (One awarded per year)
- 02/2019 2018 ASHRAE Technical Paper Awards (J. 13, J. 14, & J. 15) (Four awarded per year)
- 02/2019 2018 ASHRAE Willis H. Carrier Award (One awarded per year)
- 05/2019 Early Career Researcher of 2019, College of Engineering, University of Louisiana
- 02/2020 2019 ASHRAE Technical Paper Award (J. 21) (Four awarded per year)
- 02/2021 2020 ASHRAE Crosby Field Award (J. 27)
- 02/2021 2020 ASHRAE Technical Paper Award (J. 25 & J. 26)

FUNDING

CIMM Seed Funding. Modular design and 3D metal printing for thermal metamaterial fabrication. \$10,000 (PI, 09/2020-06/2021)

UL Lafayette Educational Grant. An Online Remote Laboratory for Teaching Undergraduate Thermo-Fluids Courses. \$500 (PI, 09/2020-08/2021)

University of the Bío-Bío. State-of-the-art, typologies and reference building for the future energy rating of public, commercial and office buildings for Chile. \$4,000 (PI, 06/2020-08/2020)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Accounting for the Barometric Pressure Impacts on Psychrometric Performance Testing of Unitary Air-Conditioning and Heat Pump Equipment. \$132,174 (PI, 04/2020-10/2021)

LAEPSCoR SURE Program. Modular manufacturing of thermal shifters for heat flow manipulation. \$5,000 (PI, 01/2020-01/2021)

United States Department of Agriculture (USDA). Energy audit on agricultural producers and rural small businesses in Louisiana for energy demand reduction and efficiency improvement. \$99,816 USDA+\$49,908 UL Lafayette (PI, 07/2018-07/2020)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Undergraduate Program Equipment Grant. An air-conditioning system mockup for teaching undergraduate HVAC course. \$5,000 (PI, 09/2018-08/2019)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Understanding Fan Coil Components and How They Relate to Energy Consumption and Energy Modeling. \$160,845 (PI, 01/2017-02/2020)

Baylor University. Developing Fan Power Terminal Unit Performance Models Compatible with EnergyPlus. \$16,000 (PI, 01/2016-06/2016)

PEER-REVIEWED PUBLICATIONS (* indicates advised students)

JOURNAL ARTICLES

- J. 32 **Yin, P.**, T. Alam*, T. Chambers. 2021. Cooling performance prediction of hydronic fin-and-tube heat exchanger with non-uniform air velocity (RP-1741). *Science and Technology for the Built Environment*: Accepted.
- J. 31 **Yin, P.** and Y. Sang. 2020. Model-based Sensitivity Analysis of Barometric Pressure on Cooling Capacity Measurement of Hydronic Room Fan Coil Units. *Science and Technology for the Built Environment*, 27:3, 316-328,.
- J. 30 O’Neal, Dennis, J. Cramer, and **P. Yin**. 2021. Part-Load Airflow and Power Model of Multi-Speed Fan-Coil Units with Electronically Commutated Motors (RP-1741). *ASHRAE Transactions*: Accepted
- J. 29 O’Neal, Dennis, and **P. Yin**. 2020. An Improved Part-Load Airflow and Power Model for Fan-Powered Terminal Units with Electronically Commutated Motors. *Science and*

Technology for the Built Environment, 26:9, 1165-1176.

- J. 28 O’Neal, D., and **P. Yin**. 2021. A Simple Airflow and Power Analysis of Fan-Coil Units with Electronically Commutated Motors (RP-1741). *ASHRAE Transactions*. Accepted
- J. 27 O’Neal, D., and **P. Yin**. 2020. Using Normalized Airflows and Powers to Model the Performance of Multi-speed Fan Coil Units with Permanent Split Capacitor Fan Motors (RP-1741). *ASHRAE Transactions*. 126 (2): 594-606.
- J. 26 **Yin, P.**, B. Derouen*, A. McBride*, and D.L. O’Neal. 2020. Laboratory performance measurement of blowers with electronically commutated motors in horizontal low-profile fan coil units (RP-1741). *ASHRAE Transactions*. 126(1): 770-81
- J. 25 O’Neal, D., and **P. Yin**. 2020. A Simple Airflow and Power Model of Fan Coil Units with Permanent Split Capacitor Motors (RP-1741). *ASHRAE Transactions*. 126 (1): 759-69.
- J. 24 Sardoueinassab, Z*, **P. Yin**, and D.L. O’Neal. 2019. Energy Modeling and Analysis of variable airflow parallel fan-powered terminal units Using Energy Management System (EMS) in EnergyPlus. *Journal of Building Performance Simulation*. 176(1): 109-19.
- J. 23 **Yin, P.**, M. Pate, and F. Battaglia. 2019. In-field Performance Evaluation and Economic Analysis of Residential Ground Source Heat Pumps in Heating Operation. *Journal of Building Engineering*. 26:100932
- J. 22 O’Neal, Dennis, J. Cramer, and **P. Yin**. 2019. Field Evaluation of the Performance of Fan Coil Units with Permanent Split Capacitor Fan Motors. *Science and Technology for the Built Environment*. 10:1359-368.
- J. 21 Lu, D., D.L. O’Neal, and **P. Yin**. 2019. A Comparison of the Annual Energy Use of Fixed- and Variable-Airflow Parallel Fan-Powered Terminal Units in a Small Office Building. *ASHRAE Transactions*. 125: 633-647.
- J. 20 **Yin, P.** and M.B. Pate. 2019. An Energy and Life-Cycle Cost Comparison of Residential PSC and ECM Blower Systems Operating at Excess Pressures Due to Restrictive Ducts. *Journal of Building Engineering*. 22: 305-13.
- J. 19 Lai, W., **P. Yin**, and Y. Liu. 2018. Investigation of Flow Characteristics from an Inclined Jet on a Heated Rotating Disk. *International Journal of Heat and Mass Transfer*. 127: 943-56
- J. 18 Sardoueinassab, Z*, **P. Yin**, and D.L. O’Neal. 2018. Energy Modeling and Analysis of Inherent Air Leakage from Parallel Fan-Powered Terminal Units Using EMS in EnergyPlus. *Energy and Buildings*. 176: 109-19
- J. 17 Lu, D., D.L. O’Neal, and **P. Yin**. 2018. An Evaluation of Two Cooling Control Strategies with Variable-Airflow Series Fan-Powered Terminal Units. *ASHRAE Transactions*. 124 (2): 38-51.

- J. 16 O’Neal, D.L., **P. Yin**, and D. Lu. 2018. A Comparison of Fixed- and Variable-Airflow Series Fan-Powered Terminal Units. *ASHRAE Transactions*. 124 (1): 121-136.
- J. 15 **Yin, P.**, D.L. O’Neal, and D. Lu, 2018. Annual Energy Performance Evaluation of Series and Parallel Fixed-Airflow Fan Powered Terminal Units. *ASHRAE Transactions* 124 (1): 148-158
- J. 14 **Yin, P.**, D.L. O’Neal. 2018. Modelling Variable Airflow Parallel Fan-Powered Terminal Units in a Mass and Energy Balance Approach. *ASHRAE Transactions* 124 (1): 33-43.
- J. 13 **Yin, P.**, C. Reid, D.L. O’Neal. 2018. Modeling Variable Airflow Series Fan-Powered Terminal Units in a Mass and Energy Balance Approach. *ASHRAE Transactions* 124 (1): 22-32.
- J. 12 Faris, G., D. Int-Hout, D. O’Neal and **P. Yin**. 2017. Fan-Powered VAV Terminal Units: application and modeling implications from past and current research (Part three). *ASHRAE Journal* 60: 42-45
- J. 11 Faris, G., D. Int-Hout, D. O’Neal and **P. Yin**. 2017. Fan-Powered VAV Terminal Units: application and modeling implications from past and current research (Part two). *ASHRAE Journal* 59: 20-28
- J. 10 Faris, G., D. Int-Hout, D. O’Neal and **P. Yin**. 2017. Fan-Powered VAV Terminal Units: application and modeling implications from past and current research (Part one). *ASHRAE Journal* 58: 18-24.
- J. 9 **Yin, P.**, M.B. Pate. 2016. Impact of Duct Flow Resistance on Residential Heating and Cooling Energy Use in Systems with PSC and ECM Blowers. *Energy and Buildings* 130: 625-36
- J. 8 **Yin, P.**, Reid, C., D.L. O’Neal. 2016. Using a Mass and Energy Balance Approach to Model Parallel Fan-Powered Terminal Units with Fixed Airflow Fans. *ASHRAE Transactions* 122(2): 253-69.
- J. 7 Reid, C., D.L. O’Neal, **P. Yin**. 2016. Characterizing the Performance of Fixed Airflow Series Fan-Powered Terminal Units Using a Mass and Energy Balance Approach. *ASHRAE Transactions* 122(2): 240-52.
- J. 6 **Yin, P.**, M.B. Pate, J.F. Sweeney. 2016. Impact of Operating Pressure on Residential Bathroom Exhaust Fan Performance. *Journal of Building Engineering* 6: 163-172
- J. 5 **Yin, P.**, M.B. Pate, J.F. Sweeney. 2016. Experimental Performance Evaluations and Empirical Model Developments of Residential Furnace Blowers with PSC and ECM Motors. *Journal of Building Engineering* 5: 239-248
- J. 4 **Yin, P.**, D.L. O’Neal. 2014. Characterizing Airflow and Power of VAV Series Fan-Powered Terminal Units from Component Data: Part I. *ASHRAE Transactions* 120(2): 285-95

CONFERENCE
PAPERS/
POSTERS/
PRESENTATIONS

- J. 3 **Yin, P.**, D.L. O’Neal. 2014. Characterizing Airflow and Power of VAV Series Fan-Powered Terminal Units from Component Data: Part II. *ASHRAE Transactions* 120(2): 296-307
- J. 2 O’Neal, D.L., J. Edmondson, **P. Yin**. 2014. Comparison of Performance Characteristics of SCR and ECM Controlled Series Fan Powered Terminal Units. *HVAC&R Research* 20(2): 194-202.
- J. 1 Liu, L.P., **P. Yin**. 2008. Study on the Performance of a Direct Expansion Solar-Assisted Heat Pump System. *Journal of Shanghai Fisheries University* 17(2): 247-50
- C. 15 **Yin, P.** and T Chambers. 2020. Energy Savings of Motor Speed Control in an Airplane Painting Hangar: A Case Study. *2020 42nd Industrial Energy Technology Conference, New Orleans, LA (Virtual)*
- C. 14 **Yin, P.** and T Chambers. 2020. Energy audit in rural areas: challenges and opportunities in Louisiana (Presentation). *2020 ACEEE Rural Energy Conference, Chicago, IL.*
- C. 13 **Yin, P.** and T Chambers. 2020. USDA Sponsored Energy Audit on Louisiana Agricultural Producers (Poster). *2020 Louisiana Agricultural Technology & Management Conference, Marksville, LA.*
- C. 12 **Yin, P.**, T. Alam*, and D. O’Neal. 2019. Empirical modeling of variable air variable water fan coil units in cooling mode for building energy calculations (RP-1741). *2019 ASHRAE Annual Conference. Kansas City, MO.*
- C. 11 Sardoucinasab, Z. *, **P. Yin**, and D. O’Neal. 2019. Air Leakage Analysis and Modeling in Parallel Fan-Powered Terminal Units Using EnergyPlus. *2019 ASHRAE Annual Conference. Kansas City, MO.*
- C. 10 O’Neal, D. and **P. Yin**. 2019. A Field Evaluation of the Airflow Performance of Fan-Coil Units. *2019 ASHRAE Annual Conference. Kansas City, MO.*
- C. 9 Sardoucinasab, Z. *, **P. Yin**, and D. O’Neal. 2019. Comparison of Hydronic Fan-coil Unit Energy Consumption with Modulation and On-Off Controls (RP-1741). *2019 ASHRAE Annual Conference. Kansas City, MO.*
- C. 8 Sardoucinasab, Z. *, S.A. McInerny, and **P. Yin**. 2018. Modeling a Healthcare Facility in South Louisiana for Evaluating Potential Energy Savings. *2018 ASHRAE Winter Conference. Chicago, IL.*
- C. 7 **Yin, P.**, X. Xiao*. 2017. A Low-cost Bi-directional People Counter for Building Control. *2017 ASHRAE Annual Conference. Long Beach, CA.*
- C. 6 O’Neal, D.L., **P. Yin**, D. Ingram. 2016. Evaluation of Fan Models for Application to ECM Fan/Motor Combinations. *ASHRAE and IBPSA-USA SimBuild 2016: Building Performance Modeling. Salt Lake City, UT.*

- C. 5 **Yin, P.**, M.B. Pate, J.F. Sweeney. 2016. A Method of Efficacy Estimation for ECM Blowers in Residential Gas Furnaces by Using Blower Rotational Speed. *2016 ASHRAE Annual Conference. St. Louis, MO.*
- C. 4 **Yin, P.**, J.F. Sweeney, M.B. Pate. 2014. Impact of External Static Pressure on Residential Heating and Cooling Energy Use in Hot Climates. *ASHRAE/IBPSA-USA Building Simulation Conference. Atlanta, GA*
- C. 3 **Yin, P.**, J.F. Sweeney, M.B. Pate. 2014. Residential Bathroom Exhaust Fan Energy Performance Evaluations Conducted in a Well-Instrumented Laboratory Environment. *The 13th International Conference on Indoor Air Quality and Climate. Hong Kong.*
- C. 2 **Yin, P.**, J.F. Sweeney, M.B. Pate. 2014. The Impact of an ECM Blower on the System Performance of a 5-ton Air Conditioner. *ASHRAE Annual Conference. Seattle, WA.*
- C. 1 **Yin, P.**, M.B. Pate, J.F. Sweeney, J.D. Kading. 2014. The Effect of High Ambient Temperature on the Performance of an R410a Air Conditioner. *The 1st International Conference on Energy and Indoor Environment for Hot Climates. Doha, Qatar.*
- WORK IN
PROGRESS
- P. 2 Sardoucinasab, Z*, **P. Yin**, and D.L. O’Neal. 2021. Energy Modeling and Analysis of variable airflow series fan-powered terminal units Using Energy Management System (EMS) in EnergyPlus. *Journal of Building Performance Simulation.* Under review.
- P. 1 **Yin, P.**, T. Alam*, X. Xiao*, S. Zahra*, D.L. O’Neal. 2021. Experimental evaluation and empirical modeling of variable air variable water fan coil units in cooling mode for building energy calculation (RP-1741). *Science and Technology for the Built Environment.* Under review.

OTHER PUBLICATIONS

- TECHNICAL
REPORTS
- T. 8 Khankari, K., K.J. Gebke, D.A. John, M. Koupriyanov, A. Livchak, K.J. Loudermilk, and **P. Yin**. Airflow Patterns and Distribution of Airborne Contaminants in Indoor Spaces. *ASHRAE Technical Committee, TC 5.3 Room Air Distribution, October 2020.*
- T. 7 **Yin, P.**, Z. Sardoucinasab, T. Alam, B. Derouen, A. McBride, J. Cramer, and D. O’Neal. Understanding fan coil components and how they relate to energy consumption and energy modeling. *ASHRAE Research Project 1741. June 2019.*
- T. 6 O’Neal, D.L., C. Reid, D. Ingram, D. Lu, J.A. Bryant, S. Gupta, B. Kanaan, S. Bryant, **P. Yin**. Developing fan power terminal unit performance data and models compatible with EnergyPlus. *AHRI Report #8012. November 2016.*
- T. 5 **Yin, P.**, W. Choi, M.B. Pate, J.D. Kading. Cooling Performance Tests (AHRI 210/240) of a Rooftop Package Unit Charged with Skygreen Alltemp. Submitted to Skygreen Energy. December 2013.
- T. 4 **Yin, P.**, W. Choi, M.B. Pate, J.D. Kading. Cooling Performance Tests (AHRI 210/240) of a Rooftop Package Unit Charged with Sponsor Provided Fluid. Submitted to Bluon Energy.

June, 2013.

- T. 3 **Yin, P.**, M.B. Pate, J.D. Kading. Experimental Saturation Pressure-Temperature Relationship of TdX. Submitted to Bluon Energy. February 2013.
- T. 2 **Yin, P.**, M.B. Pate, J.D. Kading. Performance Tests (AHRI 210/240) of an R410a Rooftop Package Unit. Submitted to Southern California Edison Technology Test Center. February, 2012.
- T. 1 **Yin, P.**, M.B. Pate, J.D. Kading. Cooling and Heating Performance Rating (AHRI 210/240) of the Cascade Energy Saver. Submitted to Cascade Manufacturing, LLC. August, 2011.

INVITED TALK

- IT. 1 Residential Air Conditioning System and Refrigerant Selection. Spring 2014 MEEN 437 Principles of Heating, Ventilating and Air Conditioning, Texas A&M University at Qatar, Doha, Qatar, February 2014.
- IT. 2 Sensor Development and Application for Human-in-the-loop Thermal Comfort Control in Residential and Small Commercial Buildings. ASME Student Chapter Meeting, University of Louisiana at Lafayette, Lafayette, LA, March 2nd, 2016
- IT. 3 Industrial/Commercial Energy Efficiency in Louisiana. Louisiana Solid Waste Association (LSWA) Environmental Conference. Lafayette, LA, March 17th, 2016.
- IT. 4 Energy analysis and modeling of fan-powered VAV terminal units. ASHRAE New Orleans and Baton Rouge Chapter Monthly Meeting. October 18th and 19th, 2017.

SERVICE

TECHNICAL COMMITTEE

- ASHRAE TC 5.3, Corresponding Member, 2016 – Present
- ASHRAE TC 6.8, Corresponding Member, 2016 – Present
- IBPSA Education Committee Member, 2018 – Present
- ASHRAE TC 5.3 Ad Hoc Committee for COVID-19 Mitigation, 2020

CHAIRING

- Session Chair, ASHRAE Annual Conferences, 2018
- Session Chair, ASHRAE Winter Conferences, 2019

REVIEWER

- ASHRAE Transactions, 2013 – Present
- Energy and Buildings, 2016 – Present
- ASHRAE Winter and Annual Conferences, 2017-Present
- Buildings and Environment, 2019-Present
- Journal of Building Performance Simulation, 2019-Present
- Science and Technology in Built Environment, 2019-Present
- Applied Energy, 2020-Present
- Sustainability, 2020-Present

- Electronics, 2020-Present

DEPARTMENT

- Faculty Search Committee, Department of Mechanical Engineering, UL Lafayette, 2017
- Departmental Secretary Search Committee, Department of Mechanical Engineering, UL Lafayette, 2020

COMMUNITY

- Judge for Elementary Beta Convention Engineering Competition, Lafayette, LA, 01/2020
- Louisiana Climate Initiatives Task Force-Science Advisory Group, member, 2020-2021

PROFESSIONAL AFFILIATIONS

- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
- International Building Performance Simulation Association-USA (IBPSA-USA)
- International Society of Indoor Air Quality and Climate (ISIAQ)

FACULTY DEVELOPMENT

RESEARCH

- NSF Career Webinar, UL Lafayette, May 9, 2019

TRAINING

- NSF Career Proposal Writing Workshop, UL Lafayette, June 4, 2019
- How to Engage: DoD Basic Research Enterprise, LSU, February 20, 2020
- Online Solar Training, Solar Energy International (SEI), March 2020

TEACHING

- Workshop Alternatives to Lectures, March 17, 2020

TRAINING

TEACHING

INSTRUCTOR

- Baylor U., ME 4345 Heat Transfer, Fall 2015
- UL Lafayette, MCHE 466 Environmental Engineering, every spring semester
- UL Lafayette, MCHE 471 Fluid Mechanics II, every fall semester
- UL Lafayette, ENGR 697 Individual Directed Study, Fall 2016
- UL Lafayette, MCHE 469 Heat Transfer, every spring semester
- UL Lafayette, MCHE 578 Building Heat Transfer and Energy Modeling, every fall semester

GRADUATE STUDENT ADVISING

PhD

- Xiaoguang Xiao, May 2021 (Committee Chair)
- Zahra Sardoueinassab, May 2019 (Committee Chair)

MASTER

- Imtiaz Qavi, August 2020 (Committee Member)
- Md Nayer Nasim, August 2020 (Committee Member)
- Tanjebul Alam, December 2019 (Committee Chair)
- Matthew Langschwager, December 2018 (Committee Member)
- Xiaoguang Xiao, May 2018 (Committee Member)
- Zahra Sardoueinassab, May 2017 (Committee Member)
- Salman Sakib, May 2017 (Committee Member)

UNDERGRADUATE STUDENT ADVISING

- Eric Vernon (Summer 2017): Design and construction of a psychrometric facility
- Joseph Andrew (Summer and Fall 2017): Design a low-cost open-source wireless sensor node
- Albert McBride (Fall 2018, Spring 2019): Performance evaluation of fan coil units
- Beau Barrett Derouen (Fall 2018, Spring 2019): Performance evaluation of fan coil units
- Dylan Liner: Energy audit for agricultural producers and small business (Fall 2018, Spring 2019), modular design of thermal metamaterials (Spring and Fall 2020)
- Dylan Liner (Spring 2020, Summer 2020): Modular manufacturing of thermal shifters for heat flow manipulation
- Colin Nezat (Fall 2020): Nature-inspired thermal regulation for built environment and people thermal comfort control

SENIOR DESIGN ADVISING

- Psychro Squad (Fall 2016): Johndavid Nickel, Lyla Breau, Yihui Wang, Shuosheng Luo, Evan Hosli
- Cool Breeze (Spring 2019): Bryce Vizona, Beau DeRouen, Bryant Montero, Stephen DeRouen, Eric Vernon
- The Spinners (Spring 2019): Taylor Marks, Kevin Frank, Michael Comeaux, Madison Thibodeaux, Farrah R Freeman