

ONE-PAGE SUMMARY

Wangda Zuo, Ph.D.

Date: May 3, 2022

Education:

Ph. D. (05/2010) Mechanical Engineering, *Purdue University*, USA
M. Sc. (07/2005) Computational Engineering, *Friedrich-Alexander-University Erlangen-Nuremberg*, Germany
M. Eng. (06/2003) and B. Sc. (07/2000) Automation, *Chongqing University*, China

Fields of Interests:

Smart, Sustainable, and Resilient City; Building and District Energy Systems
Indoor Environment Modeling; Building Controls Design and Optimization

Current Positions:

Professor, Department of Architectural Engineering, Department of Mechanical Engineering, Pennsylvania State University

Associate Director for Research, Global Building Network, Pennsylvania State University

Associate Faculty, Institute of Computational and Data Science, Pennsylvania State University

Joint Appointment, Buildings and Thermal Sciences Center, National Renewable Energy Laboratory

Major Professional Services:

- *Associate Editor*, Journal of Solar Energy Engineering: Including Wind Energy and Building Energy Conservation; Sustainable Buildings
- *Treasurer* and *Affiliate Director* of International Building Performance Simulation Association (IBPSA)
- *Chair, Vice-Chair, Secretary, Subcommittee Chair* and *Voting Member* of various ASHRAE committees

Major Honors and Awards:

- *Best Paper Award*, ISHVAC 2021
- *Fellow*, International Building Performance Simulation Association, 2021
- *Research Development Award*, Department of Civil, Environmental and Architectural Engineering, CU Boulder, 2020.
- *ExCEED Teaching Fellow*, American Society of Civil Engineers, 2019
- *Lewis-Worcester Faculty Fellow*, College of Engineering, CU Boulder, 2017-2021
- *Distinguished Service Award*, ASHRAE, 2017
- *Eliahu I. Jury Early Career Research Award*, College of Engineering, University of Miami, 2016
- *SEEDS You Choose Leadership Award*, University of Miami, 2013, 2014, 2015, 2016
- *Emerging Professional Award*, IBPSA-USA, 2016
- *Provost Research Award*, University of Miami, 2014

Publications:

- Google Scholar Profile (Citations: 2685; h-index: 26; i10-index: 58)
- Book Chapters: 1 Journal Papers: 59 Conference Papers: 66

Sponsored Research Projects:

- \$8.8M (Zuo as PI: \$7.6M)
- 32 projects funded by NSF, DOE, DOD, DHS, DTRA, CERC, ASHRAE, Chase, Delos, etc.

Major Subjects Taught:

Thermodynamics; Fluid Mechanics; Heat Transfer; Building Energy Modeling; Sustainable Building Design; Indoor Environment Modeling

Supervisees:

| <i>Summary</i> | <i>Total</i> | <i>Completed</i> | <i>In Progress</i> |
|----------------------------|--------------|------------------|--------------------|
| Ph.D. Students | 16 | 6 | 10 |
| M.S. & B.S. Students | 31 | 29 | 2 |
| Visiting Scholars/Students | 16 | 16 | 0 |

Wangda Zuo

Date: May 3, 2022

Department of Architectural Engineering
Pennsylvania State University
University Park, PA 16802

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Principle Fields of Interests

Smart, Sustainable, and Resilient City
Building and District Energy Systems
Grid-interactive Efficient Data Centers
Building to Grid Integration
Indoor Environment Modeling
Building Controls Design and Optimization

Education

Ph. D. (05/2010) Mechanical Engineering, *Purdue University*, USA
M. Sc. (07/2005) Computational Engineering, *Friedrich-Alexander-University Erlangen-Nuremberg*, Germany
M. Eng. (06/2003) Automation, *Chongqing University*, China
B. Sc. (07/2000) Automation, *Chongqing University*, China

Experience

| <i>Institution</i> | <i>Position</i> | <i>Beginning</i> | <i>Ending</i> |
|---|-----------------------------|------------------|---------------|
| Department of Architectural Engineering, <i>Pennsylvania State University</i> , USA | Professor | 01/2022 | - |
| Department of Civil, Environmental and Architectural Engineering, <i>University of Colorado Boulder</i> , USA | Associate Professor | 08/2017 | 12/2021 |
| Department of Civil, Architectural and Environmental Engineering, <i>University of Miami</i> , USA | Assistant Professor | 01/2013 | 08/2017 |
| Environmental Energy Technology Division, <i>Lawrence Berkeley National Laboratory</i> , USA | Research Scientist | 03/2011 | 12/2012 |
| Environmental Energy Technology Division, <i>Lawrence Berkeley National Laboratory</i> , USA | Post-Doctoral Fellow | 05/2010 | 03/2011 |
| School of Mechanical Engineering, <i>Purdue University</i> , USA | Graduate Research Assistant | 08/2006 | 04/2010 |
| German Aerospace Center, Germany | Researcher | 09/2005 | 08/2006 |

Other Experience

| <i>Institution</i> | <i>Position</i> | <i>Beginning</i> | <i>Ending</i> |
|---|---------------------------------|------------------|---------------|
| Global Building Network, <i>Pennsylvania State University</i> , USA | Associate Director for Research | 01/2022 | - |
| Institute of Computational and Data Science, <i>Pennsylvania State University</i> , USA | Associate Faculty | 01/2022 | - |

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| Department of Mechanical Engineering, <i>Pennsylvania State University</i> , USA | Affiliated Faculty | 01/2022 | - |
| Smart, Sustainable, and Resilient City, <i>University of Colorado Boulder</i> , USA | Faculty Director | 07/2020 | 12/2021 |
| Department of Mechanical Engineering, <i>University of Colorado Boulder</i> , USA | Affiliated Faculty | 07/2020 | 12/2021 |
| Community Engagement Design and Research Center, <i>University of Colorado Boulder</i> , USA | Affiliated Faculty | 10/2019 | 12/2021 |
| Buildings and Thermal Sciences Center, <i>National Renewable Energy Laboratory</i> , USA | Joint Appointment | 03/2018 | - |
| College of Engineering, <i>University of Colorado Boulder</i> , USA | Lewis-Worcester Faculty Fellow | 08/2017 | 12/2021 |
| Department of Civil, Architectural and Environmental Engineering, <i>University of Miami</i> , USA | Adjunct Professor | 08/2017 | 07/2018 |
| Center for Computational Science, <i>University of Miami</i> , USA | Member | 09/2016 | 08/2017 |
| Center for Urban & Community Design, <i>University of Miami</i> , USA | Member | 03/2016 | 08/2017 |
| University Erlangen-Nuremberg, Germany | Research Assistant | 05/2004 | 02/2005 |
| Automation and Drives Group, Siemens AG, Germany | Intern | 07/2003 | 10/2004 |
| Automation and Drives Group (A&D), Siemens Ltd., China | Intern | 12/2001 | 07/2002 |

Teaching Record

| Term | Subject No. | Subject Title | Role |
|-------------|--------------------|-----------------------------------|---------------|
| 2021 Fall | AREN4890/5890 | Sustainable Building Design | Instructor |
| 2021 Spring | AREN2110 | Thermodynamics | Instructor |
| 2020 Fall | AREN4890/5890 | Sustainable Building Design | Instructor |
| 2020 Spring | AREN2110 | Thermodynamics | Instructor |
| 2020 Spring | AREN4317 | Architectural Engineering Design | Co-Instructor |
| 2019 Fall | AREN4890/5890 | Sustainable Building Design | Instructor |
| 2019 Spring | AREN4317 | Architectural Engineering Design | Co-Instructor |
| 2018 Fall | AREN4890/5890 | Sustainable Building Design | Instructor |
| 2018 Spring | AREN4317 | Architectural Engineering Design | Co-Instructor |
| 2018 Spring | AREN2120 | Fluid Mechanics and Heat Transfer | Instructor |
| 2017 Fall | AREN3010 | Mechanical Systems for Buildings | Co-Instructor |
| 2017 Fall | AREN4890/5890 | Sustainable Building Design | Instructor |
| 2017 Spring | CAE781 | Advanced Building Energy Modeling | Instructor |
| 2017 Spring | CAE560/660 | Sustainable Construction | Instructor |
| 2016 Fall | CAE780 | Indoor Environment Modeling | Instructor |
| 2016 Spring | CAE560/660 | Sustainable Construction | Instructor |

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|-------------|-----------|---|------------|
| 2015 Fall | CAE790-T | Modeling and Simulation of Building Energy and Control System | Instructor |
| 2015 Spring | CAE560 | Sustainable Construction | Instructor |
| 2014 Fall | CAE680 | Indoor Environment Modeling | Instructor |
| 2014 Spring | CAE560 | Sustainable Construction | Instructor |
| 2013 Fall | CAE690-T | Advanced Modeling of Hybrid Systems in Buildings | Instructor |
| 2013 Fall | CAE690-01 | Data Analysis and Visualization for Building Systems | Instructor |
| 2013 Spring | CAE560 | Sustainable Construction | Instructor |

Sponsored Research

| | <i>Project Title</i> | <i>Sponsor</i> | <i>Role</i> | <i>Amount (\$)</i> |
|-----|--|--|-------------|--------------------|
| 32. | U.S.-Ireland R&D Partnership: Intelligent Data Harvesting for Multi-Scale Building Stock Classification and Energy Performance Prediction (Award No. CBET-2110171, 09/21-12/21; CBET-2217410, 01/22-08/24) | National Science Foundation | PI | 388,623 |
| 31. | IUCRC Proposal Phase I: University of Colorado Boulder: Center for Building Energy Smart Technologies (BEST) (Award No. IIP-2113907, 08/21-07/26) | National Science Foundation | Co-PI | 750,000 |
| 30. | Improving the Models and Understanding of the Indoor Contaminant Transportation (08/21-08/22) | Defense Threat Reduction Agency via LBNL | PI | 99,993 |
| 29. | OpenStudio Software Testing Methodologies Through Building Science Modeling and Analysis (11/20-08/21) | Department of Energy via NREL | PI | 50,723 |
| 28. | Optimal Co-Design of Integrated Thermal-Electrical Networks and Control Systems for Grid-interactive Efficient District (GED) Energy Systems (Award No. DE-EE0009139, 10/20-3/24) | Department of Energy | PI | 4,159,922 |
| 27. | Integrated Urban Outdoor and Indoor Hazard Prediction (07/20-04/21) | Defense Threat Reduction Agency via LBNL | PI | 100,000 |
| 26. | EAGER: Collaborative Research: Modernizing Cities via Smart Garden Alleys with Application in Makassar City (Award No. CNS-2025459, 07/20-06/23) | National Science Foundation | PI | 175,000 |
| 25. | Modelica-ISAT-FFD for Coupled HVAC and Airflow Simulation (12/19-09/20) | Department of Energy via LBNL | PI | 40,000 |
| 24. | Assessing Human Health and Well-being with the WELL Building Standard (11/19-11/21) | Delos Living LLC | PI | 54,000 |
| 23. | Support for District Simulation with Modelica (06/19-06/22) | Department of Energy via NREL | PI | 575,000 |
| 22. | Model Development for Virtual Electric Power Board (04/19-09/19) | Department of Energy via ORNL | PI | 15,400 |

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| 21. | Building Energy Modeling - OpenStudio SDK Development and Management (03/19-09/20) | Department of Energy via PNNL | PI | 80,000 |
| 20. | Comprehensive Pliant Permissive Priority Optimization (01/19-09/20) | Department of Energy via PNNL | PI | 150,000 |
| 19. | Statistical Analysis of Pre-Occupancy and Post-Occupancy Survey for a WELL Certified Building (10/18-03/19) | Delos Living LLC | PI | 6,032 |
| 18. | Planning IUCRC at University of Colorado Boulder: Center for Building Energy Smart Technologies (BEST) (Award No. IIP-1822156, 09/18-08/19) | National Science Foundation | Co-PI | 15,000 |
| 17. | An Innovative Computational Platform for Robust and Optimal Operation of Renewable Energy Cities (09/18-08/19) | Colorado Energy Research Collaboratory | PI | 50,000 |
| 16. | 1661-TRP, Development of Near-Optimal Control Sequence for Chiller Plants with Water Side Economizer Using Dynamic Models (08/17-04/22) | ASHRAE | PI | 116,560 |
| 15. | CRISP Type 1: Collaborative Research: A Human-Centered Computational Framework for Urban and Community Design of Resilient Coastal Cities (Award No. OAC-1638336, 01/17-12/19) | National Science Foundation | Co-PI | 299,579 |
| 14. | Improving Data Center Energy Efficiency through End-To-End Cooling Modeling and Optimization (Award No. DE-EE0007688, 10/16-05/20) | Department of Energy | PI | 614,645 |
| 13. | Building to Grid Integration in a Smart City (10/16-08/17) | University of Miami | PI | 2,500 |
| 12. | BIGDATA: Collaborative Research: IA: Big Data Analytics for Optimized Planning of Smart, Sustainable, and Connected Communities (Award No. IIS-1633338, 9/16-8/17; IIS-1802017, 8/17-8/22) | National Science Foundation | PI | 443,867 |
| 11. | Fast Simulation of Dense Gas Transportation in Buildings Using Cross-Platform Parallel Computing (07/16-08/17) | Department of Homeland Security via LBNL | PI | 25,000 |
| 10. | Model-based Controls Optimization for a Data Center Cooling System (04/16-12/16) | JPMorgan Chase | PI | 40,000 |
| 9. | 1771-TRP, Energy Modeling of Typical Commercial Buildings in Support of ASHRAE Building Energy Quotient Energy Rating Program (04/16-03/22) | ASHRAE | PI | 199,395 |
| 8. | Living Campus Energy Laboratory (06/15-05/16) | University of Miami | PI | 2,500 |

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| 7. | Development of a Fast Model for Predicting Dense Gas Transportation in Buildings (02/15-12/15) | Department of Homeland Security via LBNL | PI | 25,000 |
| 6. | Research Exchange in Building Energy Modeling (09/14-07/15) | University of Miami | PI | 2,500 |
| 5. | Development and Demonstration of a Scalable Indoor Environment Model for Model Predictive Control of Energy Efficient Building Ventilation (06/14-05/15) | University of Miami | PI | 16,071 |
| 4. | Developing Model-Based Fault Detection and Diagnostic for the Energy Efficient Building System Operation (01/14-09/14) | University of Miami | PI | 2,500 |
| 3. | Implementation and Validation of Modelica Based Models for a Large Chiller Plant System (01/13-09/16) | Department of Defense via LBNL | PI | 120,001 |
| 2. | Coupling Fast Fluid Dynamics and Modelica Buildings Library for Integrated Simulation of Indoor Environment and HVAC Systems (01/13-09/13) | Department of Energy via LBNL | PI | 30,100 |
| 1. | Demonstration of a Modelica-Based Tool Chain for Rapid Prototyping and Evaluation of Integrated Building Controls (02/12-01/13) | Department of Energy through Consortium for Building Energy Innovation | Co-PI | 188,700 |

Received Industrial Gift for Research

- J. Cumpton, \$1000, 12/31/2014.
- Costal Construction of M.D. County, Inc, \$4000, 10/24/2013.

Ph.D. Theses Supervised

| <i>Student</i> | <i>Title of Thesis</i> | <i>Completion Date</i> |
|------------------------|--|------------------------|
| Nasim Mamaghani | To be decided <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| Chengnan Shi | To be decided <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| Yizhi Yang | To be decided <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| Saranya Anbarasu | To be decided <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| Mingzhe Liu | To be decided <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| John E. Castellini Jr. | To be decided <i>Ph.D. in Mechanical Engineering at the University of Colorado Boulder</i> | Current Student |

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| Yingli Lou | Inter-connections among Energy Consumption, Carbon Emissions, and Economic Impacts for Sustainable Buildings <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |
| Cary Alexander Faulkner | Modeling and Control for Sustainable and Resilient Buildings <i>Ph.D. in Mechanical Engineering at the University of Colorado Boulder</i> | Current Student |
| Kathryn Hinkelman | From Furnaces to Forests: Innovations in Modeling and Simulation for the Transition of Legacy District Energy Systems to Integrated Biomimetic Designs <i>Ph.D. in Architectural Engineering at the Pennsylvania State University</i> | Current Student |
| Thomas Alonso Sevilla | Model-based Control of Distributed Energy Resources for Building-to-Grid Integrations <i>Ph.D. in Civil Engineering at the University of Miami</i> Co-advised with Dr. Gang Wang | Current Student |
| Jing Wang | Human-Centric Modeling and Optimization for Low Carbon and Resilient Communities <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> * Sole Nominee for College of Engineering & Applied Science's Outstanding Dissertation Award by Department of Civil, Environmental, and Architectural Engineering. | 09/2021 |
| Xu Han | Holistic Optimization of Data Center Cooling Systems and Airflow Management <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | 11/2020 |
| Yangyang Fu | Modeling and Control for Grid-interactive Efficient Data Centers <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> | 03/2020 |
| Yunyang Ye | Standardized Computational Framework for Prototypical Building Energy Model Creation and Building Energy Analyses <i>Ph.D. in Architectural Engineering at the University of Colorado Boulder</i> * Sole Nominee for College of Engineering & Applied Science's Outstanding Dissertation Award by Department of Civil, Environmental, and Architectural Engineering. | 10/2019 |
| Wei Tian | Coupled Simulation of Indoor Airflow, HVAC, Control, and Building Envelope <i>Ph.D. in Civil Engineering at the University of Miami</i> *College of Engineering's Outstanding Ph.D. Research Award | 07/2017 |
| Sen Huang | Model Based Technologies for Enhancing Building Operation <i>Ph.D. in Civil Engineering at the University of Miami</i> | 04/2016 |

M.S. Thesis Supervised

| <i>Student</i> | <i>Title of Research Project</i> | <i>Completion Date</i> |
|-----------------------|---|-------------------------------|
| David Milner | To be decided <i>M.S. in Architectural Engineering at the University of Colorado Boulder</i> | Current Student |

Dominik Sebastian Jankowski Implementation and Evaluation of Conditional Generative Adversarial Networks for Fast Indoor Air Prediction 01/2021
M.S. in Mechanical Engineering at Coburg University of Applied Sciences, Germany

M.S. Research Project Supervised

| Student | Title of Research Project | Completion Date |
|-----------------|--|------------------------|
| Angelique Fathy | Modeling of a Zero Energy, Cold-climate Residential Building Design <i>M.S. in Architectural Engineering at the University of Colorado Boulder</i> Co-advised with Jennifer Scheib | 07/2020 |

Publications

Symbols:

Underline: Current or former students.

Italic: Current or former visiting scholars.

Book Chapter

1. S. Huang, T. Sevilla, **W. Zuo** 2019, Chapter 19 “Modeling in Building-to-Gird Integration” in *Building Performance Simulation for Design and Operation* (Edition 2), Edited by J.L.M. Hensen and R. Lamberts, Routledge Taylor & Francis Group. ISBN 9781138392199.

Journal Papers

59. J. Wang, P Munankarmi, J. Maguire, C. Shi, **W. Zuo**, D. Roberts, X. Jin 2022. “Carbon Emission Responsive Building Control: A Case Study with an All-Electric Residential Community in a Cold Climate”, *Applied Energy*. 314, pp 118910. <https://doi.org/10.1016/j.apenergy.2022.118910>.
58. K. Hinkelman, J. Wang, **W. Zuo**, A. Gautier, M. Wetter, *C. Fan*, N. Long 2022. “Modelica-Based Modeling and Simulation of District Cooling Systems: A Case Study.” *Applied Energy*. 311, pp 118654. <https://doi.org/10.1016/j.apenergy.2022.118654>.
57. *C. Tian*, Y. Ye, Y. Lou, **W. Zuo**, G. Zhang, C. Li 2022. “Daily Power Demand Prediction for Buildings at A Large Scale using A Hybrid of Physics-based Model and Generative Adversarial Network.” *Building Simulation*. <https://doi.org/10.1007/s12273-022-0887-y>.
56. Y. Lou, Y. Ye, Y. Yang, **W. Zuo** 2022. “Long-term Carbon Emission Reduction Potential of Building Retrofit Measures with Dynamically Changing Electricity Emission Factors.” *Building and Environment*. 210, pp. 108683. <https://doi.org/10.1016/j.buildenv.2021.108683>.
55. C. A. Faulkner, J. E. Castellini Jr., **W. Zuo**, D. M. Lorenzetti, M. D. Sohn 2022. “Investigation of HVAC Operation Strategies for Office Buildings During COVID-19 Pandemic.” *Building and Environment*. 207, Part B, pp. 108519. <https://doi.org/10.1016/j.buildenv.2021.108519>.
54. J. E. Castellini Jr., C. A. Faulkner, **W. Zuo**, D. M. Lorenzetti, M. D. Sohn 2022. “Assessing the Use of Portable Air Cleaners for Reducing Exposure to Airborne Diseases in a Conference Room with Thermal Stratification.” *Building and Environment*, 207, Part B, pp. 108441. <https://doi.org/10.1016/j.buildenv.2021.108441>.
53. Y. Lou, Y. Yang, Y. Ye, **W. Zuo**, J. Wang 2021. “The Effect of Building Retrofit Measures on CO₂ Emissions Reduction – A Case Study with U.S. Medium Office Buildings.” *Energy and Buildings*. 253, pp. 111514. <https://doi.org/10.1016/j.enbuild.2021.111514>.
52. J. Wang, S. Huang, **W. Zuo**, D. Vrabie 2021. “Occupant Preference-Aware Load Scheduling for Resilient Communities.” *Energy and Buildings*. 252, pp. 111399. <https://doi.org/10.1016/j.enbuild.2021.111399>.
51. S. Huang, J. Wang, Y. Fu, **W. Zuo**, K. Hinkelman, R. M. Kaiser, *D. He*, D. Vrabie 2021. “An Open-Source Virtual Testbed for a Real Net-Zero Energy Community.” *Sustainable Cities and Society*. 75, pp. 103255.

<https://doi.org/10.1016/j.scs.2021.103255>.

50. C. Fan, K. Hinkelman, Y. Fu, W. Zuo, S. Huang, C. Shi, N. Mamaghani, C. A. Faulkner, X. Zhou 2021. "Open-source Modelica Models for the Control Performance Simulation of Chiller Plants with Water-side Economizer." *Applied Energy*. 299, pp. 117337. <https://doi.org/10.1016/j.apenergy.2021.117337>.
49. S. Huang, W. Zuo, D. Vrabie, R. Xu 2021. "Modelica-based System Modeling for Control-related Faults in Chiller Plants and Boiler Plants Serving Large Office Buildings." *Journal of Building Engineering*, 44, pp 102654. <https://doi.org/10.1016/j.jobe.2021.102654>.
48. Y. Ye, K. Hinkelman, Y. Lou, W. Zuo, G. Wang, J. Zhang 2021. "Evaluating the Energy Impact Potential of Energy Efficiency Measures for Retrofit Applications: A Case Study with U.S. Medium Office Buildings." *Building Simulation*. 14, pp 1377-1393. <https://doi.org/10.1007/s12273-021-0765-z>.
47. S. Huang, Y. Ye, Di. Wu, W. Zuo 2021. "An Assessment of Power Flexibility from Commercial Building Cooling Systems in the United States." *Energy*. 221, pp 119571. <https://doi.org/10.1016/j.energy.2020.119571>.
46. X. Han, W. Tian, J. VanGilder, W. Zuo, C. A. Faulkner 2021. "An Open Source Fast Fluid Dynamics Model for Data Center Thermal Management." *Energy and Buildings*. 230, pp. 110599. <https://doi.org/10.1016/j.enbuild.2020.110599>.
45. Q. Zhang, W. Saad, M. Bennis, X. Lu, M. Debbah, and W. Zuo 2021. "Predictive Deployment of UAV Base Stations in Wireless Networks: Machine Learning Meets Contract Theory." *Transaction of Wireless Communications*, 20 (1), pp. 637-652. <https://doi.org/10.1109/TWC.2020.3027624>.
44. J. Wang, K. Garifi, K. Baker, W. Zuo, Y. Zhang, S. Huang, D. Vrabie 2020. "Optimal Renewable Resource Allocation and Load Scheduling of Resilient Communities." *Energies*. 13, pp. 5683. <https://doi.org/10.3390/en13215683>.
43. Y. Fu, X. Han, K. Baker, W. Zuo 2020. "Assessments of Data Centers for Provision of Frequency Regulation." *Applied Energy*. pp. 115621. <https://doi.org/10.1016/j.apenergy.2020.115621>.
42. Y. Ye, Y. Lou, W. Zuo, E. Franconi, G. Wang, 2020. "How Do Electricity Pricing Programs Impact the Selection of Energy Efficiency Measures? -A Case Study with U.S. Medium Office Buildings." *Energy and Buildings*. 224, pp. 110267. <https://doi.org/10.1016/j.enbuild.2020.110267>.
41. Y. Ye, Y. Lou, M. Strong, S. Upadhyaya, W. Zuo, G. Wang 2020. "Development of New Baseline Models for U.S. Medium Office Buildings Based on Commercial Buildings Energy Consumption Survey Data." *Science and Technology for the Built Environment*, 26(9), pp. 1321-1336, <https://doi.org/10.1080/23744731.2020.1765616>.
40. G. Zhang, C. Tian, C. Li, J.J. Zhang, W. Zuo 2020. "Accurate Forecasting of Building Energy Consumption Via A Novel Ensembled Deep Learning Method Considering the Cyclic Feature." *Energy*. 201, pp. 117531. <https://doi.org/10.1016/j.energy.2020.117531>.
39. W. Tian, X. Han, W. Zuo, Q. Wang, Y. Fu, M. Jin 2019. "An Optimization Platform Based on Coupled Indoor Environment and HVAC Simulation and Its Application in Optimal Thermostat Placement." *Energy and Buildings*, 199, pp. 342-251. <https://doi.org/10.1016/j.enbuild.2019.07.002>.
38. Y. Fu, W. Zuo, M. Wetter, J. W. VanGilder, P. Yang 2019. "Equation-based Object-oriented Modeling and Simulation of Data Center Cooling Systems." *Energy and Buildings*. 198, pp. 503-519. <https://doi.org/10.1016/j.enbuild.2019.06.037>.
37. S. Huang, X. Lu, W. Zuo, X. Zhang, C. Liang 2019. "Model-based Optimal Operation of Heating Tower Heat Pump Systems." *Building and Environment*, 160, pp. 106199. <https://doi.org/10.1016/j.buildenv.2019.106199>.
36. W. Tian, J.W. VanGilder, X. Han, C.M. Healey, M.B. Condor, W. Zuo 2019. "A New Fast Fluid Dynamics Model for Data-Center Floor Plenums." *ASHRAE Transactions*, 125, pp. 141-148.
35. X. Lu, K. Hinkelman, Y. Fu, J. Wang, W. Zuo, Q. Zhang, W. Saad 2019. "An Open Source Modeling Framework for Interdependent Energy-Transportation-Communication Infrastructure in Smart and Connected Communities." *IEEE Access*, 7, pp. 55458-55476. <https://doi.org/10.1109/ACCESS.2019.2913630>.

34. Y. Ye, K. Hinkelman, J. Zhang, **W. Zuo**, G. Wang 2019. “A Methodology to Create Prototypical Building Energy Models for Existing Buildings: A Case Study on U.S. Religious Worship Buildings.” *Energy and Buildings*, 194, pp. 351-365. <https://doi.org/10.1016/j.enbuild.2019.04.037>.
33. S. Huang, Y. Ye, X. Han, **W. Zuo**, X. Zhang, L. Jiang 2019. “Performance Evaluation of Heating Tower Heat Pump Systems over the World.” *Energy Conversion and Management*, 186, pp. 500-515. <https://doi.org/10.1016/j.enconman.2019.03.003>.
32. Y. Fu, **W. Zuo**, M. Wetter, J. VanGilder, X. Han, D. Plamondon 2019. “Equation-Based Object-Oriented Dynamic Modeling and Simulation for Data Center Cooling System: A Case Study in Massachusetts.” *Energy and Buildings*, 186, pp. 108-125. <https://doi.org/10.1016/j.enbuild.2019.01.018>.
31. Y. Ye, **W. Zuo**, G. Wang 2019 “A Comprehensive Review of Energy-Related Data for U.S. Commercial Buildings.” *Energy and Buildings*, 186, pp. 126-137. <https://doi.org/10.1016/j.enbuild.2019.01.020>.
30. J. Wang, **W. Zuo**, L. Rhode-Barbarigos, X. Lu, J. Wang, Y. Lin 2019. “Literature Review on Modeling and Simulation of Energy Infrastructures from a Resilience Perspective.” *Reliability Engineering and System Safety*, 183, pp. 360-373. <https://doi.org/10.1016/j.ress.2018.11.029>.
29. S. Huang, **W. Zuo**, H. Lu, C. Liang, X. Zhang 2019. “Performance Comparison of A Heating Tower Heat Pump and An Air-source Heat Pump: A Comprehensive Modeling and Simulation Study.” *Energy Conversion and Management*, 180, pp. 1039-1054. <https://doi.org/10.1016/j.enconman.2018.11.050>.
28. Q. Wang, Yiqun Pan, Y. Fu, Z. Huang, **W. Zuo**, P. Xu 2019. “A Simulation-based Method for Air Loop Balancing and Fan Sizing Using Uncertainty and Sensitivity Analysis.” *Building Simulation*, 12(2), pp.247-258. <https://doi.org/10.1007/s12273-018-0471-7>.
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3. **W. Zuo**, Q. Chen 2007. "Real Time Airflow Simulation in Buildings." *Proceedings of the 6th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2007)*, October 28-31, Sendai, Japan.
2. **W. Zuo**, Q. Chen 2007. "Validation of Fast Fluid Dynamics for Room Airflow." *Proceedings of the 10th Conference of International Building Performance Simulation Association (Building Simulation 2007)*, pp. 980-983, September 3-6, Beijing, China.
1. Q. Chen, Z. Zhang, **W. Zuo** 2007. "Computational Fluid Dynamics for Indoor Environment Modeling: Past, Present, and Future." *Proceedings of the XXV Congresso Nazionale UIT sulla Trasmissione del Calore (25th UIT National Heat Transfer Conference)*, June 18-20, Trieste, Italy and also in *Proceedings of the 6th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2007)*, October 28-31, Sendai, Japan.

Posters

16. X. Han, **W. Zuo**, Y. Fu, M. Wetter, W. Tian, J. VanGilder 2019. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and Optimization." *US Department of Energy Building Technology Office 2019 Peer Review*. Arlington, VA, April 15-18.
15. J. Wang, **W. Zuo** 2019. "A Human-Centered Computational Framework for Urban and Community Design of Resilient Coastal Cities." *The 8th annual 21st Century Energy Transition Symposium*, Denver, CO, April 1-2.
14. Y. Ye, **W. Zuo**, G. Wang, K. Hinkelman 2019. "Large Scale Energy Modeling for Building Energy Rating Standard." *The 8th annual 21st Century Energy Transition Symposium*, Denver, CO, April 1-2.
13. K. Hinkelman, X. Lu, **W. Zuo**, Y. Fu, J. Wang, Y. Zhang 2019. "Multi-domain Modeling Framework for Future Smart and Connected Communities." *The 8th annual 21st Century Energy Transition Symposium*, Denver, CO, April 1-2.
12. X. Han, **W. Zuo**, Y. Fu, M. Wetter, W. Tian, J. VanGilder 2019. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and Optimization." *The 8th annual 21st Century Energy Transition Symposium*, Denver, CO, April 1-2.
11. W. Saad, N. Ramakrishnan, H. Dhillon, **W. Zuo** 2018. "BIGDATA: Collaborative Research: IA: Big Data Analytics for Optimized Planning of Smart, Sustainable, and Connected Communities." *2018 Joint PI Meeting: NSF BIGDATA and Big Data Hubs & Spokes Programs*, June 20-22, Alexandria, VA.
10. J. Wang, **W. Zuo** 2018 "A Human-Centered Computational Framework for Urban and Community Design of Resilient Coastal Cities." *2018 Campus Sustainability Summit*, April 25, Boulder, CO.
9. Y. Ye, **W. Zuo**, G. Wang 2018 "Large Scale Energy Modeling for Building Energy Rating Standard." *2018 Campus Sustainability Summit*, April 25, Boulder, CO.
8. X. Lu, **W. Zuo**, Y. Fu, J. Wang 2018 "Multi-domain Modeling Framework for Future Smart and Connected Communities." *2018 Campus Sustainability Summit*, April 25, Boulder, CO.
7. W. Saad, N. Ramakrishnan, H. Dhillon, **W. Zuo** 2017. "BIGDATA: Collaborative Research: IA: Big Data Analytics for Optimized Planning of Smart, Sustainable, and Connected Communities." *2017 Joint PI Meeting: NSF BIGDATA and Big Data Hubs & Spokes Programs*, March 15-17, Washington DC.
6. D. He, S. Huang, **W. Zuo**, R. Kaiser 2016. "A Virtual Testbed for Net Zero Energy Communities." *BuildSys '16*, November 16-17, Palo Alto, CA.
5. S. Huang, **W. Zuo** 2015. "Optimization of Chilled Water Plant Operation Using Modelica Buildings Library."

2015 Florida Energy System Consortium Workshop, May 20-21, Orlando, FL.

4. **D. Li, W. Zuo** 2014. "Modeling and Operation Evaluation for Innovative Heat Recovery System." *Honors Summer Research Reception*, University of Miami, Coral Gables, FL.
3. **W. Zuo, Q. Chen** 2009, 2010. "High Performance Indoor Airflow Simulation." *IBPSA-USA Winter Conference (2009)*, Chicago, IL and also at *the 1st Annual OMEGA Research Exhibition (2010)*, West Lafayette, IN.
2. **W. Zuo, Q. Chen** 2008. "Real Time Simulation of Indoor Airflow on Graphic Processing Units (GPU)." *The 3rd National Conference of IBPSA-USA (SimBuild 2008)*, Berkeley, CA.
1. **W. Zuo, Q. Chen** 2007. "Real Time Airflow Simulation in Buildings." *Sigma Xi Grad Student Poster Competition*, West Lafayette, IN.

Invited Talks

72. W. Zuo 2022. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Department of Mechanical and Aerospace Engineering*, University of California Irvine, Irvine, CA. April 29.
71. W. Zuo 2022. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Institute for Cyber Physical Infrastructure and Energy*, Lehigh University, Bethlehem, PA. April 21.
70. W. Zuo 2022. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Department of Civil, Architectural and Environmental Engineering*, Drexel University, Philadelphia, PA. April 19.
69. W. Zuo 2022. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Communities and Urban Science Group*, National Renewable Energy Laboratory, Online, January 19.
68. W. Zuo 2022. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Department of Building Science*, Tsinghua University, Online, January 12.
67. W. Zuo 2021. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Center for Environmental Energy Engineering*, University of Maryland, College Park, Maryland. December 10.
66. W. Zuo 2021. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Distinguished Lecture Series*, Department of Civil and Environmental Engineering, Worcester Polytechnic Institute, Online, December 1.
65. W. Zuo 2021. "Modeling and Simulation of Sustainable, Smart and Resilient Cities." *Department of Electrical and Computer Engineering, Southern Methodist University*, Dallas, TX, October 15.
64. W. Zuo 2021. "Assessments of Data Centers for Provision of Frequency Regulation." *The 2nd International Conference for Global Chinese Academia on Energy and Built Environment*, Chengdu, China, July 18.
63. W. Zuo 2020. "Power Grid with High Renewable Energy Penetration: Challenges and Opportunity." Keynote at *iCAES Symposium*, Boulder, CO, February 20.
62. W. Zuo 2019. "Open Source Platform for the Optimal Design and Operation of Data Center Cooling Systems." *The 1st International Conference for Global Chinese Academia on Energy and Built Environment*, Chengdu, China, July 22.
61. W. Zuo 2019. "Open Source Modelica Net Zero Energy Community (NSEC) Library." *The 1st International Conference for Global Chinese Academia on Energy and Built Environment*, Chengdu, China, July 21.
60. W. Zuo 2019. "Modeling and Simulation of Smart City." *The 1st International Conference for Global Chinese Academia on Energy and Built Environment*, Chengdu, China, July 20.
59. W. Zuo 2019. "Modelica-based Multi-Scale Modeling for Buildings and Communities." CEEESA Seminar, *Center for Energy, Environmental, and Economic Systems Analysis, Argonne National Laboratory*, Chicago, IL, June 17.
58. W. Zuo 2019. "Modeling of Future Smart, Sustainable, and Resilient Cities." *College of Environmental Science and Engineering, Donghua University*, Shanghai, China, May 22.
57. W. Zuo 2019. "Modeling of Future Smart, Sustainable, and Resilient Cities." *College of Civil Engineering and Architecture, Zhejiang University*, Hangzhou, China, May 21.
56. W. Zuo 2019. "Modeling of Future Smart, Sustainable, and Resilient Cities." *School of Environmental*

Science and Engineering, Huazhong University of Science and Technology, Wuhan, China, May 20.

55. W. Zuo 2019. "Modelica-based System Modeling for Green Buildings and Smart Cities", Plenary Talk at the *IBPSA-China National Conference*, Chengdu, China, May 16.
54. W. Zuo 2019. "Modeling of Future Smart, Sustainable, and Resilient Cities." *School of Design, Shanghai Jiao Tong University*, Shanghai, China, May 14.
53. W. Zuo 2019. "Modeling of Future Smart, Sustainable, and Resilient Cities." *The 13th ME Forum, School of Mechanical Engineering, Tongji University*, Shanghai, China, May 13.
52. W. Zuo 2019. "Modelica-based Multi-Scale Modeling: From Sustainable Buildings to Smart and Resilient Cities." *Northwest Energy Efficiency Alliance*, Portland, OR, April 23.
51. W. Zuo 2019. "Multi-Scale Modeling for Smart, Sustainable and Resilient Cities." *Pacific Northwest National Laboratory*, Portland, OR, April 22.
50. W. Zuo 2019. "Sustainable, Smart and Connected Communities", Panel of *Building a Smart Base and Community - US Ignite Application Summit, Smart Cities Connect Conference and Expo*, Denver, CO, April 3.
49. W. Zuo 2019. "Net Zero Energy Community", Panel of *Decarbonization Solutions at the 8th annual 21st Century Energy Transition Symposium*, Denver, CO, April 1.
48. W. Zuo 2019. "Multi-Scale Modeling with Modelica: From Heat Exchanger to Smart City." *Simulation and Optimization of Building Systems Workshop*, Boulder, CO, March 18.
47. W. Zuo 2019. "Modeling and Simulation for Smart, Sustainable, and Resilient Cities." *Fraunhofer Institute for Building Physics (IBP)*, Valley, Bavaria, Germany, March 12.
46. W. Zuo 2019. "Fast Indoor Airflow Modeling for Sustainable Building Design." *The Faculty of Mechanical Engineering and Automotive Engineering, Coburg University of Applied Sciences*, Coburg, Bavaria, Germany, March 8.
45. W. Zuo 2019. "Modeling and Simulation for Smart, Sustainable, and Resilient Cities." *Department of Computer Science, Friedrich-Alexander-University Erlangen-Nuremberg*, Erlangen, Bavaria, Germany, March 7.
44. W. Zuo 2018. "Applications of Modelica-based Modeling Technology: From Sustainable Buildings to Smart and Resilient Cities." *Oak Ridge National Laboratory*, Oak Ridge, TN, December 19.
43. W. Zuo 2018. "Modeling and Simulation for Smart, Sustainable, and Resilient Cities." Building Energy and Environments Graduate Seminar, *Department of Civil, Architectural and Environment Engineering, University of Texas at Austin*, Austin, TX, November 26.
42. W. Zuo 2018. "Novel Computational Framework for Optimal Planning of Smart, Sustainable, and Connected Communities." Panel of *Current Research: Building Smart, Community-Based Decision-Making, Community Building Colorado-Style Conference*, Boulder, CO, October 19.
41. W. Zuo 2018. "Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities." *Skidmore, Owings & Merrill LLP (SOM)*, Chicago, IL, September 28.
40. W. Zuo 2018. "Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities." *Tianjin University*, Tianjin, China, May 25.
39. W. Zuo 2018. "Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities." *Harbin Institute of Technology*, Harbin, China, May 24.
38. W. Zuo 2018. "Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities." *Guangzhou University*, Guangzhou, China, May 22.
37. W. Zuo 2018. "Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities." *Central South University*, Changsha, China, May 18.
36. W. Zuo 2018. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and Optimization." *Hunan University*, Changsha, China, May 17.
35. W. Zuo 2018. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and

- Optimization.” *Tsinghua University*, Beijing, China, May 15.
34. W. Zuo 2018. “Equation-Based Modeling for Energy Efficient Data Center Cooling.” *The 2018 International United Laboratory for Energy and Environment (IULEE) Workshop on Energy and Environment*, Boulder, CO, May 8.
 33. W. Zuo 2018. “Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities”, *Seminar at Pacific Northwest National Laboratory*, Richland, WA, March 30.
 32. W. Zuo 2017. “Equation-based Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities.” *National Renewable Energy laboratory*, Golden, CO, December 11.
 31. W. Zuo 2017. “From Sustainable Buildings to Smart and Resilient Cities: Innovative Modeling for Real-World Challenges.” *Engineers for a Sustainable World*, Denver, CO, December 8.
 30. W. Zuo 2017. “Modeling and Simulation for Cyber-Physical Systems: From Sustainable Buildings to Smart and Resilient Cities.” *Lunch & Learn Seminar, Ritchie School of Engineering and Computer Science, University of Denver*, Denver, CO, November 16.
 29. W. Zuo 2017. “Net Zero Energy Community.” Session of Smart City and Community: Connecting the Dots, *Community Building Colorado-Style Conference*, Boulder, CO, October 21.
 28. W. Zuo 2017. “Modeling and Simulation for Cyber-Physical Systems: From Sustainable Building to Smart City.” *CECE Seminar Series 2017, Department of Civil, Environmental and Construction Engineering, University of Central Florida*, Orlando, April 10.
 27. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *Tsinghua University*, Beijing, China, December 30.
 26. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *Nanjing University*, Nanjing, China, December 29.
 25. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *Southeast University*, Nanjing, China, December 28.
 24. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *The 11th ME Forum, School of Mechanical Engineering, Tongji University*, Shanghai, China, December 27.
 23. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *College of Environmental Science and Engineering, Donghua University*, Shanghai, China, December 26.
 22. W. Zuo 2016. “Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities.” *Hunan University*, Changsha, China, December 23.
 21. W. Zuo 2016. “Data-Drive Solutions for Building Energy Efficiency-A View from Building Scientists.” *Xiamen University of Technology*, Xiamen, China, December 22.
 20. W. Zuo 2016. “From Buildings to Cities: Research and Development of Modelica-Based Technique for Real-World Applications.” *Seminar at Energy Technologies Area (ETA), Lawrence Berkeley National Laboratory*, Berkeley, CA, November 14.
 19. W. Zuo 2016. “Model-Based Optimization for Building Energy Efficiency.” *The 221th Academic Seminar on Integration Science and Technology, Shenzhen Institutes of Advanced Technology, China Academy of Sciences*, Shenzhen, China, June 1.
 18. W. Zuo 2016. “Model-Based Optimization for Building Energy Efficiency.” *College of Automation, Chongqing University*, Chongqing, China, May 24.
 17. W. Zuo, 2016. “Equation-Based Modeling and Simulation for Sustainable Buildings.” *Taco Comfort Solutions*, Cranston, Rhode Island, October 26.
 16. W. Zuo 2016. “Innovations in Modeling and Simulations for Sustainable Buildings.” *Seminar at Argonne National Laboratory*, Chicago, IL, June 23.
 15. W. Zuo 2016. “Model-Based Optimization for Building Energy Efficiency.” *School of Aerospace Engineering, Xiamen University*, Xiamen, China, June 2.

14. W. Zuo 2016. "Model-Based Optimization for Building Energy Efficiency." *International Lecture for Sustainable Building and Environment, No. 121, College of Urban Construction and Environmental Engineering, Chongqing University, Chongqing, China, May 27.*
13. W. Zuo 2016. "Model-Based Optimization for Building Energy Efficiency." *Hongyi Lecture, No. 343, Chongqing University of Technology, Chongqing, China, May 23.*
12. W. Zuo 2015. "Innovations in Modeling and Simulations for Sustainable Buildings." *Graduate Seminars Series, Mechanical Engineering - Engineering Mechanics Department at Michigan Technological University, Houghton, MI, September 3.*
11. W. Zuo 2015. "Innovations in Modeling and Simulations for Sustainable Buildings." *Oak Ridge National Laboratory, Oak Ridge, TN, July 2.*
10. W. Zuo 2015. "Innovations in Modeling and Simulations for Sustainable Buildings." *Pacific Northwest National Laboratory, Richland, WA, April 17.*
9. W. Zuo 2014. "Recent Development and Application of Modelica-Based Simulation for Low Energy Buildings." *Department of Energy, Washington DC, October 8.*
8. W. Zuo 2014. "Next Generation Building Simulation Based on Modelica." *Florida Solar Energy Center, Cocoa, FL, May 12.*
7. W. Zuo 2014. "Modelica for Building System Design and Operation." *Lunch & Learn Seminar, Dassault Systemes Simulia Corp., Dearborn, MI, March 6.*
6. W. Zuo 2013. "Recent Breakthroughs in Building Simulations." *Shenzhen Institutes of Advanced Technology, China Academy of Sciences, Shenzhen, China, June 6.*
5. W. Zuo 2013. "Next Generation Building Simulation Tools Based on Modelica and Functional Mockup Interface." *College of Automation, Chongqing University, Chongqing, China, May 16.*
4. W. Zuo 2013. "Recent Breakthroughs in Building Simulations." *College of Urban Construction and Environmental Engineering, Chongqing University, Chongqing, China, May 15.*
3. W. Zuo 2013. "Recent Breakthroughs in Building Simulations." *Department of Automation, Xiamen University, Xiamen, China, May 13.*
2. W. Zuo 2012. "Put the Pedal to the Metal: How You Can Speed Up Your Simulation." *The 5th Conference of International Building Performance Simulation Association-USA (SimBuild2012), Madison, WI, August 3.*
1. W. Zuo, M. Wetter 2012. "Innovative Computer Tools for Energy Efficient Cooling of Data Centers." *Discovery 2015: HPC and Cloud Computing Workshop, Berkeley, CA, July 20.*

Guest Lectures

18. W. Zuo 2022. "Modeling in Building to Grid Integration", IBPSA Education Webinar Series, April 28.
17. W. Zuo 2021. "Smart, Sustainable, and Resilient Cities", CVEN5147 Civil Engineering Systems, *University of Colorado Boulder, Boulder, CO, September 25.*
16. W. Zuo 2020. "Smart, Sustainable, and Resilient Cities", AREN4317 Architectural Engineering Design, *University of Colorado Boulder, Boulder, CO, April 20.*
15. W. Zuo 2020. "Smart, Sustainable, and Resilient Cities", COEN3210 Climate Change & Engineering, *University of Colorado Boulder, Boulder, CO, April 15.*
14. W. Zuo 2019. "Introduction to Building Energy Systems." *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Boulder, CO, October 23.*
13. W. Zuo 2019. "Smart, Sustainable, and Resilient Cities", COEN3210 Climate Change & Engineering, *University of Colorado Boulder, Boulder, CO, April 25.*
12. W. Zuo 2019. "Smart, Sustainable, and Resilient Cities", AREN4317 Architectural Engineering Design, *University of Colorado Boulder, Boulder, CO, April 24.*
11. W. Zuo 2018. "Sustainable Buildings and Cities", COEN3210 Climate Change & Engineering, *University of Colorado Boulder, Boulder, CO, April 24.*

10. W. Zuo 2018. "From Earth to Mars: Modeling of Future Smart Community." Program in Environmental Design, *University of Colorado Boulder*, Boulder, CO, February 16.
9. W. Zuo 2017. "Equation-based Modeling for Sustainable, Smart and Resilient Infrastructures." CVEN5147 Civil Engineering Systems, *University of Colorado Boulder*, Boulder, CO, October 31.
8. W. Zuo 2017. "Introduction to Building Energy Systems." *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder*, Boulder, CO, September 27.
7. W. Zuo 2017. "Innovations in Modeling and Simulation: From Sustainable Buildings to Smart Cities." *Department of Industrial Engineering, University of Miami*, Coral Gables, FL, March 8.
6. W. Zuo 2017. "Overview of HVAC System." *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder*, Boulder, CO, February 16.
5. W. Zuo 2017. "Equation-Based Modeling and Simulation: The Next Generation Technology for Sustainable Buildings and Cities." *Department of Mechanical and Materials Engineering, Florida International University*, Miami, FL, January 20.
4. W. Zuo 2016. "Research in Sustainable and Smart Cities." *School of Architecture, University of Miami*, Coral Gables, FL, September 23.
3. W. Zuo 2015. "Equation-Based Modeling and Simulations for Sustainable Buildings." *Department of Industrial Engineering, University of Miami*, Coral Gables, FL, April 1.
2. W. Zuo 2012. "Indoor Airflow Simulation." *School of Architectural Engineering and Construction, University of Nebraska*, Lincoln, NE.
1. W. Zuo 2012. "Physics of Turbulence and Turbulence Modeling." *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder*, Boulder, CO.

Project Report

6. W. Zuo, M. Wetter, J. VanGilder, X. Han, Y. Fu, C. A. Faulkner, J. Hu, W. Tian, M. Condor 2021. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and Optimization." pp. 1-109, Report for *US Department of Energy*, DOE-CUBoulder-07688. <https://www.osti.gov/servlets/purl/1773506>.
5. W. Tian, J. VanGilder, M. Condor, X. Han, Y. Fu, W. Zuo, M. Wetter 2019. "Improving Air Flow Management of Data Centers Based on Fast Fluid Dynamics and In Situ Adaptive Tabulation." pp 1-48. Report for *US Department of Energy*, February 12th.
4. Y. Fu, X. Han, W. Zuo, M. Wetter, J. VanGilder 2018. "Optimization of Cooling Systems of Two Data Centers Using Modelica Buildings Library." pp. 1-91, Report for *US Department of Energy*, February 20th.
3. W. Zuo, Y. Fu, Y. Ye, I. R. Stahl 2017. "Smart Infrastructure and Renewable Energy: Study on ZenCity." Project report for the *ZenCity* project, pp. 1-8, May 29th.
2. S. Huang, W. Zuo 2015. "The Impact of the Condenser Water Set Point Optimization Frequency on the Energy Saving." Report for *Lawrence Berkeley National Laboratory*.
1. M. Wetter, X. Pang, W. Zuo, T. S. Nouidui, K. Phalak 2013. "Enabling Tools for Design of Energy Efficient Building Systems." Report for *California Energy Commission*, CEC-500-2014-055, pp. 1-72.

Other Major Publications/Presentations

67. C. A. Faulkner, D. Jankowski, W. Zuo 2021. "Artificial Intelligence for Indoor Airflow Simulation." *Seminar 37: Data-Driven Computational Fluid Dynamics, 2021 ASHRAE Summer Conference*, Virtual Conference.
66. W. Zuo 2021. "Modeling of Future Smart, Sustainable and Resilient Cities." Seminar on *Smart Cities and Communities, AEI Conference 2021*, Virtual Conference, April 7-9.
65. W. Zuo 2021. "Coupled CFD-Multizone-Modelica Models for Dynamic Simulation of Indoor Environment and HVAC Systems." *Seminar 88: Whole Greater Than the Sum: Coupling Building Simulation Techniques, 2021 ASHRAE Winter Conference*, Virtual Conference, February 9-11.
64. W. Zuo 2021. "Modeling of Sustainable, Smart and Connected Communities." *Seminar 79: Sustainable*

Approaches for Energy Demand in the Community Scale, 2021 ASHRAE Winter Conference, Virtual Conference.

63. W. Zuo, Y. Fu, X. Han, W. Tian, J. VanGilder, M. Wetter, D. Plamondon 2020. "Open Source Modelica Models for Data Center Cooling." *2020 American Modelica Conference, Virtual Conference, September 22.*
62. W. Zuo, J. Nelson, G. Machado 2020. "Time-Saving Smart Cities", Steftalks Webinar by Stefanini, September 9.
61. W. Zuo 2020. "Modeling a Real-world Net Zero Energy Community." *Seminar 60 Modeling and Optimization of Sustainable Communities, 2020 ASHRAE Annual Conference, Virtual Conference, July 1.*
60. W. Zuo 2020 "Open-Source Software Package for Energy Efficient Data Center Design and Operation." *IBPSA-USA Webinar, May 28.*
59. W. Zuo 2020. "Multi-scale Modeling for Smart, Sustainable, and Resilient Cities." Seminar at *Department of Civil, Architectural and Environmental Engineering, the University of Texas at Austin, Austin, TX, March 3.*
58. W. Zuo 2020. "Applying Equation-Based Modeling for Energy Efficient Data Center Cooling Operation." *Seminar 70 Leveraging Computational Models to Make Smart Controls, 2020 ASHRAE Winter Conference, Orlando, FL, February 5.*
57. W. Zuo 2020. "Multi-scale Modeling for Smart, Sustainable, and Resilient Cities." Seminar at *Department of Architectural Engineering, the Pennsylvania State University, University Park, PA, January 20.*
56. W. Zuo 2019. *Panel 4 Modeling Grid-Interactive Buildings, 2019 ASHRAE Building Performance Analysis Conference, Denver, CO, September 26.*
55. W. Zuo 2019. "Modeling the Transient Event of Data Center Cooling during the Power Outage." *Seminar 52 Modeling Transient Events, Part 1: External Factors Which Affect the Indoor Environment, 2019 ASHRAE Annual Conference, Kansas City, MO, June 25.*
54. W. Zuo 2019. "Optimization on Thermostat Location in an Office Room Using a Coupled Simulation of Indoor Airflow and HVAC System." *Seminar 28 Balancing Energy and Effectiveness, 2019 ASHRAE Annual Conference, Kansas City, MO, June 24.*
53. W. Zuo 2019. "Fast Fluid Dynamics for Energy Efficient Building Design and Operation." *Seminar 28 on Challenges of Using Open Source CFD Tools, 2019 ASHRAE Winter Conference, Atlanta, GA, January 14.*
52. W. Zuo 2018. "Urban Energy System." *CU/NREL Strategy Session in Power Systems, Electric Grid Research, Education, Boulder, CO, October 25.*
51. W. Zuo 2018. "A Fast and Self-Learning Reduced Order Model for Indoor Airflow Simulation." *Seminar 23 on Faster, Cheaper, More Accessible: The Latest Research in Airflow and Thermal Modeling of Indoor Environments, 2018 ASHRAE Annual Conference, Houston, TX, June 25.*
50. W. Zuo, Y. Fu, M. Wetter, J. VanGilder 2017. "Improving Data Center Energy Efficiency through End-to-End Cooling Modeling and Optimization." *ASHRAE Data Center Energy Calculation Workgroup Meeting, Webinar, December 8.*
49. W. Zuo 2017. "Building Mechanical and Energy Systems." *Society of Asian Scientists & Engineers, Boulder, CO, October 4.*
48. W. Zuo 2017. "IBPSA Project 1." *Building Simulation 2017 Un-Conference, SimClub, Denver, CO, September 14.*
47. W. Zuo 2017. "Research Towards to Computational Frameworks for Smart, Sustainable, and Resilient Cities." *Building Simulation 2017 Conference, San Francisco, CA, August 8.*
46. Y. Fu, W. Zuo, M. Wetter, J. VanGilder 2017. "Improving Data Center Energy Efficiency through End-To-End Cooling Modeling and Optimization." *ASHRAE Data Center Energy Calculation Workgroup Meeting, Long Beach, CA, June 25.*
45. W. Zuo 2017. "Innovations in Modeling and Simulation for Cyber-Physical Systems: From Sustainable Building to Smart City." *Department of Civil and Environmental Engineering, Vanderbilt University, Nashville, TN, March 1.*
44. W. Zuo, Y. Fu, Y. Ye, I. R. Stahl 2017. "Smart Infrastructure and Renewable Energy." *"Zencity Workshop:*

Designing a smart city in Yucatán” of the Smart Cities Miami Conference, Miami, FL, February 24.

43. W. Zuo 2017. “From Sustainable Buildings to Smart and Resilient Cities: Research and Development of Equation-based Modeling for Solving the Real-World Challenges.” *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Boulder, CO, February 16.*
42. W. Zuo 2016. “Advanced Modeling Tools for Energy Efficient Data Center Cooling.” *Webinar for ASHRAE TC 9.9 Data Center Energy Calculation Work Group, December 3.*
41. D. He, S. Huang, W. Zuo, Y. Fu, R. Kaiser 2016. “Modelica-Based Modeling for Net Zero Energy Communities.” *North America Modelica Users’ Group Conference, Troy, MI, September 28-29.*
40. W. Zuo, R. Kaiser, S. Welty 2016. “Envisioning a 21st Century Renewable, Reliable, Resilient, and Affordable Energy Infrastructure for Cuba.” *Association for the Study of the Cuban Economy 2016 Annual Meeting, July 28-30.*
39. R. J. Miranda, S. Huang, W. Zuo 2016. “Designing an Energy and Water Efficient Hotel Using an Equation-Based Modeling Approach.” *Seminar 67 on Simulation for Cutting-Edge Building Design, 2016 ASHRAE Winter Meeting, Orlando, FL, January 27.*
38. W. Zuo 2016. “A Fast Coupled Simulation of 3D Indoor Airflow Motion and HVAC System for Ventilation Control of Complex Environment.” *Seminar 11 on New CFD Techniques for Design of Air Distribution Systems, 2016 ASHRAE Winter Meeting, Orlando, FL, January 24.*
37. W. Zuo 2015. “Coupling Indoor Airflow, HVAC, Control and Building Envelope Heat Transfer in the Modelica Buildings Library.” *Joint Workshop of IEA Annex 60 and IBPSA-NVL, Leuven, Belgium, September 18.*
36. W. Zuo 2015. “Modelica-Based Model Predictive Control of a Chilled Water Plant.” *Seminar 48 on Model Predictive Control: Application to Chilled Water Plants and Radiant Slab Cooling, 2015 ASHRAE Annual Conference, Atlanta, GA, June 30.*
35. W. Zuo 2015. “Innovations in Modeling and Simulations for Sustainable Buildings.” *Department of Civil, Architectural and Environment Engineering, University of Texas at Austin, Austin, TX, March 2.*
34. W. Zuo 2014. “Smart Energy Campus for the University of Miami.” *University of Miami, Coral Gables, December 15.*
33. W. Zuo 2014. “Modelica for the Controls Design of Energy Efficient Hotel.” *North America Modelica Users Group Meeting, Atlanta, GA, October 13-14.*
32. W. Zuo, M. Wetter 2013. “Modeling of HVAC System for Controls Optimization Using Modelica.” *Intelligent Building Operations Workshop, University of Colorado Boulder, Boulder, CO, June 20-22.*
31. D. Kim, W. Zuo, J.E. Braun, M. Wetter 2013. “Comparisons of Building System Modeling Approaches for Control System Design.” *Intelligent Building Operations Workshop, University of Colorado Boulder, Boulder, CO, June 20-22.*
30. W. Zuo, M. Wetter 2013. “Optimization of Chilled Water Plant Control Using Modelica.” *Modelica North America User Virtual Meeting, February 18.*
29. W. Zuo 2012. “Building Systems for Net Zero Energy Buildings.” *Department of Civil & Architecture Engineering, University of Miami, Miami, FL, September 10.*
28. W. Zuo 2012. “Innovations in Simulation Research for Low Energy and Healthy Buildings.” *School of Architectural Engineering and Construction, University of Nebraska, Lincoln, April 4.*
27. W. Zuo 2012. “Innovations in Simulation Research for Low Energy and Healthy Buildings.” *Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Boulder, March 12.*
26. W. Zuo, 2012. “Functional Mockup Interface – An Open-Source Standard for Co-Simulation and Model Exchange.” *Seminar 53 on Integrated Multi-Domain Simulations for Innovative Building Design and Operation: Part 2, 2012 ASHRAE Winter Conference, Chicago, IL, January 25.*
25. W. Zuo, M. Wetter 2011. “Building Systems for Net Zero Energy Buildings.” *Carbon Cycle 2.0 LDRD Seminar Series, Lawrence Berkeley National Laboratory, Berkeley, CA, August 24.*
24. W. Zuo, 2011. “Evaluation and Optimization of Control System for Water Side Economizer.” *Seminar 20 on Operation-oriented Flexible Building System Modeling, 2011 ASHRAE Annual Conference, Montreal,*

Canada, June 26.

23. N. Keen, R. Gerber, W. Zuo 2011. "What Is NERSC and How Can Their Computer Resources Help You?" *Seminar for Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, Berkeley, CA, June 23.*
22. M. Wetter, W. Zuo 2011. "Challenges and Numerical Consideration in Building Energy Modeling." *Seminar MS40 on Dynamical System Methods for Design and Operation of Sustainable Buildings – Part I of II, Society of Industrial and Applied Mathematics Conference on Application of Dynamical Systems, Snow Bird, UT, May 23.*
21. W. Zuo 2011. "Simulation Research for Net Zero Energy Buildings." *Department of Civil & Architecture Engineering, University of Miami, Miami, FL, March 11.*
20. W. Zuo 2011. "Towards to Net Zero Energy Buildings – Innovations in Building Simulations." *United Technologies Research Center, East Hartford, CT, February 11.*
19. W. Zuo 2011. "Simulation Research for Low Energy Buildings." *Seminar for Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, Berkeley, CA, January 27.*
18. W. Zuo 2010. "Towards to Net Zero Energy Buildings – Innovations in Building Simulations." *MAE/EQS STAR Center Seminar, Department of Mechanical and Aerospace Engineering, Syracuse University, Syracuse, NY, November 19.*
17. W. Zuo 2010. "High Performance Flow Simulation on Graphics Processing Unit." *Presentation for Indoor Environment Research group, Lawrence Berkeley National Laboratory, Berkeley, CA, June 17.*
15. W. Zuo 2010. "High Performance Flow Simulation on Graphics Processing Unit." *Seminar for Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, Berkeley, CA, June 17.*
14. W. Zuo, Q. Chen 2010. "Fast Predictions of Particles with Small Stokes Number in a Ventilated Room." *Seminar 38 on Modeling of Particle Transport in Indoor Environment for Air Quality Analyses, 2010 ASHRAE Winter Conference, Orlando, FL, January 26.*
13. W. Zuo 2009. "Advanced Simulations of Air Distributions in Buildings." *ExxonMobile Upstream Research Company, Houston, TX, December 1.*
12. W. Zuo, T. Zhang, K. Lee, Q. Chen 2009. "A Simplified Approach to Describe Complex Diffusers in Displacement Ventilation for CFD Simulations." *Seminar 35 on Modeling Technique for Personal Ventilation, 2009 ASHRAE Annual Conference, Louisville, KY, June 23.*
11. W. Zuo, Q. Chen 2009. "High Performance, Low-Cost Indoor Airflow Simulation on Graphics Hardware." *Research in Engineered Environments Seminar Series, West Lafayette, IN, March 24.*
10. W. Zuo 2009. "Advanced Simulations of Air Distributions in Buildings." *Department of Civil, Architectural, and Environmental Engineering, Drexel University, Philadelphia, PA, March 11.*
9. W. Zuo, Q. Chen 2009. "Real Time Simulation for Airflow Motion and Contaminant Transportation in Buildings." *Seminar 15 on CFD Simulations of Air Distributions in Buildings: Past, Present and Future, 2009 ASHRAE Winter Conference, Chicago, IL, January 25.*
8. W. Zuo, Q. Chen 2008. "Real-Time Airflow Simulation in Buildings by Using Graphic Process Units." *Abstracts of the 1st International Conference on Building Energy and Environment (COBEE), Dalian, China.*
7. W. Zuo, Q. Chen 2007. "Fast Fluid Dynamics for Applications in Building Environment." *Thermal System Seminar Series, Purdue University, West Lafayette, IN, October 2.*
6. W. Zuo, Q. Chen, X. Yuan, L. Glicksman 2007. "Displacement Ventilation System Modeling." *Seminar 19 on Modeling Stratified Room Air Distribution with Energy Simulation Tools, 2007 ASHRAE Annual Conference, Long Beach, CA.*
5. V. Kumar, J. Jovanovic, M. Breuer, W. Zuo, F. Durst 2005. "Anisotropy Invariant Reynolds Stress Model (AIRSM) and its Applications to Separated Flows." *des Kompetenznetzwerk fuer Technisch-Wissenschaftliches Hoch- und Hoehstleistungsrechnen in Bayern (KONWIHR) Quartl, Vol. 40, pp. 12-16.*
4. W. Zuo 2005. "The Implementation and Verification of the Anisotropy Invariant Reynolds Stress Turbulence Model." *Research Colloquium of German Aerospace Center, Göttingen, Germany.*

3. W. Zuo 2005. "The Implementation and Verification of the Anisotropy Invariant Reynolds Stress Turbulence Model." *Institute of Aerodynamics and Gas Dynamics, University of Stuttgart, Germany.*
2. W. Zuo 2005. "Introduction to CFD." *Joined Advanced Student School, St. Petersburg, Russia.*
1. W. Zuo 2004. "Physics of Turbulence and Turbulence Modeling." *Summer Academy, Sarntal, Italy, July.*

Contribution to Software Development

- Modelica Buildings library, publicly released at <http://simulationresearch.lbl.gov/modelica>
- Modelica library for Smart and Connect Community (SCC), publicly released at <https://www.colorado.edu/lab/sbs/scc-library>
- Modelica library for Net Zero Energy Community (NSEC), publicly released at <https://www.colorado.edu/lab/sbs/nsec-library>
- Fast Fluid Dynamics for Indoor Environment Simulation (publicly released as a part of Modelica Buildings library)
- Reduced order model for data center airflow management, publicly released at https://github.com/doctools/isat_ffd

International Research Collaboration

| | Project Title | Organizer | Participating Countries |
|----|---|-----------------------------|--------------------------------|
| 3. | IBPSA Project 1 "BIM/GIS and Modelica Framework for Building and Community Energy System Design and Operation" (2016-2022) | IBPSA | 11 |
| 2. | Annex 66 "Definition and Simulation of Occupant Behavior in Buildings" (2013-2017) | International Energy Agency | 24 |
| 1. | Annex 60 "New Generation Computational Tools for Building and Community Energy Systems Based on the Modelica and Functional Mockup Interface Standards" (2012-2017) | International Energy Agency | 16 |

Awards

- *Best Paper Award*, The 12th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC 2021), Seoul, South Korea (Virtual Conference), 2021
- *Fellow*, International Building Performance Simulation Association, 2021
- *2020 Reviewers of the Year*, Journal of Solar Energy Engineering – Including Wind Energy and Building Energy Conversation, 2021.
- *Research Development Award*, Department of Civil, Environmental and Architectural Engineering, CU Boulder, 2020.
- *ExCEED Teaching Fellow*, American Society of Civil Engineers, 2019
- *Best Paper Award*, Chinese National Conference on HVAC Modeling, 2017.
- *Lewis-Worcester Faculty Fellow*, College of Engineering, CU Boulder, 2017-2021
- *Distinguished Service Award*, ASHRAE, 2017.
- *Eliahu I. Jury Early Career Research Award*, College of Engineering, University of Miami, 2016.
- *SEEDS You Choose Leadership Award*, University of Miami, 2016.
- *Emerging Professional Award* in recognition of superior early achievement in the field of energy modeling, IBPSA-USA, 2016.
- *SEEDS You Choose Leadership Award*, University of Miami, 2015.
- *SEEDS You Choose Leadership Award*, University of Miami, 2014.
- *Provost Research Award*, University of Miami, 2014.
- *SEEDS You Choose Leadership Award*, University of Miami, 2013.
- *Best Poster Award*, The 1st OMEGA Annual Research Exhibition, Purdue University, 2010.
- *Graduate Student Grant-In-Aid Award*, ASHRAE, 2009

- *Best Poster Award*, IBPSA-USA Winter Meeting, Chicago, IL, 2009
- *The 3rd Place in Poster Competition*, The 3rd National Conference of IBPSA-USA (SimBuild 2008), Berkeley, CA, 2008
- *Student Scholarship*, The 3rd National Conference of IBPSA-USA (SimBuild 2008), Berkeley, CA, 2008
- *Graduate School Incentive Grant*, Purdue University, 2008
- *Scholarship* for attending U.S. Foreign Policy Colloquium, 2007
- *Travel Award for Doctoral Student*, School of Mechanical Engineering, 2007
- *Siemens Scholarship*, Siemens AG, Germany, 2004

Departmental and University Committees, Services, etc.

| <i>Activities</i> | <i>Function</i> | <i>Beginning</i> | <i>Ending</i> |
|---|---------------------|------------------|---------------|
| Environmental Engineering Faculty Search Committee | Member | 10/2019 | 04/2020 |
| ASHRAE University of Colorado Boulder Student Branch | Faculty Co-Advisor | 09/2018 | - |
| Graduate Committee, CEAE Department, University of Colorado Boulder | AREN Representative | 08/2017 | - |
| ASHRAE University of Miami Student Branch | Faculty Co-Advisor | 02/2017 | 08/2017 |
| College of Engineering Strategic Plan Implementation Work Group 1: Excellence in Research, University of Miami | Member | 09/2016 | 10/2016 |
| Student Recruitment and Retention for CAE department, University of Miami | Responsible Faculty | 05/2016 | 08/2017 |
| College of Engineering Roadmap initiative: Working Group 2 Problem-Based Interdisciplinary Collaboration, University of Miami | Member | 02/2016 | 03/2016 |
| University of Miami Team for “2016 U.S. Department of Energy Race to Zero Student Design Competition” | Faculty Advisor | 09/2015 | 04/2016 |
| Search Committee for Dean of College of Engineering, University of Miami | Member | 09/2014 | 07/2015 |
| University of Miami Student Team for “2014 Atlantic Coast Conference Clean Energy Challenge” | Faculty Advisor | 10/2013 | 03/2014 |
| Scientist Search Committee of Environment Energy Technology Division, Lawrence Berkeley National Laboratory | Chair | 02/2012 | 05/2012 |
| Mentoring Program of Environment Energy Technology Division, Lawrence Berkeley National Laboratory | Mentor | 01/2012 | 06/2012 |

Professional Committees & Services

| <i>Journal</i> | <i>Function</i> | <i>Beginning</i> | <i>Ending</i> |
|---|------------------|------------------|---------------|
| Journal of Solar Energy Engineering: Including Wind Energy and Building Energy Conservation | Associate Editor | 2019 | - |
| Sustainable Buildings | Associate Editor | 2015 | 2017 |

Peer Reviewers

Journals:

1. Applied Energy
2. Applied Thermal Engineering
3. ASHRAE Transactions
4. Automation in Construction
5. Building and Environment
6. Building Simulation
7. Energies
8. Energy
9. Energy and Buildings
10. Energy Reports
11. Engineering Applications of Computational Fluid Mechanics
12. HVAC&R Research
13. IEEE Access
14. Indoor and Built Environment
15. Information Science
16. International Journal for Numerical Methods in Fluids
17. Journal of Architectural Engineering
18. Journal of Building Engineering
19. Journal of Building Performance Simulation
20. Journal of Energy Resources Technology
21. Journal of Solar Energy Engineering: Including Wind Energy and Building Energy Conservation
22. Natural Hazards Review
23. Physics Letters A
24. Simulation Modelling Practice and Theory
25. Solar Energy
26. Sustainability
27. Sustainable Buildings
28. The Annals of Occupational Hygiene

Conferences:

1. The 9th Conference of IBPSA Germany and Austria (BauSIM 2022), Weimar, Germany.
2. The 14th International Modelica Conference (Modelica 2021), Virtual Conference, 2021.
3. Building Simulation 2021 Conference, Bruges, Belgium, 2021.
4. The 8th Conference of IBPSA Germany and Austria (BauSIM 2020), Graz, Austria, 2020.
5. 2020 ASHRAE Building Performance Analysis Conference & SimBuild, Chicago, IL, 2020.
6. American Modelica Conference 2020, Boulder, CO, 2020
7. Symposium on Simulation for Architecture and Urban Design (SimAUD2019), Atlanta, GA, 2019.
8. The 13th International Modelica Conference (Modelica 2019), Regensburg, Germany, 2019.
9. The 15th Conference of International Building Performance Simulation Association (Building Simulation 2017), San Francisco, CA, 2017.
10. ASHRAE 2017 Winter Conference, Las Vegas, NV, 2017
11. The ASHRAE and IBPSA-USA SimBuild 2016: Building Performance Modeling Conference, Salt Lake City, UT, 2016.
12. The 14th Conference of International Building Performance Simulation Association (Building Simulation 2015), Hyderabad, India, 2015.
13. ASME 2015 International Mechanical Engineering Congress & Exposition (IMECE), Houston, TX, 2015.
14. ASME 2015 International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK2015), San Francisco, CA, 2015
15. The 1st International Conference of the CIB Middle East & North Africa Research Network (CIB-MENA 2014), Abu Dhabi, UAE, 2014.

16. The 2014 ASHRAE/IBPSA-USA Building Simulation Conference, Atlanta, GA, 2014.
17. The 13th Conference of International Building Performance Simulation Association (Building Simulation 2013), Chambéry, France, 2013.
18. The 5th National Conference of IBPSA-USA (SimBuild 2012), Madison, WI, 2012.
19. The 2nd International Conference on Building Energy and Environment (COBEE2012), Boulder, Colorado, 2012.
20. The 12th Conference of International Building Performance Simulation Association (Building Simulation 2011), Sydney, Australia, 2011.
21. The 5th International Conference on Energy Sustainability (EsFuelCell2011), Washington D.C., 2011.
22. ASHRAE 2011 Winter Conference, Las Vegas, NV, 2011.
23. The 4th National Conference of IBPSA-USA (SimBuild 2010), New York, NY, 2010.
24. The 6th International Symposium on Heating, Ventilating and Air Conditioning, Nanjing, China, 2009.

Proposal Review:

- Nazarbayev University
- U.S. National Science Foundation, 2021 (2 times)
- Elsevier, 2020
- U.S. National Science Foundation, 2020 (3 times)
- Natural Sciences and Engineering Research Council of Canada, 2019
- U.S. National Science Foundation, 2019
- U.S. National Science Foundation, 2017
- National Endowment for the Humanities, 2016
- University of Miami, 2016
- Swiss National Science Foundation, 2016
- U.S. National Science Foundation, 2016
- ASHRAE, 2015
- Swiss National Science Foundation, 2013
- U.S. Department of Energy, 2013.
- ASHRAE, 2011.

| Conference | Function | Date |
|--|-----------------------------|------------------|
| The 9 th Conference of IBPSA Germany and Austria (BauSIM 2022), Weimar, Germany | Scientific Committee Member | Sep. 20-22, 2022 |
| 2022 Building Performance Analysis Conference & SimBuild, Chicago, IL | Scientific Committee Member | Sep. 14-16, 2022 |
| Simulation for Architecture and Urban Design (SimAUD) at ANNSIM 2022, San Diego, CA | Review Committee Member | Jul. 18-21, 2022 |
| The 5th International Conference on Building Energy and Environment (COBEE 2022), Montreal, Canada | Scientific Committee Member | Jul. 25-29, 2022 |
| The 14th International Modelica Conference (Modelica 2021), Virtual Conference | Program Committee Member | Sep. 20-24, 2021 |
| The 17th Conference of International Building Performance Simulation Association (Building Simulation 2021), Bruges, Belgium | Session Chair | Sep. 1-3, 2021 |
| The 2nd International Conference for Global Chinese Academia on Energy and Built Environment, Chengdu, China | Session Chair | Jul. 16-19, 2021 |

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| ASHRAE 2021 Annual Conference, Virtual Conference | Session Chair | Jun. 28-30, 2021 |
| AEI Conference 2021, Virtual Conference | Technical Program Committee Member | Apr. 7-9, 2021 |
| ASHRAE 2021 Winter Conference, Virtual Conference | Session Chair | Feb 9-11, 2021 |
| The 8 th Conference of IBPSA Germany and Austria (BauSIM 2020), Graz, Austria. | Scientific Committee Member | Sep. 23-25, 2020 |
| American Modelica Conference 2020, Virtual Conference | Scientific Committee Member | Sep. 22-24, 2020 |
| 2020 Building Performance Analysis Conference & SimBuild, Chicago, IL | Scientific Committee Member, Session Chair | Aug. 12-14, 2020 |
| ASHRAE 2020 Annual Conference, Virtual Conference | Session Chair | Jun. 27-Jul. 1, 2020 |
| The 11th annual Symposium on Simulation for Architecture and Urban Design (SimAUD), Vienna, Austria | Scientific Committee Member | May 25-27, 2020 |
| The 16th Conference of International Building Performance Simulation Association (Building Simulation 2019), Rome, Italy | IBPSA-Italy Award Committee Member, Session Chair | Sep. 2-4, 2019 |
| The 1 st International Chinese Conference on Energy and Built Environment, Chengdu, China | Session Chair | Jul. 19-22, 2019 |
| ASHRAE 2019 Annual Conference, Kansas City, MO | Session Chair | Jun. 22-26, 2019 |
| 2019 IBPSA-China National Conference, Chengdu, China | Session Chair | May 16-17, 2019 |
| Symposium on Simulation for Architecture and Urban Design (SimAUD2019), Atlanta, GA | Program Committee Member | Apr. 7-9, 2019 |
| Simulation and Optimization of Building Systems Workshop, Boulder, CO | Chair | Mar. 18, 2019 |
| The 13th International Modelica Conference (Modelica 2019), Regensburg, Germany | Program Committee Member | Mar. 4-6, 2019 |
| American Modelica Conference 2018, Boston, MA | International Program Committee Member | Oct. 9-10, 2018 |
| Symposium on Simulation for Architecture and Urban Design (SimAUD2018), Delft, the Netherlands | Scientific Committee Member | Jun. 4-7, 2018 |

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| The 4th International Conference on Building Energy and Environment (COBEE2018), Melbourne, Australia | Keynote Session Chair, International Scientific Committee Member | Feb. 5-9, 2018 |
| The 15th Conference of International Building Performance Simulation Association (Building Simulation 2017), San Francisco, CA | Executive Scientific Committee Member, Session Chair | Aug. 7-10, 2017 |
| ASHRAE 2017 Annual Conference, Long Beach, CA | Session Chair | Jun. 24-28, 2017 |
| 2017 Joint PI Meeting: NSF BIGDATA and Big Data Hubs & Spokes, Washington DC | Breakout Session Chair | Mar. 15-16, 2017 |
| ASHRAE 2017 Winter Conference, Chicago, IL | Session Chair | Jan. 28- Feb. 1, 2017 |
| 2016 International Conference on Building Materials and Civil Engineering, Wuhan, China | Technical Program Committee Member | Dec. 10-11, 2016 |
| The ASHRAE and IBPSA-USA SimBuild 2016: Building Performance Modeling Conference, Salt Lake City, UT | Session Chair | Aug. 10-12, 2016 |
| ASHRAE 2016 Annual Conference, St Louis, MO | Session Chair | Jun. 25-29, 2016 |
| International Energy Agency Annex 60 “New generation computational tools for building and community energy systems based on the Modelica and Functional Mockup Interface standards” Expert Meeting, Coral Gables, FL | Organization Committee Chair | May 9-11, 2016 |
| Healthy Buildings 2015 America, Boulder, CO | Scientific Committee Member | Jul. 19-22, 2015 |
| The 3rd International Conference on Building Energy and Environment (COBEE) and the 9th ISHVAC (the International Symposium on Heating, Ventilation and Air Conditioning), Tianjin, China | International Scientific Committee Member | Jul.12-15, 2015 |
| ASHRAE 2015 Annual Conference, Atlanta, GA | Session Chair | Jun. 27-Jul. 1, 2015 |
| ASHRAE 2015 Winter Conference, Chicago, IL | Session Chair | Jan. 24-28, 2015 |
| The 1 st International Conference of the CIB Middle East & North Africa Research Network (CIB-MENA 2014), Abu Dhabi, UAE | International Scientific Committee Member | Dec. 14-16, 2014 |
| ASHRAE 2014 Annual Conference, Seattle, WA | Session Chair | Jun. 28-Jul. 2, 2014 |
| ASHRAE 2014 Winter Conference, New York City, NY | Session Chair | Jan. 18-22, 2014 |

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|---|---|-----------------------|
| The 13th Conference of International Building Performance Simulation Association (Building Simulation 2013), Chambéry, France | Session Chair | Aug. 25-28, 2013 |
| ASHRAE 2013 Winter Conference, Dallas, TX | Session Chair | Jan. 26-30, 2013 |
| The 2nd International Conference on Building Energy and Environment (COBEE2012), Boulder, CO. | International Scientific Committee Member | Aug. 1-4, 2012 |
| ASHRAE 2012 Winter Conference, Chicago, IL | Session Chair | Jan. 21-25, 2012 |
| ASHRAE 2011 Annual Conference, Montreal, Canada | Session Chair | June 25-29, 2011 |
| ASHRAE 2011 Winter Conference, Las Vegas, NV | Session Chair | Jan. 29-Feb. 22, 2011 |
| The 4th National Conference of IBPSA-USA (SimBuild2010), New York, NY | Session Chair | Aug. 11-13, 2010 |
| The 19 th International Compressor Engineering Conference, West Lafayette, IN | Session Vice-chair | July 14-17, 2008 |
| The 12 th International Refrigeration and Air Conditioning Conference, West Lafayette, IN | Session Vice-chair | July 14-17, 2008 |

| <i>Professional Services</i> | <i>Function</i> | <i>Beginning</i> | <i>Ending</i> |
|---|---|------------------|---------------|
| International Building Performance Simulation Association (IBPSA) | Treasurer | 2016 | - |
| | Affiliate Director Representing USA on the Board of IBPSA | 2016 | - |
| ASHRAE Project “RP-1675 - Guidance for CFD Modeling of Data Centers” | Project Monitoring Subcommittee Member | 2016 | - |
| International Building Performance Simulation Association – USA Chapter | Research Committee Chair | 2014 | 2018 |
| ASHRAE TC 4.10 Indoor Environment Modeling | Chair | 2019 | 2021 |
| | Vice Chair | 2017 | 2019 |
| | Secretary | 2015 | 2017 |
| | Research Subcommittee Chair | 2013 | 2015 |
| | Voting Member | 2013 2017 | 2016 2021 |

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|---|----------------|------|------|
| ASHRAE TC 7.4 Exergy Analysis for Sustainable Buildings | Chair | 2017 | 2019 |
| | Secretary | 2015 | 2017 |
| | Voting Member | 2015 | 2019 |
| ASHRAE TC 4.7 Energy Calculation | Voting Member | 2013 | 2017 |
| ASHRAE Student Congress | Representative | 2009 | 2009 |

Professional Membership

- Member of American Society of Mechanical Engineers, since 2019.
- Member of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), since 2007
- Member of IBPSA (International Building Performance Simulation Association), since 2008

Internal Examiner of Ph.D. Theses

13. Suwhan Yee. Advisor: Donghyun Rim. Department of Architectural Engineering, Pennsylvania State University.
12. Chen Xia. Advisor: Yuqing Hu. Department of Architectural Engineering, Pennsylvania State University.
11. Jong-Hyo Choi. "Principles and Performance of Air Cleaning with Enhanced Acoustic Agglomeration Methods." Advisor: John Z. Zhai. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
10. Mohammad Dabbagh. "Energy Performance of Switchable Windows and Dynamic Shading Systems for Buildings." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
9. Ayeshah Mohammad Al-Awadhi. "Principles and Applications of Thermochemical Energy Storage Systems: Model, Optimization, Test, and Integration." Advisor: John Z. Zhai. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
8. Ammar Dehwah 2022. "Energy Performance of Dynamic Roof Systems for Grid-interactive Efficient Buildings." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
7. Margarite Jacoby 2021. "Evaluation of Sensor Network Design Parameters that Affect Prediction Accuracy of Residential Occupancy Algorithms." Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
6. Amy Elizabeth Allen 2021. "Development and Evaluation of A Topology Optimization Framework for District Thermal Energy Systems to Lower Life Cycle Cost and Carbon Emissions." Advisor: Gregor P. Henze and Kyri Baker. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
5. Baqer Eisa Ameer 2020. "Development of a Simulation Environment for Designing and Retrofitting Sustainable Buildings in Urban Centers." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
4. Dareum Nam 2019. "Development of Simulation Modules for Active Chilled Beam Systems with an Integrative Experimental and Modeling Approach." Advisor: John Z. Zhai. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
3. Koosha Kiamehr 2017. "Energy Efficiency Improvement of VFD-Motor-Pump/Fan Systems." Advisor: Gang Wang. Department of Civil, Architectural and Environmental Engineering, University of Miami.
2. Kaustubh Phalak 2016. "Control Methods to Improve Non-Linear HVAC System Operations." Advisor: Gang Wang. Department of Civil, Architectural and Environmental Engineering, University of Miami.
1. Esber Andiroglu 2015. "Development of a Virtual Air / Water Flow Meter Using Fan / Pump Head and Motor Power." Advisor: Gang Wang. Department of Civil, Architectural and Environmental Engineering, University of Miami.

External Examiner of Ph.D. Theses

5. Qiu Jian Wang 2020. "Simulation-based Method for HVAC Air-side System Balancing". Advisor: Peng Xu. School of Mechanical Engineering, Tongji University, China.
4. Yunchao Yang 2018. "High Fidelity Numerical Investigations of Super-Lift Co-Flow Jet Active Flow Control Airfoil and its Applications". Advisor: Gecheng Zha. Department of Mechanical and Aerospace Engineering, University of Miami.
3. Jiaye Gan 2016. "High Fidelity Simulation of Fluid-Structure Interaction in Transonic and Supersonic Flow." Advisor: Gecheng Zha. Department of Mechanical and Aerospace Engineering, University of Miami.
2. Donghun Kim 2015. "Development and application of models and algorithms for model-predictive control in buildings." Advisor: James E. Braun. School of Mechanical Engineering, Purdue University.
1. Song Luo 2014. "Lateral Current Distribution in Proton Exchange Membrane Fuel Cells with Interdigitated Flow Field." Advisor: Hongtan Liu. Department of Mechanical and Aerospace Engineering, University of Miami.

Master Students (Non-Thesis) Supervised

3. Edgar Daniel Varela 2021. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
2. Bernardo Samuel Benzecry 2016. Department of Civil, Architectural and Environmental Engineering, University of Miami.
1. Raul Andres Velarde 2015. Department of Civil, Architectural and Environmental Engineering, University of Miami.

Internal Examiner of Master Theses

10. Austin Robinson 2021. "Demand Controlled Air Curtains to Reduce Respiratory Infection Risks for Indoor Environments with Displacement Ventilation." Advisor: John Zhai. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
9. Amir Salib 2021. "Modeling Analysis of Ice Rink Performance." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
8. Roya Rajabi 2021. "Impact of Dynamic Slab Insulation on Energy Performance of US Residential Buildings." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
7. Jessica Stershic 2021. "Microgrid Design and Considerations for Rural Colorado." Advisor: Kyri Baker. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
6. Sarah Dafoe 2021. "Multi-Use Microgrid Communities and Their Impact on Goal-Based On-Site Generation." Advisor: Kyri Baker. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
5. Zachary Amos Peterson 2019. "Practical Requirements of Developing a Transactive Energy System for a Campus Environment." Advisor: Kyri Baker. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
4. John Nelson 2018. "Investigations into the Passive Cooling Potential of Mass inherent in Medium to Large Commercial Buildings." Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
3. Nicholas Long 2018. "Reduced Order Models for Rapid Analysis of Ambient Loops for Commercial Buildings." Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
2. Ezgi Ozcoban 2017. "Comparison of Reinforced Concrete Bridge and Fiber Reinforced Polymer Bridge Using Life Cycle Assessment." Advisor: Matthew J. Trussone, Department of Civil, Architectural and Environmental Engineering, University of Miami.
1. William Bartow 2014. "Experimental Investigations of Base Drag Reduction Using Passive Jet Flow Control." Advisor: Gecheng Zha. Department of Mechanical and Aerospace Engineering, University of Miami.

Internal Examiner of Master Project Reports

13. Nicholas Shenberger 2021. "Micro Hydroelectric Generation Using Grey and Rainwater in High-Rise Buildings in the United States." Advisor: Kyri Baker. Department of Civil, Environmental and Architectural

- Engineering, University of Colorado Boulder.
12. Maja Lynn Sagaser 2021. "Life Cycle Assessment of the City of Boulder's Brenton Building." Advisor: Wil Srubar. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 11. Matthew Steen 2021. "A Review and Categorization of Grid-interactive Efficient Building Technologies for Building Performance Simulation." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 10. Jordan Marie Thompson 2020. "Resiliency Evaluation of Net-Zero Residential Communities" Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 9. Mohammed Almansour 2020. "Optimal Design Approach of High Efficiency Building Based on Construction Value Engineering – Case Study of Residential Buildings in Kuwait." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 8. Archan Shah 2020. "Energy Evaluation of Shallow Ground Source Heat Pumps for Residential Buildings in California." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 7. Punya S. Dash 2019. "Implementation of Indoor Ice Rink in EnergyPlus." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 6. Timothy D. Hreha 2019. "Evaluating the Energy Performance of LEED-Certified Residence Halls." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 5. Adam McKittrick 2019. "Cost Comparison between Annual and Monthly Net Zero Construction for Multifamily Buildings." Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 4. Fatema Almajed 2019. "Increased Diversity of Reduced Order Models for Rapid Analysis of 5GDHC Networks for Commercial Buildings." Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 3. Nicholas Ryan Smith 2018. "Energy Modeling of Wastewater Heat Recovery Systems". Advisor: Gregor P. Henze. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 2. Wayne Leonard 2018. "Shallow Earth Seasonal Heat Storage – An Effective, Low-Cost Approach to Geothermal HVAC." Advisor: Moncef Krarti. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.
 1. Libby I. Coleman 2018. "Climate-based Comparative Lifecycle Assessment of Glazing Assemblies for Glass Curtain Walls in Commercial Office Buildings." Advisor: Wil V. Srubar III. Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder.

Hosted Visiting Scholars

16. Nasim Mamaghani, Ph.D. Student, University of Colorado Denver, 02/2021-05/2021.
15. Yizhi Yang, M.S. Student, Columbia University, 09/2020-12/2020.
14. Dominik Jankowski, M.S. Student, Coburg University of Applied Sciences, Germany, 07/2020-12/2020.
13. Chenliang Fan, Ph.D. Student, Guangzhou University, China, 12/2019-06/2021.
12. Chenlu Tian, Ph.D. Student, Shandong Jianzhu University, China, 10/2019-03/2020.
11. Saranya Anbarasu, M.S. Student, CEPT University, India, 05/2019-11/2019.
10. Shifang Huang, Ph.D. Student, Southeast University, China, 01/2018-12/2018.
9. Peng Xu, Associate Professor, Chongqing University of Technology, China, 06/2017-05/2018.
8. Yihui Qiu, Associate Professor, Xiamen University of Technology, China, 04/2017-10/2017.
7. Qiujian Wang, Ph.D. Student, Tongji University, China, 03/2017-06/2018.
6. Guang Zhou, Ph.D. Student, Guangzhou University, China, 11/2016-10/2017.
5. Dong He, Ph.D. Student, Chongqing University, China, 09/2015-09/2016.
4. Guifang Shao, Associate Professor, Xiamen University, China, 08/2014-07/2015.
3. Tiejun Li, Ph.D. Student, Chongqing University, China, 08/2014-07/2015.
2. Dongbo Pan, Associate Professor, Southwest University, China, 08/2014-07/2015.
1. Changjiang Jiang, Associate Professor, Chongqing University of Posts and Telecommunications, China, 08/2014-07/2015.

Supervised Undergraduate / Graduate Students for Research

28. Chloe Snellgrove, B.S. in Civil Engineering, University of Colorado Boulder, 2021-Present.
27. Jessica Stershic, M.S. in Architectural Engineering, University of Colorado Boulder, 2019-2020.
26. Nerys Huffman, B.S. in Mechanical Engineering, California Institute of Technology, 2019.
25. Xing Lu, M.S. in Architectural Engineering, University of Colorado Boulder, 2017-2019.
24. Satish Upadhyaya, B.S. in Computer Science, University of Colorado Boulder, 2018-2021.
23. Matthew Hayden Strong, B.S. in Computer Science, University of Colorado Boulder, 2018-2021.
22. Ayush Khanal, B.S. in Computer Science, University of Colorado Boulder, 2018-2019.
21. Danlin Hou, M.S. in Architectural Engineering, University of Colorado Boulder, 2017-2018.
20. Peilin Yang, M. S. in Architectural Engineering, University of Colorado Boulder, 2017-2019.
19. Keya Joshi, M. S. in Mechanical Engineering, University of Colorado Boulder, 2017-2018.
18. Daniel Jacques, B. S. in Mechanical Engineering, University of Maryland, Baltimore County, 2017.
17. Hiba Benkhye, B. S. in Mechanical Engineering, University of Miami, 2017.
16. Sophia Delgado, B. S. in Industrial Engineering, University of Miami, 2017.
15. Isabella Stahl, B. S. in Architectural Engineering, University of Miami, 2017.
14. Alex David Plumb, B. S. in Architectural Engineering, University of Miami, 2017.
13. Clay Wyda, B. S. in Environmental Engineering, University of Miami, 2016-2017.
12. Isabella Goltz Ver, B. S. in Chemical Engineering, Rural Federal University of Rio de Janeiro, 2016.
11. Drake Peterson, B. S. in Architectural Engineering, University of Miami, 2016-2017.
10. Robert Foster, B. S. in Aerospace Engineering, University of Miami, 2015.
9. Lonching Eng, B. S. in Electric Engineering, University of Miami, 2015-2016
8. Bernardo Samuel Benzecry, M. S. in Architectural Engineering, University of Miami, 2015-2016.
7. Ana Carolina Laurini Malara, B. S. in Civil Engineering, University of Sao Paulo, 2014-2016.
6. Thomas Alonso Sevilla, B. S. in Electric Engineering, University of Miami, 2014-2016.
5. German Augusto Barrios, B. S. in Electric Engineering, University of Miami, 2014-2015.
4. Mary Semaan, M. S. in Environmental Engineering, University of Miami, 2014.
3. Christina Marie Thomas, B. S. in Electric Engineering, University of Miami, 2014.
2. Dan Li, B. S. in Physics and Mathematics, University of Miami, 2013-2015.
1. Ana C. Cohen Mobily-Guitta, B. S. in Architectural Engineering, University of Miami, 2013-2014.

Awards Received by Zuo's Students

59. Kathryn Hinkelman 2022. Marlene & Joseph Borda Architectural Engineering Graduates Fellowship. \$750.
58. Cary Alex Faulkner 2022. PhD Fellow. UNL Durham School of Architectural Engineering and Construction PhD Symposium.
57. Cary Alex Faulkner 2022. Travel Award. Department of Mechanical Engineering, University of Colorado Boulder, \$750.
56. Saranya Anbarasu 2022. ASHRAE Rocky Mountain Chapter Student Scholarship.
55. Nasim Mamaghani 2022. ASHRAE Rocky Mountain Chapter Student Scholarship.
54. Yunyang Ye 2022. Homer Addams Award for contribution to ASHRAE Research Project RP-1771. ASHRAE, \$5,000.
53. Chengnan Shi 2021. Student Travel Grant to attend the 2022 ASHRAE Winter Conference, ASHRAE, \$1,000.
52. Jing Wang 2021. Nominee for College of Engineering & Applied Science's Outstanding Dissertation Award, Department of Civil, Environmental, and Architectural Engineering.
51. Thomas Sevilla 2021. ASHRAE Award. Department of Civil, Architecture and Environmental Engineering, University of Miami.
50. Kathryn Hinkelman 2021. P.E.O. Scholar Award, P.E.O. Scholar Awards Board of Trustees, \$20,000.
49. Matthew Hayden Strong 2021. Active Learning Program Awards. The College of Engineering and Applied Science at the University of Colorado Boulder.
48. Matthew Hayden Strong 2021. Research Award for Undergraduate Students. The College of Engineering and Applied Science at the University of Colorado Boulder.
47. John E. Castellini Jr. 2021. Summer Fellowship. Department of Mechanical Engineering at the University of Colorado Boulder, \$7,596.
46. Yingli Lou 2021. ASHRAE Rocky Mountain Chapter Student Scholarship, \$1,500.

45. Nasim Mamaghani 2021. Student scholarship for attending the Conference in Energy Efficiency for Transformative Solutions, Denver, CO.
44. Kathryn Hinkelman 2021. IBUILD Graduate Research Fellowship, U.S. Department of Energy, \$88,000.
43. Matthew Hayden Strong 2020. Honorable Mention for Outstanding Computer Science Undergraduate Researchers, Computing Research Association.
42. Saranya Anbarasu 2020. Awtar and Teji Singh Fellowship. The College of Engineering and Applied Science at the University of Colorado Boulder, \$20,000.
41. Dominik Jankowski 2020. Europe-Colorado Mobility Program. The College of Engineering and Applied Science at the University of Colorado Boulder, \$5,500.
40. Xu Han 2020. Strauch Family Graduate Fellowship. The University of Colorado Boulder, \$4,000.
39. Saranya Anbarasu 2020. Dean's Graduate Fellowship. College of Engineering & Applied Science, University of Colorado Boulder, \$7,725 stipend plus benefits.
38. Saranya Anbarasu 2020. Department Fellowship. Department of Civil, Environmental, and Architectural Engineering, University of Colorado Boulder. One semester support with tuition and benefits.
37. Saranya Anbarasu 2020. Graduate Dean's Fellowship, the Graduate School, University of Colorado Boulder, \$1,000.
36. Jessica Stershic 2020. CEAE Summer Fellowship. Department of Civil, Environmental, and Architectural Engineering, University of Colorado Boulder, \$7,725 stipend plus benefits.
35. Cary Alex Faulkner 2020. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$675.
34. Xu Han 2020. Dissertation Completion Fellowship, Department of Civil, Environmental, and Architectural Engineering, University of Colorado Boulder, coverage of 100% tuition and 25% stipend for one semester.
33. Jing Wang 2020. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$675.
32. Jessica Stershic 2020. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$675.
31. Yingli Lou 2020. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$675.
30. Yunyang Ye. Nominee for College of Engineering & Applied Science's Outstanding Dissertation Award, Department of Civil, Environmental, and Architectural Engineering.
29. Cary Alex Faulkner 2019. Graduate Dean's Fellowship, the Graduate School, University of Colorado Boulder.
28. Jessica Stershic 2019. Student scholarship for attending the Energy Service Coalition's 8th Annual Market Transformation Conference, Denver, CO.
27. Kathryn Hinkelman 2019. Student Travel Award for attending IBPSA-Project 1 Expert Meeting in Rome, Italy, IBPSA, \$2,500.
26. Kathryn Hinkelman 2019. Honorable Mention for Energy Fellowship Program, The Link Foundation.
25. Jessica Stershic 2019. Galvanize the Future: A Richard L. Brooks Memorial Scholarship, American Galvanizers Associations, \$2,500.
24. Xu Han 2019. ASHRAE College of Fellows Travel Award. ASHRAE, \$2,000.
23. Yunyang Ye 2019. ASHRAE Grant-in-Aid Award. ASHRAE, \$10,000.
22. Jessica Stershic 2019. Dean's Graduate Assistantship. College of Engineering & Applied Science, University of Colorado Boulder, \$24,750 stipend plus tuition and benefits.
21. Yingli Lou 2019. Dean's Graduate Fellowship. College of Engineering & Applied Science, University of Colorado Boulder, \$7,500 stipend plus benefits.
20. Yangyang Fu 2018. ASHRAE Student Travel Grant. ASHRAE Rocky Mountain Chapter, \$1,500.
19. Yunyang Ye 2018. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$750.
18. Yangyang Fu 2018. ASHRAE Student Travel Grant. ASHRAE University of Colorado Boulder Student Branch, \$750.
17. Yangyang Fu 2018. IBPSA-USA travel scholarship for attending the 2018 Building Performance Analysis Conference and SimBuild in Chicago, IL, \$1,000.
16. Yangyang Fu 2018. ASHRAE Grant-in-Aid Award. ASHRAE, \$10,000.
15. Wei Tian 2017. Outstanding Graduate Award. Department of Civil, Architecture and Environmental

- Engineering, University of Miami.
14. Wei Tian 2017. ASHRAE Grant-in-Aid Award. ASHRAE, \$10,000.
 13. Yunyang Ye 2017. Outstanding Service Award. ASHRAE University of Miami Chapter.
 12. Wei Tian 2017. Outstanding Ph.D. Research Award. College of Engineering, University of Miami.
 11. Ana Carolina Laurini Malara 2016. Travel scholarship for the Summer Camp at Brazilian National Institute of Pure and Applied Mathematics, Rio de Janeiro, Brazil.
 10. Sen Huang 2016. IBPSA-USA travel scholarship for attending the ASHRAE and IBPSA-USA SimBuild 2016 Conference in Salt Lake City, UT.
 9. Thomas Sevilla 2016. Tuition Scholarship. Department of Civil, Architecture and Environmental Engineering, University of Miami, Coral Gables.
 8. Sen Huang 2014. NSF Travel Award for attending the Symposium on Building Energy Uncertainty and Risk Analysis at the Georgia Tech.
 7. Wei Tian 2014. NSF Travel Award for attending the Symposium on Building Energy Uncertainty and Risk Analysis at the Georgia Tech.
 6. Sen Huang 2014. ASHRAE/IBPSA-USA student travel scholarship for attending the ASHRAE/IBPSA-USA Building Simulation Conference in Atlanta, Georgia.
 5. Wei Tian 2014. ASHRAE/IBPSA-USA student travel scholarship for attending the ASHRAE/IBPSA-USA Building Simulation Conference in Atlanta, Georgia.
 4. Dan Li 2014. Honors Summer Research Program. University of Miami.
 3. Dan Li 2014. "Beyond the Book" summer award for research-based learning. College of Arts and Science, University of Miami.
 2. Dan Li, Reymundo J. Miranda 2014. "Semifinalist team" representing the University of Miami in the "Atlantic Coast Conference Clean Energy Challenge" at the University of Maryland, College Park, MD.
 1. Reymundo J. Miranda 2013. Tuition Scholarship. Department of Civil, Architecture and Environmental Engineering, University of Miami.