# Zhiqiang (John) Zhai, Dr.Eng., Ph.D., Professor
# Fellow of ASHRAE, ISIAQ, IBPSA

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## EDUCATION

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|---|---|
| Ph.D. | **Massachusetts Institute of Technology (MIT)**, Cambridge, MA, USA |
| (2003) | Building Technology Program, Department of Architecture |
| | (*Specialization*: Sustainable Building, Integrated Building Simulation, and Indoor Air Quality) |
| Dr.Eng. | **Tsinghua University**, Beijing, China |
| (1999) | Fluid Mechanics Program, Department of Engineering Mechanics |
| | (*Specialization*: Computational Fluid Dynamics and Turbulence) |
| M.S. | **Tsinghua University**, Beijing, China |
| (1995) | Fluid Mechanics Program, Department of Engineering Mechanics |
| | (*Specialization*: Experimental Fluid Mechanics) |
| B.S. | **Tsinghua University**, Beijing, China |
| (1994) | Engineering Mechanics Program, Department of Engineering Mechanics |

## EXPERIENCE

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| 2018(July-Sept) | **The Japan Society for the Promotion of Science Fellow**, Tohoku University, Sendai, Miyagi, Japan<br>*Deliver seminars, supervise graduate students, and collaborate on research projects.* |
| 2018(May-July) | **Visiting Scientist**, Lawrence Berkeley National Laboratory, Berkeley, CA, USA<br>*Collaborate on various research projects.* |
| 2015-Now | **Professor**, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, CO, USA<br>*Conduct teaching, research and service activities in the areas of integrated building systems, building energy efficiency, indoor environment quality, and sustainable building.* |
| 2014-2016 | **Faculty Director** for Architectural Engineering Program, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, CO, USA<br>*Manage and lead Architectural Engineering Freshmen and outreach program.* |
| 2011-2015 | **Associate Professor**, Program of Environmental Design (Architecture), University of Colorado at Boulder, CO, USA<br>*Help reform and develop the new architecture program as one of the few campus-appointed voting faculty members.* |
| 2010-2015 | **Associate Professor**, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, CO, USA<br>*Conduct teaching, research and service activities in the areas of integrated building systems, building energy efficiency, indoor environment quality, and sustainable building.* |
| 2010-2011 | **Full-Time Senior Fellow**, Rocky Mountain Institute (RMI), Boulder, CO, USA<br>*Manage, supervise and advise over a dozen design and consulting projects in different sectors.* |
| 2003-2010 | **Assistant Professor**, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, CO, USA<br>*Conduct teaching, research and service activities in the areas of integrated building systems, building energy efficiency, indoor environment quality, and immune and sustainable building.* |
| 2003(Jun-Aug) | **Research Associate**, Building Technology Program, MIT, Cambridge, MA<br>*Optimize ventilation system designs for chemical and biological laboratories.* |
| 1999-2003 | **Teaching and Research Assistant**, Department of Architecture, MIT, Cambridge, MA<br>*Assist teaching a series of core courses offered by Building Technology Program, and conduct* |

*several research projects related to building energy efficiency, indoor environment quality, and integrated system design.*

1994-1999 **Teaching and Research Assistant**, Department of Engineering Mechanics, Tsinghua University, Beijing, China

*Assist teaching several experimental and computational fluid mechanics courses, develop new turbulence models, and apply CFD for solving industry problems.*

## HONORS AND AWARDS

- Catalyst: Leaders – International Leader Fellowship, The Royal Society of New Zealand, 2023
- The Fulbright US Scholar, US Department of State, 2023
- 2021 Best Paper Award, Buildings Journal, 2023
- Nominated for the College of Engineering & Applied Science (CEAS) Outstanding Faculty Advisor Award, 2022
- World's Top 2% Scientists by Stanford University, 2021
- Fellow, The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), 2020
- Best Paper Award, The 2nd International Conference of International Alliance for Sustainable Urbanization and Regeneration (IASUR), China, 2019
- The College of Engineering & Applied Science (CEAS) Faculty Research Award, University of Colorado at Boulder, 2019
- Fellow, The International Building Performance Simulation Association (IBPSA), 2019
- Fellow, The International Academy of International Society of Indoor Air Quality and Climate (ISIAQ), 2018
- 2017 Best Paper Award, International Journal of Building Simulation, 2018
- The JSPS Invitational Fellowship for Research, The Japan Society for the Promotion of Science, 2018
- The Gold Award of New Product & Technology, The 2016 World Internet of Things (IoT) Conference and Exposition, China, Oct 30-Nov 1, 2016
- Named as Distinguished Lecturer by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), 2014.
- Invited Participant for 2010 US Frontiers of Engineering (US FOE) Symposium and Invited Organizer for 2011 US FOE Symposium by National Academy of Engineering of US
- Research Development Award, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, May, 2010
- Distinguished Service Award (DSA) of American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), May, 2010
- William Mong Visiting Research Fellowship in Engineering, The University of Hong Kong, 2009
- 2008 Best Paper Award, International Journal of Building Simulation, 2009
- The Conference Award, The Council on Research and Creative Work (CRCW), University of Colorado at Boulder, 2008, 2012
- Sustainability Award of Green Faculty, University of Colorado at Boulder, 2008
- The Charles A. and Anne Morrow Lindbergh Foundation Project Award, 2007
- Young Researcher Award, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, 2007
- Presidential Fellowship, Massachusetts Institute of Technology, 1999–2003
- Grant-in-Aid Fellowship, American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), 2001
- Avalon Travel Grant, Massachusetts Institute of Technology, 2000
- Martin Family Society of Fellows for Sustainability, Massachusetts Institute of Technology, 2000

## THESES

- **Ph.D. Dissertation**: "Developing an Integrated Building Design Tool by Coupling Building Energy Simulation and Computational Fluid Dynamics Programs", Massachusetts Institute of Technology, 2003.
- **Dr.Eng. Dissertation**: "Study of the Flow around Dry-Cooling Towers", Tsinghua University, 1999.
- **M.S. Thesis**: "Model Experiment on Wind-Break Problem of Heler-Type Dry-Cooling Towers in Power Plants",

Tsinghua University, 1995.

- **B.S. Thesis**: "Numerical Simulation of Thermal Performance of Heler-Type Dry-Cooling Towers", Tsinghua University, 1994.

## PUBLICATIONS

***(* denotes my student and post-doc co-authors)***

**Contribution to Books**

1. Wang L, Ge H, **Zhai Z**, etc. 2023. *Proceedings of the 5th International Conference on Building Energy and Environment.* Springer Singapore, 04 September [ISBN: 978-981-19-9821-8; 978-981-19-9823-2; 978-981-19-9822-5]
2. **Zhai Z**. 2022. *Energy Efficient Buildings – Fundamentals of Building Science and Thermal Systems*. John Wiley & Sons, October 04. [ISBN: 978-1119881933]
3. **Zhai Z** and Wang H*. 2022. Ventilation System Design: Fast Predictions. *Handbook of Ventilation Technology for the Built Environment: Design, Control and Testing (Book)*, Edited by Cao SJ and Feng Z, The Institution of Engineering and Technology. [ISBN: 978-1839531477]
4. **Zhai Z.** 2020. *Computational Fluid Dynamics for Built and Natural Environments*. Springer, Singapore. [ISBN: 978-981-329-819-4]
5. **Zhai Z** et al. 2018. Terminal Equipment Principles and Airflow Distribution. *Data Center Energy-Saving Technologies and Applications (Book in Chinese),* Edited by Zhang Q and Li Z, Mechanical Engineering Press, Beijing. [ISBN: 978-7-111-60248-4]
6. **Zhai Z** et al. 2017. Breathing and Living Walls. *Advanced Energy Efficient Building Envelope Systems (Book)*, pp.75-130, Edited by Krarti M, ASME Press, New York. [ISBN: 9780791861370]
7. Krarti M and **Zhai Z** et al. 2017. Advanced Energy Efficient Building Envelope System. *The CRC Handbook of Thermal Engineering: Second Edition (Book)*, Edited by Raj P. Chhabra, CRC Press. [ISBN: 978-1498715270]
8. **Zhai Z** and Feng N*. 2017. Passive Cooling and Heating Techniques for Building. *Handbook of Integrated and Sustainable Buildings Equipment and Systems: Volume 1: Energy Systems (Book)*, Edited by Gonzalez JE and Krarti M, ASME Press, New York. [ISBN: 978-0791861271]
9. Chen Q, **Zhai Z**, You X, Zhang T. 2017. *Inverse Design Methods for the Built Environment (Book)*, Routledge. [ISBN: 978-1138204980]
10. Miller SL and **Zhai Z** (Editors). 2015. *Proceedings of the Healthy Building 2015 America Conference*.
11. **Zhai Z**. 2014. Computational Fluid Dynamics Applications in Green Building Design. *Computational Fluid Dynamics Applications in Green Design (Book),* pp.1-22, Edited by Maher A.R. Sadiq Al-Baghdadi, International Energy and Environment Foundation (IEEF). [ISBN: 978-1494875756]
12. **Zhai Z**, Li X*, and Wang H* (Editors). 2012. *Proceedings of the 2nd International Conference on Building Energy and Environment (COBEE2012)* (1314 pages). [ISBN: 978-0-9816881-9-0; 0-9816881-9-5]
13. Liu J, Zhang T, and **Zhai Z** (Editors). 2008. *Proceedings of the First International Conference on Building Energy and Environment (COBEE2008)*, Volume I, II, III, 2365 Pages. [ISBN: 978-0-9816881-6-9, 978-0-9816881-7-6, 978-0-9816881-8-3, and 978-0-9816881-5-2 (CD)].
14. Chen Q and **Zhai Z**. 2004. The Use of CFD Tools for Indoor Environmental Design. *Advanced Building Simulation (Book)*, pp.119-140, Edited by Malkawi A and Augenbroe G, Spon Press, New York. [ISBN: 978-0415321228]

**Contribution to Journal Special Issues**

1. Beitelmal A, **Zhai Z**, and J Gonzales. 2023. Advances on Indoor Air Quality Systems for Healthy and Sustainable Buildings. *ASME Journal of Engineering for Sustainable Buildings and Cities.*
2. Wang L**, Zhai Z**, and Hong T. 2023. Advances in Research on Urban Microclimate and Impacts on Built Environment. *Building and Environment.*
3. Dai Y, Zhao X, Yuan Y, and **Zhai Z**. 2023. Energy and Built Environment - CEBE2023. *Renewable and Sustainable Energy Reviews*.
4. Zhang TT and **Zhai Z**. 2022. Toward Immune Buildings, Lessons Learned from the COVID-19 Pandemic and the Aftermath, *Journal of Buildings*.
5. **Zhai Z** and He G. 2022. Green Buildings in Architecture, Structures and Construction. *Journal of Architecture, Structures and Construction.*

6. Zhao X, Luo L, Yuan Y, **Zhai Z**, and Dai Y. 2022. Energy Scientific and Technological Advances. *Energy*.
7. Dai Y, Yuan Y, **Zhai Z**, Zhao X, and Jia T. 2022. Building-Integrated Solar Energy. *Solar Energy*
8. **Zhai Z**, Yuan Y, Li X, and Jiang F. 2022. Energy Conservation Solutions: from Theory to Practice. *Energy and Buildings*.
9. Yuan Y, **Zhai Z** and Zhao J. 2022. Energy Efficient Underground Space. *Underground Space*.
10. Yuan Y, Zhao X, **Zhai Z**, Dai Y, and Zhong W. 2021. Built Thermal Environment*. Journal of Thermal Science*
11. **Zhai Z**. 2019. Build Trust in Building Simulation. *Energy and Buildings*.
12. Duanmu L, Wang J, Li X*, Shu H, Cao G, Xia J, and **Zhai Z** (Editors). 2015. Sustainable Energy Utilization in Cold Climate Zone. *Renewable Energy*, 84: 1-152 (December)
13. **Zhai Z** and Liu J (Editors). 2014. Special Issue for 2012 International Conference on Building Energy and Environment (COBEE). *Energy and Buildings*, Volume 68, Part B: 633-720.
14. **Zhai Z** (Editor)**.** 2014. Topical Issue for 2012 International Conference on Building Energy and Environment (COBEE). *Building Simulation: An International Journal*, 7(2): 107-204.
15. **Zhai Z**, Watch D, and Vernon W (Editors). 2013. Special Issue on Technological Advancements that Improve or Enhance Energy Efficiency in Healthcare and Biomedical Research Facilities. *The World Review of Science, Technology and Sustainable Development*, 10(1/2/3): 1-161.
16. Liu J, Zhang T and **Zhai Z** (Editors). 2010. Special Issue for 2008 International Conference on Building Energy and Environment (COBEE). *Energy and Buildings*, 42(1): 1-146.
17. **Zhai Z**, Liu J, and Zhang T (Editors). 2009. Special Issue for 2008 International Conference on Building Energy and Environment (COBEE). *Building and Environment*, 44(11): 2201-2318.

**Papers in Peer-Reviewed Journals**

1. **Zhai Z**, Baum J*, Griego D*. 2023. Applying Natural Ventilation for Commercial Buildings with Atrium: Indoor Environment Prediction and Outdoor Pollutant Impact. *ASME Journal of Engineering for Sustainable Buildings and Cities.*
2. Zhang H, Tian Y, Tian C, **Zhai Z**. 2023. Effect of Key Structure and Working Condition Parameters on A Compact Flat-Evaporator Loop Heat Pipe for Chip Cooling of Data Centers. *Energy*, 284, 128658.
3. Tominaga Y, Wang L, **Zhai Z**, Stathopoulos T. 2023. Accuracy of CFD Simulations in Urban Aerodynamics and Microclimate: Progress and Challenges. *Building and Environment*, 2023/8/10, 110723.
4. Goodrum WM*, **Zhai Z**, Robles ml. 2023. Impacts Of Architectural Beauty to Building Energy Performance. *Architecture, Structures and Construction*, 3(1): 87-111.
5. Likins-White M*, Tenent RC, **Zhai Z**. 2023. Degradation of Insulating Glass Units: Field Measurements and Energy Impacts. *Buildings*, 13(2), 551
6. Li J, Zhang Y, Peng Z, Zhang X, **Zhai Z**, Luo Y, Liu B, Sun X, Al-Saadi SN*. 2023. Thermal Performance of a Plate-Type Latent Heat Thermal Energy Storage Heat Exchanger - An Experimental Investigation and Simulation Study. *Journal of Energy Storage*, 65, August 15, 107295.
7. Lim H* and **Zhai Z.** 2022. Estimating Unknown Parameters of A Building Stock Using A Stochastic-Deterministic-Coupled Approach. Energy and Buildings, 255: 111673.
8. Duan X, Shen C, Chen D, **Zhai Z**. 2022. Effect Of Environmental Factors on the Concentration Distribution of Bioaerosols with Different Particle Sizes in An Enclosed Space. *Indoor and Built Environment,* August 11.
9. Wang Y, **Zhai Z**, Xue Y*. 2022. A City-Scale Inverse Modelling Method for Air Pollutant Source Determination. *Sustainable Cities and Society,* 87: ARTN 104248.
10. Lu Y, Duanmu L, **Zhai Z**, Wang Z*. 2022. Application and Improvement of Canny Edge-Detection Algorithm for Exterior Wall Hollowing Detection Using Infrared Thermal Images. *Energy and Buildings*. 274: ARTN 112421.
11. Ding J, Zhang H, Leng D, Xu H, Tian C, **Zhai Z**. 2022. Experimental Investigation and Application Analysis on An Integrated System of Free Cooling and Heat Recovery for Data Centers. International Journal of Refrigeration. 136: 142-151.
12. Zhang T and **Zhai Z**. 2022. Toward Immune Buildings: Lessons Learned from the COVID-19 Pandemic and Its Aftermath. *Buildings*, 12 (9): ARTN 1440.
13. Yan S*, Wang LL, Birnkrant MJ, Zhai J, Miller SL. 2022. Evaluating SARS-Cov-2 Airborne Quanta Transmission and Exposure Risk in A Mechanically Ventilated Multizone Office Building. *Building and Environment*, 219: ARTN 109184.

14. Liu L, Zhang Q, **Zhai Z**, Zhao X. 2022. A Simplified Method to Simulate Tube-In-Tank Latent Thermal Energy Storage with Fin-Enhanced Phase Change Material in Data Center. *Journal Of Energy Storage*, 55: ARTN 105757.
15. Yan S*, Wang LL, Birnkrant MJ, **Zhai Z**, Miller SL. 2022. Multizone Modeling of Airborne SARS-CoV-2 Quanta Transmission and Infection Mitigation Strategies in Office, Hotel, Retail, and School Buildings. *Buildings*, 13 (1): 102-102.
16. **Zhai Z**, Li H*, Bahl R, and Trace K. 2021. Application of Portable Air Purifiers for Mitigating COVID-19 in Large Public Spaces. *Buildings*, 11(8): ARTN 329.
17. Denkenberger D*, Pearce JM, Brandemuehl M, Alverts M, **Zhai Z**. 2021. Expanded Microchannel Heat Exchanger: Finite Difference Modeling. *Designs,* 5(4): 58-58.
18. Zheng S*, Wang Y, **Zhai Z**, Xue Y*, Duanmu L. 2021. Characteristics of Wind Flow around a Target Building with Different Surrounding Building Layers Predicted by CFD Simulation. *Building and Environment,* 201: ARTN 107962.
19. **Zhai Z** and Li H*. 2021. Distributed Probability of Infection Risk of Airborne Respiratory Diseases. *Indoor and Built Environment*: ARTN 1420326X211030324.
20. Huang L*, Fan C, **Zhai Z**. 2021. A Graphical Multi-Objective Performance Evaluation Method with Architect-Friendly Mode. *Frontiers of Architectural Research,* 10(2): 420-431.
21. Yue C*, Zhang Q, **Zhai Z**, Wang J, Ling L. 2021. Numerical Study on Flow and Thermal Characteristics of a Micro-Channel Separated Heat Pipe under Various Surface Wettability. *Case Studies in Thermal Engineering,* 28: ARTN 101345.
22. Li H*, Kang YM, **Zhai Z**. 2021. Potential Risk Analysis of Medical Staff when Performing Endotracheal Intubation in Negative Pressure Isolation Ward. *Indoor & Built Environment,* ARTN 1420326X20979015.
23. Zheng S*, **Zhai Z**, Wang Y, Xue Y*, Duanmu L, and Liu W. 2021. Evaluation and Comparison of Various Fast Fluid Dynamics Modeling Methods for Predicting Airflow around Buildings. *Building Simulation*, 15: 1083–1095.
24. **Zhai Z**, BAHL R, TRACE K, GUPTA B, and Li H*. 2021. Mitigating COVID-19 In Public Spaces. *ASHRAE Journal* (OCTOBER): 28-38.
25. Li H*, Zhong K, Yu J*, Kang YM, **Zhai Z**. 2020. Solar Energy Absorption Effect of Buildings in Hot Summer and Cold Winter Climate Zone, China. *Solar Energy*, 198: 519-528.
26. Yu J*, Kang YM, Li H*, Zhong K, **Zhai Z**. 2020. Influence of Ventilation-Behavior During Off-Periods on Energy-Consumption for an Intermittently Heated Room of Dormitory Buildings. *Energy*, 197, 117103.
27. Denkenberger DC*, Brandemuehl JM, **Zhai Z**, Pearce M. 2020. Finite Difference Heat Exchanger Model: Flow Maldistribution with Thermal Coupling. *Heat Transfer Engineering*, 42(11): 889-903.
28. Yu J*, Kang YM, **Zhai Z**. 2020. Advances in Research for Underground Buildings: Energy, Thermal Comfort and Indoor Air Quality. *Energy and Buildings,* 215, 109916.
29. Yu J*, Kang Y, **Zhai Z**, Zhong K. 2020. Influences of Occupant Ventilation-Behavior During Off-Periods on Indoor Thermal Environment in Intermittently Heated Buildings. *Building and Environment*, 186, 107289.
30. Li H*, Jia H, Zhong K, **Zhai Z**. 2021. Analysis of Factors Influencing Actual Absorption of Solar Energy by Building Walls. *Energy*, 215: ARTN 118988.
31. Chen X, Zhang Q, **Zhai Z**, Qiu J. 2020. Performance of A Cold Storage Air-Cooled Heat Pump System with Phase Change Materials for Space Cooling. *Energy and Buildings,* 228, 110405.
32. Liu L, Zhang Q, **Zhai Z**, Yue C, Ma X. 2020. State-of-the-Art on Thermal Energy Storage Technologies in Data Center. *Energy and Buildings*, 226, 110345.
33. Yu J*, Kang Y, **Zhai Z**. 2020. Comparison of Ground Coupled Heat Transfer Models for Predicting Underground Building Energy Consumption. *Journal of Building Engineering*, 32, 101808.
34. Sun C* and **Zhai Z**. 2020. The Efficacy of Social Distance and Ventilation Effectiveness in Preventing COVID-19 Transmission. *Sustainable Cities and Society,* 62, 102390.
35. Li H*, Zhong K, **Zhai Z**. 2020. A New Double-Skin Façade System Integrated with TiO2 Plates for Decomposing BTEX. Building and Environment, 180, 107037.
36. Li H*, Zhong K, **Zhai Z**. 2020. Investigating the Influences of Ventilation on the Fate of Particles Generated by Patient and Medical Staff in Operating Room. *Building and Environment,* 180, 107038.
37. Huang L* and **Zhai Z**. 2020. Critical Review and Quantitative Evaluation of Indoor Thermal Comfort Indices and Models Incorporating Solar Radiation Effects. *Energy and Buildings*, 224, 110204.
38. **Zhai Z**. 2020. Facial Mask: A Necessity to Beat COVID-19. *Building and Environment,* 175, 106827.

39. Yu J*, Kang Y, **Zhai Z**. 2020. Comparison of Indoor Environmental Design Standards for Underground and Aboveground Civil Buildings. *Heating Ventilating & Air Conditioning*, Oct (In Chinese).
40. **Zhai Z** and Salazar A*. 2020. Assessing the Implications of Submetering with Energy Analytics to Building Energy Savings. *Energy and Built Environment,* 1(1): 27-35.
41. Peng J, Yan J, **Zhai Z**, etc. 2020. Solar Energy Integration in Buildings. *Applied Energy*. 264: ARTN 114740.
42. Li J, Zhang Q*, **Zhai Z**, Sun X, Liao S. 2020. An Improved r-Factor Algorithm for Total Variational Diminishing (TVD) Schemes on Two-Dimension Non-Uniform Unstructured Grids. *International Journal for Numerical Methods in Fluids* (November 25, 2020).
43. **Zhai Z**, Preechawuttidet P*, Li H*. 2019. Comparison and Analysis of Hospital Operating Room Ventilation Standards. *Jiangsu Jianzhu*, 200: 1-5. (In Chinese)
44. **Zhai Z** and Metzger ID*. 2019. Insights on Critical Conditions and Parameters for Personalized Ventilation. *Sustainable Cities and Society*, Volume 48, July, 101584.
*45.* Nam D* and **Zhai Z**. 2019. Experimental Study on Energy Performance of Active Chilled Beam Systems. *Science and Technology for the Built Environment,* DOI: 10.1080/23744731.2019.1611119.
46. Li J, Zhang Q*, **Zhai Z**. 2019. An Efficient Segregated Algorithm for Two-Dimensional Incompressible Fluid Flow and Heat Transfer Problems with Unstructured Grids. *International Journal of Heat and Mass Transfer*, 133: 1052-1064.
47. Yue C*, Zhang Q*, **Zhai Z**, Ling L. 2019. Numerical Investigation on Thermal Characteristics and Flow Distribution of a Parallel Micro-Channel Separate Heat Pipe in Data Center. *International Journal of Refrigeration,* 98: 150-160.
48. **Zhai Z** and Helman JM*. 2019. Implications of Climate Changes to Building Energy and Design. *Sustainable Cities and Society*, 44: 511-519.
49. **Zhai Z** and Helman JM*. 2019. Climate Change: Projections and Implications to Building Energy Use. *Building Simulation: An International Journal*, 12(4): 585–596.
50. Wei Y, Liu W, Xue Y*, **Zhai Z**, Chen Q, Zhang T. 2019. Inverse Design of Aircraft Cabin Ventilation by Integrating Three Methods. *Building and Environment*, 150: 33-43.
51. Chen X*, Zhang Q*, **Zhai Z**, Ma X. 2019. Potential of Ventilation Systems with Thermal Energy Storage Using PCMs Applied to Air Conditioned Buildings. *Renewable Energy,* 138: 39-53.
52. Chen X*, Zhang Q*, **Zhai Z**, Ma X. 2019. Optimization and Sensitivity Analysis of Design Parameters for A Ventilation System Using Phase Change Materials. *Building Simulation: An International Journal*, 1-11, May
53. **Zhai Z** and Jin Q*. 2018. Identifying Decaying Contaminant Source Location in Building HVAC System Using the Adjoint Probability Method. *Building Simulation: An International Journal*, 11(5): 1029–1038.
54. Lim H* and **Zhai Z**. 2018. Influences of Energy Data on Bayesian Calibration of Building Energy Model. *Applied Energy*. 231: 686-698.
55. **Zhai Z** and Rivas J*. 2018. Promoting Variable Refrigerant Flow System with A Simple Design and Analysis Tool. *Journal of Building Engineering*. 15: 218-228.
56. Wang H*, Wang H, Gao F, Zhou P, and **Zhai Z**. 2018. Literature Review on Pressure–Velocity Decoupling Algorithms Applied to Built-Environment CFD Simulation. *Building and Environment*, 143: 671-678.
57. Denkenberger DC*, Brandemuehl MJ, Pearce JM, **Zhai Z**. 2018. Expanded Microchannel Heat Exchanger: Nondestructive Evaluation. *Journal Heat Transfer Engineering*, DOI: 10.1080/01457632.2018.1496976.
58. Yue C*, Zhang Q*, **Zhai Z**, Ling L. 2018. CFD Simulation on the Heat Transfer and Flow Characteristics of A Microchannel Separate Heat Pipe under Different Filling Ratios. *Applied Thermal Engineering*, 139: 25-34.
59. Lan L*, **Zhai Z**, Lian Z. 2018. A Two-Part Model for Evaluation of Thermal Neutrality for Sleeping People. *Building and Environment*, 132: 319-326.
60. Chen C, Ling H*, **Zhai Z**, Li Y, Yang F, Han F, Wei S. 2018. Thermal Performance of An Active-Passive Ventilation Wall with Phase Change Material in Solar Greenhouses. *Applied Energy*, 216: 602–612.
61. Youssef AMA*, **Zhai Z**, Reffat RM. 2018. Generating Proper Building Envelopes for Photovoltaics Integration with Shape Grammar Theory. *Energy and Buildings*, 158: 326-341.
62. Xue Y* and **Zhai Z**. 2017. Inverse Identification of Multiple Outdoor Pollutant Sources with A Mobile Sensor. *Building Simulation: An International Journal*, 10(2): 255-263.
63. Chen X, Zhang Q*, **Zhai Z**, Wu D, Liao S. 2017. Experimental Study on Operation Characteristics of A Novel Refrigeration System Using Phase Change Material. *Energy and Buildings,* 150: 516-526.

64. Lim H* and **Zhai Z**. 2017. Review on Stochastic Modeling Methods for Building Stock Energy Prediction. *Building Simulation: An International Journal*, 10(5): 607-624.
65. Lim H* and **Zhai Z**. 2017. Comprehensive Evaluation of The Influence of Meta-Models on Bayesian Calibration. *Energy and Buildings,* 155: 66-75.
66. Wang H*, Lu S, Cheng J, **Zhai Z**. 2017. Inverse Modeling of Indoor Instantaneous Airborne Contaminant Source Location with Adjoint Probability-Based Method under Dynamic Airflow Field. *Building and Environment*, 117: 178–190.
67. **Zhai Z**. 2017. Relationships between Esthetics, Energy Efficiency, and Economics of Buildings. *Chinese Authorities Logistics Magazine, Jan.*
68. Li J, Zhang Q*, **Zhai Z**. 2017. An Efficient SIMPLER-Revised Algorithm for Incompressible Flow with Unstructured Grids. *Numerical Heat Transfer, Part B: Fundamentals,* 71(5): 425-442.
69. Miller SL, Facciola NA, Toohey D, and **Zhai Z**. 2017. Ultrafine and Fine Particulate Matter Inside and Outside of Mechanically Ventilated Buildings. *International Journal of Environmental Research and Public Health,* 14(2): 128. doi: 10.3390/ijerph14020128.
70. Youssef AMA*, Reffat RM, **Zhai Z**, Abd-Elsamie Eid M. 2016. Comparative Analysis of Simulation and Optimization Tools for Building Integrated Photovoltaics (BIPV). *Journal of Engineering Sciences* (Assiut University), 44(4): 363 –377.
71. **Zhai Z** and Liu X*. 2016. Sensitivity Analysis of the Probability-Based Inverse Modeling Method for Indoor Contaminant Tracking. *International Journal of Low-Carbon Technologies*, 12(2): 75-83.
72. Wang H* and **Zhai Z.** 2016. Advances in Building Simulation and Computational Techniques: A Review between 1987 and 2014. *Energy and Buildings*, 128: 319–335.
73. **Zhai Z**, Johnson MH*, Mankibi ME*, Stathopoulos N. 2016. Review of natural ventilation models. *International Journal of Ventilation*, 15(3-4): 186-204.
74. **Zhai Z**. 2016. Breathing Wall: Concept and Thermal Performance. *Cityscape: A Journal of Policy Development and Research*, 18(2): 203-208.
75. Tong Y*, **Zhai Z**, Wang C, Zhou B, Niu X. 2016. Possibility of Using Roof Openings for Natural Ventilation in a Shallow Urban Road Tunnel. *Tunnelling and Underground Space Technology,* 54: 92-101.
76. Xue Y*, Liu W, **Zhai Z**. 2016. New Semi-Lagrangian-Based PISO Method for Fast and Accurate Indoor Environment Modeling. *Building and Environment*, 105: 236–244.
77. Yue C, Zhang Q*, **Zhai Z**. 2016. Numerical Simulation of the Filtration Process in Fibrous Filters Using CFD-DEM Method. *Journal of Aerosol Science,* 101: 174–187.
78. Youssef AMA*, **Zhai Z**, Reffat RM. 2016. Genetic Algorithm Based Optimization for Photovoltaics Integrated Building Envelope. *Energy and Buildings*, 127: 627–636.
79. Feng Qi*, **Zhai Z**, Dang G. 2016. Building Height Estimation Using Google Earth. *Energy and Buildings*, 118: 123–132.
80. Chen X, Zhang Q*, **Zhai Z**. 2016. Energy Saving Potential of a Ventilation System with a Latent Heat Thermal Energy Storage Unit under Different Climatic Conditions. *Energy and Buildings*, 118: 339–349.
81. Previtali JM* and **Zhai Z**. 2016. A Taxonomy of Vernacular Architecture. *Energy and Buildings*, 110: 71–78.
82. Luongo JC, Fennelly KP, Keen JA, **Zhai ZJ**, Jones BW, Miller SL. 2016. Role of Mechanical Ventilation in the Airborne Transmission of Infectious Agents in Buildings. *Indoor Air*, 26(5): 666-678. doi: 10.1111/ina.12267.
83. **Zhai Z**, Yates AP*, Duanmu Lin, Wang Z*. 2015. An Evaluation and Model of the Chinese Kang System to Improve Domestic Comfort in Northeast Rural China – Part-1: Model Development. *Renewable Energy*, 84: 3-11.
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60. Zhang Z, **Zhai Z**, and Chen Q. 2007. Evaluation of Various CFD Models in Predicting Room Airflow and Turbulence. *The 10th International Conference on Air Distribution in Rooms - Roomvent 2007*, June, Helsinki, Finland.
61. Fedrigo C*, Manzan M, and **Zhai Z**. 2007. Structural and Environmental Fire Safety in Atria Design. *The 10th International Conference on Air Distribution in Rooms - Roomvent 2007*, June, Helsinki, Finland.
62. Spencer J* and **Zhai Z**. 2007. Fast Evaluation of Sustainable Heating and Cooling Strategies for Solar Homes with Integrated Energy and CFD Modeling. *The 10th International Building Performance Simulation Association Conference and Exhibition - Building Simulation 2007*, Sept, Beijing, China.
63. Liu X* and **Zhai Z**. 2007. Probability-Based Inverse Modeling Algorithm for Indoor Pollutant Source Tracking. *The 10th International Building Performance Simulation Association Conference and Exhibition - Building Simulation 2007*, Sept, Beijing, China.
64. Fedrigo C*, Manzan M, and **Zhai Z**. 2007. Structural and Environmental Fire Safety in Atria Design. Proceedings

of XXV Congresso Nazionale UIT sulla Trasmissione del Calore (*25th UIT National Heat Transfer Conference*), June 18-20, Trieste, Italy.

65. Pappas A* and **Zhai Z**. 2006. Energy Simulation of a Double Skin Facade: A Process Using CFD and EnergyPlus. *The IBPSA-USA Second National Conference - SimBuild 2006*, August, Cambridge, MA.
66. **Zhai Z**. 2006. Numerical Study of Optimal Building Scales with Low Cooling Load in both Hot and Mild Climatic Regions. *The ASME International Solar Energy Conference - SOLAR 2006*, July, Denver CO.
67. Jeong K*, Krarti M, and **Zhai Z**. 2006. CFD-Based Parametric Study for Personalized Partition Air Distribution System. *The ASME International Solar Energy Conference - SOLAR 2006*, July, Denver CO.
68. **Zhai Z**. 2005. Simulation-Based Ventilation System Study for Chemical Laboratory. *The 10th International Conference on Indoor Air Quality and Climate - Indoor Air 2005*, Sept. 4-9, Beijing, China.
69. **Zhai Z**. 2005. A New Building Ventilation Effectiveness Index. *The 10th International Conference on Indoor Air Quality and Climate - Indoor Air 2005*, Sept. 4-9, Beijing, China.
70. Courtney A*, Givler T*, Abarr L*, and **Zhai Z**. 2005. From Warehouse to Sustainable Art Learning Center: The Case for Simulation in Building Renovation. *The 9th International Building Performance Simulation Association Conference and Exhibition - Building Simulation 2005,* August 15-18, Montreal, Canada.
71. **Zhai Z**. 2004. Application of CFD for Design of Energy-Efficient and Comfortable Buildings. *The 5th International Bi-Annual ASME/JSME Symposium on Computational Technology for Fluid/Thermal/Chemical/Stressed Systems with Industrial Applications*, July 25-29, San Diego, CA.
72. **Zhai Z**, Gao Y, and Chen Q. 2004. Pressure Boundary Conditions in Multi-Zone and CFD Program Coupling. *The First IBPSA-USA Conference - SimBuild 2004*, August, Boulder, CO.
73. Chen Q and **Zhai Z**. 2003. How Realistic is CFD as a Tool for Indoor Environment Design and Studies without Experiment? *Keynote paper, Proceedings of the 4th International Symposium on HVAC*, Vol. 1, pp. 62-77, Tsinghua University Press, Beijing, China.
74. **Zhai Z** and Chen Q. 2003. Impact of Determination of Convective Heat Transfer on the Coupled Energy and CFD Simulation for Buildings. *Proceedings of Building Simulation Conference 2003*, Vol. 3, pp. 1467-1474, Eindhoven, Netherlands
75. **Zhai Z** and Fu S. 2002. Modeling the Airflow around Cooling Towers with Multi-Block CFD. *The 4th International ASME/JSME/KSME Symposium*. Canada.
76. **Zhai Z,** Chen Q, and Scanlon PW. 2002. Venting Contaminants and Fire Smoke from an Indoor Auto-Racing Complex. *Proceedings of Indoor Air 2002, the 9th International Conference on Indoor Air Quality and Climate*, pp. 830-835, Monterey, California.
77. **Zhai Z**, Chen Q, Haves P, and Klems JH. 2001. Strategies for Coupling Energy Simulation Programs and Computational Fluid Dynamics Programs. *Proceedings of Building Simulation Conference 2001*, Vol. 1, pp. 59-66, Rio de Janeiro, Brazil.
78. **Zhai Z**, Hamilton SD, Huang JM, et al. 2000. Integration of Indoor and Outdoor Airflow Study for Natural Ventilation Design Using CFD. *Proceedings of the 21st AIVC Annual Conference on Innovations in Ventilation Technology*, The Hague, Netherlands.
79. Chen Q, **Zhai Z**. et al. 2000. Building Natural Ventilation Design and Studies. *Proceedings of Conference on Thermal Environment of Residential Buildings*, Beijing, China.
80. Fu S and **Zhai Z**. 1999. Numerical Investigation of Flow around Two Natural Draft Cooling Towers in Tandem Arrangement. *Proceedings of 8th Asian Congress of Fluid Mechanics*, Dec. 6-10, Shenzhen, China.
81. Fu S, **Zhai Z**, et al. 1998. Critical Assessment of Nonlinear Eddy-Viscosity Models in a Recirculating Flow Caused by Square Ribs. *The 3rd International Conference on Fluid Mechanics*, China.
82. Fu S, **Zhai Z**, et al. 1997. Numerical Study of Flow Past a Wing-Body Junction with a Realizable Nonlinear Eddy-Viscosity Model. *The 11th Symposium on Turbulent Shear Flows,* France.

**Research Reports**

1. **Zhai Z** and Peng H*. 2023. Review Critical Home IAQ Parameters and Practical Measurement Techniques. *Final Report to AprilAire*, 21 pages.
2. **Zhai Z** et al. 2020. Experimental Validation and Model Development for Urban Pollutant Source Tracking Method, For Wind Engineering Joint Usage/Research Center FY2019 *Research Result Report to Tokyo Polytechnic University*, Japan, 10 pages.
3. **Zhai Z** et al. 2017. Testing and Modeling Energy Performance of Active Chilled Beam Systems. *Final Report for*

*Project 1629-TRP to ASHRAE*, 101 Pages.

4. **Zhai Z** et al. 2016. EFRI-SEED: Living Wall Materials and Systems for Automatic Building Thermo-Regulation. *Final Report for US NSF EFRI Project*.
5. **Zhai Z**, Hertzberg J, Smith W, Quinn G, and Mcneill J*. 2013. Experimental Investigation of Hospital Operating Room (OR) Air Distribution. *Final Report for Project 1397-TRP to ASHRAE*, 156 pages.
6. ASHRAE Guideline 33-2013: Guideline for Documenting Indoor Airflow and Contaminant Transport (One of the nine co-authors), 10 pages.
7. **Zhai Z**, Hermansen KA*, and AL Saadi SN*. 2012. The Development of Simplified Rack Boundary Conditions for Numerical Data Center Models, *Final Report for Project 1487-TRP to ASHRAE*, 130 pages.
8. **Zhai Z** and Wang H*. 2011. Optimizing the Trade Off between Grid Resolution and Simulation Accuracy: Coarse Grid CFD Modeling, *Final Report for Project 1418-TRP to ASHRAE*, 159 pages.
9. **Zhai Z** and Sleiti A. 2011. CFD Shootout Contest – Prediction of Duct Fitting Losses, *Final Report for Project 1493-TRP to ASHRAE*, 29 pages.
10. **Zhai Z,** Krarti M and Wilson E*. 2011. The Correlation between HVAC System Pressure Drop and Energy Saving. *Final Report to National Air Duct Cleaners Association*, 134 pages.
11. **Zhai Z** and Chen Z*. 2011. Asia-Pacific Partnership (APP): Development of Simulation Data Sets and Benchmark Models for the Chinese Commercial Building Sector. *Final Report to National Renewable Energy Lab*, 131 pages.
12. **Zhai Z**, Krarti M, and Johnson MH*. 2010. Assess and Implement Natural and Hybrid Ventilation Models in Whole-Building Energy Simulations. *Final Report for Project 1456-TRP to ASHRAE*, 195 pages.
13. **Zhai Z**, Brandemuehl M, et al. 2010. Building-Integrated Photovoltaic/Thermal Collector Panel Design and Test. *Final Report for ASHRAE Senior Design Project*, 49 pages.
14. An Assessment of The National Institute of Standards and Technology Building and Fire Research Laboratory (Fiscal Year 2010), Panel on Building and Fire Research, Laboratory Assessments Board, Division on Engineering and Physical Sciences, 42 Pages (Co-Author), 2010.
15. **Zhai Z** and Metzger ID*. 2009. Numerical Investigation and Optimization of Thermal and IAQ Performance of Personalized HVAC Systems. *Final Research Report to LG Electronics*, 124 pages.
16. **Zhai Z** and Previtali J*. 2008. Applying Ancient Building Technologies to Design Energy Efficient Buildings – Modern Implications of Vernacular Passive Building Technologies. *Full Technical Report to The Charles A. and Anne Morrow Lindbergh Foundation,* 125 pages.
17. Miller SL, Facciola N*, Toohey D, and **Zhai Z**. 2008. Identification, Classification, and Correlation of Ultrafine Indoor Airborne Particulate Matter with Outdoor Values. *Final Project Report (1281RP) to American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)*, 177 pages.
18. **Zhai Z**, Brandemuehl M and Del Balso R*. 2008. Rosebud Project: White River Health Center. *Final Research Report to Department of the Interior, Division of Energy and Minerals Development*, 29 pages.
19. McNeill J*, **Zhai Z**, Tan G, and Stetz M. 2007. Protocols for Measuring and Reporting the On-site Performance of Buildings Except Low-Rise Residential Buildings. *Final Project Report to ASHRAE*, 185 pages.
20. Boxer E*, Passmore K*, and **Zhai Z**. 2006. Floor-Based Task-Ambient Conditioning. *Final Project Report to ASHRAE Undergraduate Senior Project Grant Program*, 43 pages.
21. **Zhai Z** and Hannigan M. 2006. Design and Build Project for an Optimal Wood-Fired Pottery Kiln. *Final Project Report to the Outreach Committee of University of Colorado*, 27 pages.
22. **Zhai Z** and Chen Q. 2002. Developing an Integrated Design Tool: Coupling Energy Simulation and Computational Fluid Dynamics Programs. *Final Report to Lawrence Berkeley National Laboratory,* 136 pages, Massachusetts Institute of Technology.
23. **Zhai Z**, Fu S, Zhu KQ, and Dai ZJ. 1999. Wind-Break Techniques for Dry-Cooling Towers. *Final Report to The Electric Power Bureau of Northern China,* 210 pages, Tsinghua University.

**Other Publications**

1. Zhao X, Luo L, Yuan Y, **Zhai Z**, Dai Y, Liu H. 2022. Energy Scientific and Technological Advances–Special issue for 2nd Global Chinese Energy and Environment Conference. Energy, 126053.
2. **Zhai Z** and Liu J. 2014. Editorial: Another Move-Forward in the Building Energy World. *Energy and Building*, 68: 633.
3. **Zhai Z** and McNeill J*. 2014. Editorial: Roles of Building Simulation Tools in Sustainable Building Design. *Building Simulation: An International Journal, 7(2): 107-109.*

4. Denkenberger DC*, **Zhai Z**, Brandemuehl MJ, Pearce JM. 2013. High-Effectiveness Low-Cost Micro-Channel Heat Exchanger: Concept, Prototype and Manufacturing (Abstract). *International Symposium on Green Manufacturing and Applications (ISGMA 2013),* June 25-29, Honolulu, HI, US.
5. **Zhai Z**, Watch D, and Vernon W. 2012. Editorial: The Green Wave in Healthcare and Bio-Research Buildings. *The World Review of Science, Technology and Sustainable Development*, 10: 2-4.
6. Robles M, **Zhai Z**, and Goodrum WM*. 2012. Beauty in Building: Measuring the Impact of Spaces That Make Us Feel Fully Alive and That Inspire. The white paper, February 29, 2012. http://www.patternmapping.com/PDF/BeautyinBuilding_white%20paper-29-02.pdf.
7. Liu J, Zhang T and **Zhai Z**. 2010. Editorial: Considering Building Energy from Environmental Perspective. *Energy and Buildings*, 42(1): 1.
8. Mcneill J*, Hertzberg J, and **Zhai Z**. 2010. Combined Experimental and Computational Investigation of Sterile Air Flows in Surgical Environments. (Abstract and Oral Presentation). *63rd Annual Meeting of the APS Division of Fluid Dynamics*, November 21-23, Long Beach, California. Abstract published in Bulletin of the American Physical Society, Volume 55, Number 16.
9. Herrmann L*, **Zhai Z**. and Deru M. 2010. Identifying Strategies to Improve Chinese Office Building Code Standards. *1st Annual Energy Showcase at CU-Boulder*.
10. Lilliestierna N*, Zdrowski J*, Corbin C*, **Zhai Z**, Brandemuehl M. 2010. Combined Thermal/Electric Collector Panel Research (Abstract and Oral Presentation). *1st Annual Energy Showcase at CU-Boulder*.
11. Mcneill J*, Hertzberg J, and **Zhai Z**. 2010. Sterile Air Flows in Surgical Environments. (Abstract and Oral Presentation). *CU Graduate Student Mech Eng Dept Symposium (GEARS).*
12. **Zhai Z**, Liu J, and Zhang T. 2009. Editorial: Special Issue for 2008 International Conference on Building Energy and Environment (COBEE). *Building and Environment*, 44(11): 2201.
13. Mcneill J*, Hertzberg J, and **Zhai Z**. 2009. Flow Visualization of Sterile Air Flows in Surgical Environments. (Abstract and Oral Presentation). *62nd Annual Meeting of The DFD09 (Division of Fluid Dynamics) Meeting of The American Physical Society (APS)*, Minneapolis, MN, November 22-24, 2009. Abstract published in *Bulletin of the American Physical Society*, vol. 54, 308, 2009.
14. McNeill J*, Wilson E*, **Zhai Z**, and Krarti M. 2009. Detailed Air-Side HVAC Modeling – Focusing on the Component Interactions (Poster and Oral Presentation). *The IBPSA-USA Chicago Meeting*, January 24, Chicago, IL.
15. Zhai ZJ, Liu J, Zhang TT. 2009. Editorial: Special Issue for 2008 International Conference on Building Energy and Environment (COBEE). *Building and Environment,* 44(11):2201.
16. **Zhai Z**. 2008. Simulation-Assisted Conceptual Building Design: Integration in a Real Case Study. (Abstract and Oral Presentation). *The 1st International Conference on Building Energy and Environment (COBEE2008),* July 13-16, Dalian, China.
17. Corbin C*, Brandemuehl M, and **Zhai Z**. 2008. Design Parameter Sensitivity of a Building Integrated Photovoltaic-Thermal Collector. (Abstract and Poster Presentation). *CU-Boulder Energy Initiative Energy Research Symposium*, Nov. 17, Boulder, CO.
18. **Zhai Z**. 2008. A Beauty of Renewable Harvest: Innovative, Integrated and Intelligent Building Façade System. (Abstract and Poster Presentation). *CU-Boulder Energy Initiative Energy Research Symposium*, Nov. 17, Boulder, CO.
19. Yi C, Monson RK, **Zhai Z**, Anderson DE, Lamb B, Turnipseed AA, and Burns SP. 2006. Advective Flows and Canopy Turbulence Caused by Topography and Canopy Structure. (Extended Abstract and Poster Presentation). *Flux Measurements in Difficult Conditions – a Specialist Workshop*, January 26-28, Boulder, CO.
20. Yi C, Monson RK, **Zhai Z**, Anderson DE, Turnipseed AA, Burns SP, and Lamb B. 2006. Modeling Canopy Turbulent Flow over Complex Terrain. (Extended Abstract and Poster Presentation). *The 17th AFM Conference*, May 22-25, San Diego, CA.
21. Yi C, Monson RK, **Zhai Z**, Anderson DE, Lamb B, Turnipseed AA, and Burns SP. 2005. Advective Flows and Canopy Turbulence Caused by Topography and Canopy Structure. (Extended Abstract and Poster Presentation). *AMERIFLUX Annual Science Team Meeting*, October 18-20, Boulder, CO.

**Other Invited Talks and Seminars**

1. Keynote "Zero-Energy and Zero-Carbon Buildings: Challenges and Opportunities", The 3rd International Conference on Sustainable Buildings and Structures (ICSBS2023), Suzhou, China, 8/18/2023.

2. Invited Talk “Post-Pandemic Thoughts on Hospital Environment Safety and Health: Challenges and Strategies”, The Jiangnan University Hospital, Wuxi, China, 8/14/2023.
3. Keynote “Uncertainty in Building Engineering Modeling: Significance and Impact”, The 3rd International Conference for Global Chinese Academia on Energy and Built Environment (CEBE2023), Shanghai, China, 7/30/2023.
4. Invited Seminar “Energy and Low-Carbon Development: Building Impact and Contribution”, Shanghai University of Science and Technology, Shanghai, China, 7/27/2023.
5. Invited Talk “Cost of Conditioning Indoor Air: Implications and Pathways to Net-Zero-Energy”, Shandong University, 7/26/2023.
6. 3-day Workshop on “Sustainable Building Design: Principles and Practices”, Shandong University, 7/24-7/26, 2023.
7. Keynote “Cost of Engineering Indoor Air: Implications and Pathways to Net-Zero-Energy”, Healthy Building 2023 – Asia and Pacific Rim, Tianjin, China. 7/17/2023.
8. Invited Talk “What Can We Learn From ASHRAE Research Projects?”, Tianjin Chengjian University, Tianjin, China, 7/16/2023.
9. Keynote “BIPV: Implication to Zero-Energy”, Workshop on Green Building Development Trend, Beijing University of Technology, Beijing, China, 7/15/2023.
10. 4-day Workshop on “Sustainable Building Design”, University of Science and Technology Beijing, Beijing, China, 7/10-7/13, 2023.
11. Keynote “Post-Pandemic Thoughts on Ventilation and Air Conditioning Systems in Public Buildings: Challenges and Strategies”, Workshop on Future Built Environment Science and Design, Nanjing, China, 7/5/2023.
12. Invited Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, Xi'an University of Architecture and Technology, Xi’an, China, 6/29/2023.
13. Invited Seminar “Energy and Low-Carbon Development: Building Impact and Contribution”, Central South University, Changsha, China, 6/17/2023.
14. Invited Talk “Experience with JSPS Seminar Program”, JSPS US & Canada JSPS Alumni Association, 6/14/2023.
15. Invited Seminar “Energy and Low-Carbon Development: Building Impact and Contribution”, University of South China, Hengyang, Hunan, China, 6/14/2023.
16. Invited Seminar “Energy Storage Technologies and Applications for Residential Buildings: From Low-Tech To High-Tech”, Changsha University of Science and Technology, Changsha, Hunan, China, 6/13/2023.
17. Keynote “What Can We Learn From ASHRAE Research Projects?”, Workshop on Human Settlements from A Multidisciplinary Perspective, Wuhan, Hebei, China, 6/9/2023.
18. Invited Talk “Integrated Building Design: Principles and Practices”, Wuhan University of Technology, 6/7/2023.
19. Invited Seminar “Post-Pandemic Thoughts on Ventilation and Air Conditioning Systems in Public Buildings: Challenges and Strategies”, Beijing University of Technology, Beijing, China, 5/17/2023.
20. Invited Seminar “Building Energy and Environment: Micro vs Macro”, Tsinghua University, Beijing, China, 5/15/2023.
21. Keynote "Net Zero Energy Building: Challenges and Opportunities", The International Forum on Low-Carbon and Green Urbanization, Wuhan, China, 12/3-12/4, 2022.
22. Keynote "Net Zero Energy Building: Status and Future", The Taishan Academic Forum: Artificial Environment Control and Energy Efficiency Improvement for Low-Carbon Buildings, Jinan, China, 12/2-12/3, 2022.
23. Seminar "Integrated Green Building Design", for the “Public Buildings in Low-Carbon and Post-Pandemic Urban Environments” Design Competition, China, 12/2/2022.
24. Keynote “Modeling in Underground Buildings and the Future”, The 2022 BIM International Forum, Shijiazhuang, China, 11/18/22.
25. Keynote "Comparative Study of Energy Performance and Saving Potential of China and US Commercial Buildings and Routes to Net-Zero Energy", The Green and Low-Carbon Building Research and Engineering Practice International Forum, Wuhan, China, 11/12/2022.
26. Invited Talk "Research Hotspots and Trends in Building Energy and Environmental", Changsha University of Science and Technology, Changsha, China, 11/11/2022.
27. Invited Talk "Research in Building Energy and Environment: From Micro to Macro", Hunan University, Changsha, China, 11/9/2022.

28. Keynote "Mitigating COVID-19 in Public and Commercial Spaces", COBEE2012, Montreal, Canada, 7/26/2022.
29. Invited Talk "2018 JSPS Fellowship for Research in Japan", COBEE2022, Montreal, Canada, 7/26/2022.
30. Invited Talk "Clear the Air: Healthy Indoor Air for Businesses and Tenant Spaces", US DOE, 6/28/2022.
31. Invited Talk "Epidemic challenges and response strategies for ventilation and air conditioning systems in critical areas of hospitals", Dalian University of Technology, Dalian, China, 6/15/2022.
32. Invited Talk "CFD for Indoor Environment Study", The ASHRAE Thailand Chapter, Bangkok, Thailand, 3/8/2022.
33. Invited Talk "Identification of Indoor Airborne Contaminant Sources with Inverse Modeling Methods", the ASHRAE Thailand Chapter, Bangkok, Thailand, 3/8/2022.
34. Invited Talk "Mitigating COVID-19 at Public Spaces", The Granite State ASHRAE Chapter, 2/10/2022.
35. Invited Talk "Energy and Low-Carbon Development", Tsinghua University, China, 12/21/2021.
36. Invited Seminar "Hot and Trending Areas in Building Energy and Environment - Observation and Analysis from the Highly Cited Journal Articles", Tianjin University, China, 12/19/2021.
37. Invited Seminar "Hot and Trending Areas in Building Energy and Environment - Observation and Analysis from the Highly Cited Journal Articles", Hunan University, China, 12/18/2021.
38. Keynote "Airflow Around a Building: Simulation Challenges", The China-UK Seminar on Urban Heat Island Mitigation and Adaptation, Wuhan, China, 12/17/2021.
39. Invited Seminar "Energy Storage for Residential Buildings", Harbin Institute of Technology, China, 12/4/2021.
40. Invited Seminar "HVAC Challenges and Mitigation Strategies in Large Commercial Buildings", Shandong University, China, 12/3/2021.
41. Invited Talk "Transition from Ph.D. to Ph.D. Supervisor", Annual Summit of PhD Supervisors in Building Energy and Environment, Guangzhou, China, 11/28/2021.
42. Keynote “Adaptive Technology for Resilient Human Settlement”, HABITechno5 International Conference, ITB Bandung, Indonesia, 11/11/2021.
43. Invited Seminar "Green Building Design - An Integrated Approach", Shanghai Jiaotong University, China, 10/19/2021.
44. Invited Seminar “Infection Risk of Airborne Respiratory Disease: Modeling Principles and Applications”, Rochester Institute of Technology, 9/21/2021.
45. Keynote "Net Zero Energy Building: Challenge and Opportunities", The 2021 Astechnova International Energy Conference and EPIC Engineering Physics International Conference, 8/24/2021.
46. Seminar "Larson HVAC lab: Overview and Future", HARDI - Heating Air-conditioning & Refrigeration Distributors International, Boulder, CO, US, 7/20/2021.
47. Keynote "Nonmixing Unsteady Multiple-Source WR Model: Principles and Applications", The 2nd International Conference for Global Chinese Academia on Energy and Built Environment (CEBE2021), Chengdu, China, 7/19/2021.
48. Invited Talk "Advances in Underground Buildings: Energy, Thermal Comfort and Indoor Air Quality", Summit Forum on New Energy and New Materials & IULEE Workshop 2021, Qingdao, China, 5/16/2021.
49. Keynote “HVAC Challenges and Mitigation Strategies in Hospitals", The Pandemic Mitigation and Hospital Development Workshop, Nanjing, China, 5/15/2021.
50. Invited Seminar “Mitigating COVID at Public Spaces", BAE Webinar Series on COVID-19 Control, Building and Environment Journal, 1/26/2021.
51. Invited Talk "Taking Care of Our Guests in Restaurants and Public Spaces", The American Hotel and Lodging Association (AHLA), 12/15/2020.
52. Invited Talk "Energy and Low Carbon Development", Tsinghua University, China, 12/20/2020.
53. Invited Talk "Buildings: What Engineers Can Do?", Harbin Institute of Technology, China, 12/5/2020.
54. Keynote "HVAC Major in US - Current and Future", The 22nd National Annual Conference on HVACR, Taiyuan, Shanxi, China, 10/14/2020.
55. Invited Seminar “Toward a Better Building: Safe, Comfortable, Healthy, and Efficient”, Northeast Electric Power University, China, 8/24/2020.
56. Keynote "Driving Forces for Research Universities – Learning from US Faculty Evaluation and Promotion System", The 15th Summit of Doctor Supervisors in Built Environment, Nanjing, China, 8/22/2020.
57. Invited Talk: "Research Method and Experience for Fundamental and Applied Science", Beijing University for Technology, China, 7/21/2020.
58. Invited Talk "Intelligent Sensing – Underground Space", Hebei Geo University, China, 7/15/2020.

59. Invited Talk "Education and Development of Architectural Engineering Major in US", Harbin Institute of Technology, China, 5/16/2020.
60. Invited Talk "Urban Propagation Prediction of COVID-19", Beijing University, China, 1/26/2020.
61. Invited Talk “Green Building Design: An Integrated Approach”, Environmental Design Colloquium Series, University of Colorado at Boulder, Nov. 2019.
62. Invited Talk “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, Concordia University, Montreal, Quebec, Canada. Nov 4th, 2019
63. Keynote Speech “Prediction of Building Stock Energy Demand”, ICCEBE2019, Chengdu, 7/14/2019.
64. Invited Talk “Towards a Better Building”, Central University of China, Changsha, July, 2019.
65. Four-day Workshop in Hunan University on "Sustainable Building Design", July, 2019.
66. Four-day Workshop in The University of Science and Technology Beijing on "Sustainable Building Design", July, 2019.
67. Seminar “How to Write a Technical Paper”, Hebei Geo University, Shijiazhuang, June, 2019.
68. Invited Talk “Towards a Better Building”, Qingdao University of Technology, Qingdao, China, June, 2019.
69. Invited Talk “Towards a Better Building”, Shandong University, Jinan, China, June, 2019.
70. Keynote Speech “Identification of Appropriate CFD Models for Indoor Particle and Droplet Simulation in Ventilated Spaces”, IEHB&BIO 2019, Nanjing, China, May, 2019.
71. Invited Talk “R U Ready”, Furen High School, Wuxi, China, May, 2019.
72. Invited Talk “Inverse Design of Built Indoor Environments. Simulation and Optimization of Building Systems”, Simulation and Optimization of Building Systems Workshop, University of Colorado at Boulder, 3/18/2019.
73. Keynote Speech “Degree Vision and Curriculum Plan: Insights from US Models”, Building Environment and Energy Degree Leader Congress of China, Beijing, China, 4/21/2018.
74. Seminar “What can we learn from ASHRAE research projects?”, Dalian University of China, Dalian, China, 4/13/2018.
75. Invited Talk “Advances in Building Energy Systems Engineering”, IULEE Workshop, Boulder, CO, 5/8/2018.
76. Invited Talk “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, NREL, Golden, CO, 5/15/2018.
77. Invited Talk “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, LBNL, Berkeley, CA, 6/15/2018.
78. Seminar “Inverse Indoor Environment Designs by CFD-Based Genetic Algorithm Method”, ASHARE Summer Meeting, Houston TX, June, 2018.
79. Seminar “Modeling for Design of Energy-Efficient, Comfortable and Healthy Buildings”, Summer Training Program for Professors and Designers, Suzhou, China, 7/30/2018.
80. Invited Talk “What Can We Learn from ASHRAE Research Projects?”, Shanghai University of Science and Technology, Shanghai, China, 8/1/2018.
81. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, Tohoku University, Sendai, Japan, 8/10/2018.
82. Seminar “Inverse Tracking of Indoor and Outdoor Pollutant Sources with Limited Sensor Outputs”, Tohoku University, Sendai, Japan, 8/10/2018.
83. Seminar “Inverse Tracking of Indoor and Outdoor Pollutant Sources with Limited Sensor Outputs”, Tokyo Polytechnic University, Tokyo, Japan, 8/29/2018.
84. Seminar “Graduate Research Topic Selection”, Tohoku University, Sendai, Japan, 9/8/2018.
85. Invited Talk “Transition from a PhD student to a Professor”, Hebei GEO University, Shijiazhuang, China, 9/19/2018.
86. Invited Talk “Inverse Design of Built Environments”, Southwest Jiaotong University, Chengdu, China, 9/21/2018.
87. Invited Talk “On Research for Faculty”, Hebei GEO University, Shijiazhuang, China, 9/26/2018.
88. Keynote Speech “Bio-Energy for Cooking and Heating in Developing Countries: Design and Optimization”, The 1st International Symposium on Bio Energy and Environment (BEE 2017), Tianjin, China, July 9-12, 2017.
89. Seminar “Research Method and Writing in Engineering and Basic Science”, Dalian University of Technology, China, July 6$^{th}$, 2017.
90. Keynote Speech “Sustainable Building: The Global Trend and Practice”, The International Workshop on Holistic Solutions for Urban Development and Ecological Environmental Sustainability (HSUDEES), Shijiazhuang, Hebei, China, July 28$^{th}$, 2017.
91. Invited Talk “Sustainable Building: The Global Trend and Practice”, Tsinghua University, China, July 24$^{th}$, 2017.

92. Invited Talk “Deep Retrofit of Commercial Building – A Key Pathway towards Low-Carbon Cities”, Xi'an Jiaotong-Liverpool University (XJTLU), Suzhou, China, July 16th, 2017.
93. Distinguished Lecture “Integrated Building Energy and CFD Simulations”, ASHRAE Pakistan Chapters, March 2017.
94. Distinguished Lecture “Identification of Indoor Airborne Contaminant Sources with Inverse Modeling Methods”, ASHRAE Pakistan Chapters, March 2017.
95. Distinguished Lecture “Natural Ventilation: Design and Modeling”, ASHRAE Pakistan Chapters, March 2017.
96. Distinguished Lecture “Assessment of Natural and Hybrid Ventilation Models in Whole-Building Energy Simulation”, ASHRAE Pakistan Chapters, March 2017.
97. Distinguished Lecture “Hospital Operating Room (OR) Air Distribution”, ASHRAE Pakistan Chapters, March 2017.
98. Distinguished Lecture “What can we learn from ASHRAE projects?”, ASHRAE Pakistan Chapters, March 2017.
99. Distinguished Lecture "Assessment of Natural and Hybrid Ventilation Models in Whole-Building Energy Simulation", The 24th Pakistan HVACR Conference, Lahore, Pakistan, April 1, 2017
100. Distinguished Lecture "Critical Review on Hospital Surgical Room and Mechanical System Designs", The 24th Pakistan HVACR Conference, Lahore, Pakistan, March 31, 2017
101. Distinguished Lecture “What Can We Learn From ASHRAE Projects?”, Univ. of Engineering & Tech., Lahore, Pakistan, March 30, 2017
102. Distinguished Lecture “What Can We Learn From ASHRAE Projects?”, National University of Sciences and Technology, Islamabad, Pakistan, March 29, 2017
103. Distinguished Lecture "Identification of Indoor Airborne Contaminant Sources with Inverse Modeling Methods", The ASHRAE Northern Pakistan Chapter, Islamabad, Pakistan, March 28, 2017
104. Distinguished Lecture "Hospital Operating Room (OR) Air Distribution", The ASHRAE Northern Pakistan Chapter, Islamabad, Pakistan, March 28, 2017
105. Distinguished Lecture “Natural Ventilation: Concept and Design”, NED Univ. of Engineering & Tech., Karachi, Pakistan, March 27, 2017
106. Distinguished Lecture "Integrated Building Energy and CFD Simulations", The ASHRAE Pakistan Chapter, Karachi, Pakistan, March 25, 2017
107. Distinguished Lecture "Natural Ventilation: Concept and Design", The ASHRAE Pakistan Chapter, Karachi, Pakistan, March 25, 2017
108. Keynote Speech "Inverse Tracking of Indoor and Outdoor Pollutant Sources with Limited Sensor Outputs", International Workshop on Gusty Wind, Thermal Environment, and Energy Saving, Tokyo Polytechnic University, Japan, March 9-10, 2017
109. Seminar “CFD Modeling Accuracy: Comparative Study of Airflow Around a Thermal Manikin”, The ASHRAE Winter Conference, Las Vegas, Nevada, Jan, 2017.
110. Seminar “Inverse Modeling for Optimization of Indoor Environment Quality", The ASHARE Winter Conference, Las Vegas, Nevada, January, 2017
111. Invited Talk "Natural Ventilation: Concept and Design", at the Zhejiang A&F University, China, Dec. 29, 2016
112. Keynote Speech "Creating Comfortable and Healthy Indoor Environment: Inverse Design Method for Indoor HVAC Systems", The 20th National HVAC Conference, Haikou, Hainan, China, Nov. 8-11, 2016
113. Invited Talk "Urban Air Pollutant Source Tracking System under Hybrid IoT", The 2016 World Internet of Things (IoT) Conference, Wuxi, Jiangsu, China, Oct 30-Nov 1, 2016
114. Distinguished Lecture "Natural Ventilation: Design and Modeling", The ASHRAE West Virginia Chapter and West Virginia Society for Healthcare Engineering, Charleston, WV, Oct 7th, 2016
115. Distinguished Lecture "Hospital Operating Room (OR) Air Distribution", The ASHRAE West Virginia Chapter and West Virginia Society for Healthcare Engineering, Charleston, WV, Oct 7th, 2016
116. Invited Seminar "Thermal Performance of Double Skin Façade with Buoyancy-Driven Airflow", The University of Shanghai for Science and Technology, Shanghai, China, August 4th, 2016
117. Invited Talk "Sustainable Building: The Global Trend and Practice", The Shanghai Research Institute of Building Sciences (Group), Shanghai, China, August 3rd, 2016
118. Invited Talk "Sustainable Building: The Global Trend and Practice", The China Academy of Building Research, Beijing, China, July 20th, 2016
119. Seminar “An Approach to Interpreting Critical Indoor Pollution Scenes of a Whole Building with Limited Sensor Outputs”, The University of Tokyo, Tokyo, Japan, July 11th, 2016

120. Seminar "Thermal Performance of Double Skin Façade with Buoyancy-Driven Airflow", The ASHARE Winter Conference, Orlando, FL, January 23-27, 2016
121. Seminar "Coarse Grid CFD for Fast Modeling of Indoor Environments: Why NOT?", The ASHARE Winter Conference, Orlando, FL, January 23-27, 2016
122. Invited Talk “Green Building Design: An Integrated Approach”, Green Building Workshop, Wuxi, China, Oct 16th, 2015
123. Invited Talk “Reducing Green House Gas Emissions through Green Planning, Design and Technologies: The World Trend”, China-Mauritius Business Summit, Shenzhen, Oct 15th, 2015.
124. Invited Keynote “Links of Building, Climate, Urban, and People for Comfort, Health and Productivity”, China Builder Ratings Association Summit, Beijing, Oct 17th, 2015.
125. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe - Case Studies from Fundamentals to Applications” at University of Shanghai for Science and Technology, Shanghai, July, 2015.
126. Invited Talk “PhD Research Topic Selection”, The 10th China National HVAC PhD Supervisor Conference, Beijing, China, July, 2015.
127. DL Lecture “Natural Ventilation: Design and Modeling”, ASHRAE Taiwan Chapter, Taiwan, April, 2015.
128. DL Lecture “Energy Performance and Modelling of Naturally Ventilated Buildings”, ASHRAE Singapore Chapter, April, 2015.
129. DL Lecture “Integrated Building Energy and CFD Simulations”, ASHRAE Singapore Chapter, April, 2015.
130. Invited Talk “Air Distribution and Contaminant Dispersion in Hospital Operating Rooms”, National Taipei University of Technology, Taiwan, April 2015.
131. Seminar “Experimental and CFD Investigation of Hospital Operating Room (OR) Air Distribution”, ASHARE Winter Conference, Chicago, Jan 25, 2015
132. Seminar "Deep Retrofit of Commercial Building – A Key Pathway towards Low-Carbon Cities" at Dalian University of Technology, Dalian, China, May, 2014.
133. Seminar "Energy Storage for Residential Buildings: from High-Tech Potentials to Low-Tech Applications" at Dalian University of Technology, Dalian, China, May, 2014.
134. Invited Talk “Progress and Discussion on Inverse Design of Air Cabin Environment” at Civil Aviation University of China, Tianjin, China, May 2014.
135. Invited Talk “Living Wall”, at the US-China Workshop on Next Generation of Building Enclosure Systems, Nanjing, China, May 25th, 2014.
136. Invited Talk “System Model of Chinese Kang”, at the US-China Workshop on Next Generation of Building Enclosure Systems, Nanjing, China, May 25th, 2014.
137. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe - Case Studies from Fundamentals to Applications” at National Chin-Yi University of Technology, Taiwan, March 28, 2014.
138. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe - Case Studies from Fundamentals to Applications” at National Cheng Kung University, Taiwan, March 31, 2014.
139. Seminar “Roles of Beauty, Energy, and Economy in Building” at Industrial Technology Research Institute, Taiwan, April 1, 2014.
140. Seminar “An Approach to Interpreting Critical Indoor Pollution Scenes of a Whole Building with Limited Sensor Outputs”, at Industrial Technology Research Institute, Taiwan, April 1, 2014.
141. Seminar “An Approach to Interpreting Critical Indoor Pollution Scenes of a Whole Building with Limited Sensor Outputs”, at National Taipei University of Technology, Taiwan, April 3, 2014.
142. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe - Case Studies from Fundamentals to Applications” at The Penn State University, March 3, 2014.
143. Seminar “Experimental Validation of Data Center Rack Models” at ASHRAE Winter Conference, Jan 19, 2014, New York City, US.
144. Keynote Speech “Energy Storage for Residential Buildings: From High-Tech Potentials to Low-Tech Applications” for the APEC Conference on Low Carbon Town and Physical Energy Storage, May 25-26, 2013, Changsha, Hunan, China.
145. Invited Talk “Roles of Beauty, Energy, and Economy in Building” at The 9th International Conference on Green and Energy-Efficient Building, April, 2013, Beijing, China.
146. Seminar "Field Measurements of Thermal Conditions during Surgical Procedures for the Development of CFD Boundary Conditions" at ASHRAE Summer Conference, 2012.

147. Seminar "The Development of Simplified Rack Boundary Conditions for Numerical Data Center Models" at ASHRAE Summer Conference, 2012.
148. Seminar "Assessment of Natural and Hybrid Ventilation Models in Whole-Building Energy Simulation" at ASHRAE Winter Conference, 2012.
149. Invited Talk "The Living Wall" at the Wirth Chair Sustainability Series, September 4th, 2012, Denver, Colorado.
150. Seminar "Reducing Green House Gas Emissions through Green Planning, Design and Technologies: The Trend", The NSF RCN: Sustainable Cities Workshop, August 18th, 2012, Colorado.
151. Seminar "Advances in Modeling: Findings from Recent ASHRAE Researches" at Dalian University of Technology, China, June, 2012.
152. Seminar "Green Building Design - An Integrated Approach" at Tianjin University, China, June, 2012.
153. Seminar "Zero-Carbon, Carbon Neutral, and Low Carbon Technologies" at Tianjin University, China, June, 2012.
154. Seminar "Air Cabin Environment Design Theory and Platform Using GA-CFD" at The First Annual Meeting of the Center for Cabin Air Reformative Environment, Beijing, China, Dec, 2012.
155. Seminar "Energy Performance and Saving Potential of Chinese Commercial Buildings" at the Workshop on Sustainable and High-Performance Industrial Facility Technologies (SHIFT), Tianjin, China, Dec, 2012.
156. 10-day Workshop at Dalian University of Technology (China) on "CFD Analysis for Built and Natural Environment", 2011.
157. 4-day Workshop at Tianjin University (China) on "CFD for Indoor Environment Quality Study", 2011.
158. One-week Workshop in Mexico on "Sustainable Building Design", 2011.
159. Invited Seminar in Mexico "Toward a Better Building: Comfort, Health, Efficiency, and Safety", 2011.
160. Invited Seminar in UK "Nature-inspired Design: Biomimicry in the Built Environment", March, 2011.
161. US FOE Chair Presentation "Engineering Sustainable Building", Sept, 2011.
162. Invited Talk "Deep Retrofit of Commercial Building – A Key Pathway towards Low-Carbon Cities", US-China Workshop on Low-Carbon Cities, Hong Kong, Dec, 2010.
163. Seminar "Natural Ventilation: Concept and Design", RMH, Denver, CO, 11/17, 2010.
164. Seminar "ASHRAE Research Activities at UC-Boulder", ASHRAE Rocky Mountain Chapter, Denver, CO, 12/1, 2010.
165. Seminar "An Approach to Interpreting Critical Indoor Pollution Scenes of a Whole Building with Limited Sensor Outputs", the University of Hong Kong, Hong Kong, Dec, 2009.
166. Seminar "Role of CFD in Building Design", Mechanical Engineering Department, CU-Boulder, Sept, 2009.
167. Seminar "An Optimized PV System: Can It Achieve All?", The ASHRAE Annual Conference, Louisville, KY, June 23, 2009.
168. Seminar "Overview of UCB/AREN/BSP – Education and Research", Nanjing University of Technology, Nanjin, China, June 5, 2009.
169. Seminar "Toward a Better Building: Comfortable, Healthy, Efficient, and Safe", Nanjing University of Technology, Nanjin, China, June 5, 2009.
170. Seminar "Turbulence Models for Indoor Environment Modeling – Fundamentals and Summary of Prevalent Turbulence Models", The ASHARE Winter Conference, Chicago, IL, Jan, 2009.
171. Seminar "An Approach to Interpreting Critical Indoor Pollution Scenes of a Whole Building with Limited Sensor Outputs", The ASHARE Winter Conference, Chicago, IL, Jan, 2009.
172. Seminar "UCB and BSP Overview and Simulation-Assisted Conceptual Building Design - Integration in a Real Case Study", South China University of Technology, Guangzhou, China, July 19, 2008.
173. Invited Opening Ceremony Speech "Why We Are Here and Where We Are Going", The 1st International Conference on Building Energy and Environment (COBEE2008), Dalian, China, July 13, 2008.
174. Seminar "Identification of Indoor Airborne Contaminant Sources with Probability-Based Inverse Modeling Methods", Taiwan Clean-Room Tech Association, Taiwan, May 27, 2008.
175. One-Day Workshop "Identification of Indoor Airborne Contaminant Sources with Probability-Based Inverse Modeling Methods", National Taipei University of Technology, Taiwan, May 26, 2008.
176. Presentation "Status of Building Energy Consumption and Simulation in China", US National Renewable Energy Laboratory (NREL), Commercial Buildings Research Team, Feb 25, 2008.
177. Seminar "Integrated Building Energy and CFD Simulation for Rooms with Mixed and Displacement Ventilation Systems", The ASHRAE Annual Conference, Long Beach, CA, June, 2007.
178. Seminar "Study of Penetration of Outdoor Fine Particles into a Nonresidential Building with Multi-Zone Simulation", The ASHRAE Annual Conference, Long Beach, CA, June, 2007.

179. Invited Workshop Presentation “Comparative Study of Airflow around a CFD Thermal Manikin”, Special Workshop in ROOMVENT07, Helsinki, Finland, June, 2007.
180. Invited Presentation “Applying Ancient Building Technologies to Design Energy Efficient Buildings – Modern Implications of Ancient Passive Building Technologies”, The Lindbergh Foundation, St Paul, MN, May, 2007.
181. Seminar “Can I be a CFD Pro: Some Tips?”, Tianjin University, China, Dec, 2006.
182. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, Tianjin University, China, Dec, 2006.
183. Invited Non-Member Roundtable Speech “Identification of Appropriate CFD Models for Indoor Particle and Droplet Simulation in Ventilated Spaces”, The American Industrial Hygiene Conference and The Ventilation 2006 Conference, AIHA and ACGIH, Chicago, IL, May, 2006.
184. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe - Some Case Studies from Fundamentals to Applications", Department of Civil Engineering, University of Colorado at Denver, April, 2006.
185. One Week Solo Workshop “Sustainable Building Design”, Centro Federal de Educagco Tecnologica de Minas Gerais, Brazil, October, 2005.
186. Seminar “Roles of CFD in Building Design”, Tsinghua University, China, June, 2005.
187. Seminar “Roles of CFD in Building Design”, Tianjin University, China, June, 2005.
188. Seminar “Toward a Better Building: Comfort, Health, Efficiency, and Safety”, Johns Manville Technical Center, CO, Sept, 2004.
189. Seminar “Toward a Better Building: Comfortable, Healthy, Efficient, and Safe”, Building Systems Program, University of Colorado at Boulder, Sept, 2003.

**Patents:**

1. US patent: Method for Detecting Hollowing of Exterior Wall Finish Layer, Patent No: US 11,367,171 B2; Date: June 21, 2022

**In Media and Press**

1. “CU Boulder professor receives Fulbright for holistic approach to indoor air quality” https://www.colorado.edu/ceae/2023/07/21/cu-boulder-professor-receives-fulbright-holistic-approach-indoor-air-quality
2. “If you lower the heat by 1 degree, what does it do to your Xcel bill?” https://www.9news.com/article/news/local/next/next-with-kyle-clark/xcel-bill-lower-heat-1-degree-colorado/73-2806c58b-24fa-48d4-bd7d-6185443652bf
3. "Making Building Air Less Infectious", https://www.naefrontiers.org/17058/News?id=17058
4. "Central HVAC Filtration vs. Portable Air Purifier Filtration: Mitigating Covid-19 in Public Space", https://www.ashrae.org/technical-resources/ashrae-journal/featured-articles/central-hvac-filtration-vs-portable-air-purifier-filtration-mitigating-covid-19-in-public-spaces
5. "Could fresh air be the key to ending the pandemic?" https://www.mic.com/p/could-fresh-air-be-the-key-to-ending-the-pandemic-84293252
6. "Across The Mountain West, Heat Waves Are Changing Residents' Air Conditioning Calculus" https://www.wyomingpublicmedia.org/open-spaces/2021-08-20/across-the-mountain-west-heat-waves-are-changing-residents-air-conditioning-calculus
7. “Researchers study social distancing, ventilation in predicting the probability of COVID infection” https://www.colorado.edu/engineering/2021/02/18/researchers-study-social-distancing-ventilation-predicting-probability-covid-infection
8. "Certainties and doubts about air transmission of the coronavirus" https://www.elindependiente.com/vida-sana/salud/2020/09/24/certezas-y-dudas-sobre-la-transmision-aerea-del-coronavirus/
9. "Scientists call for sweeping change in building design to reduce airborne diseases like COVID-19" https://www.latimes.com/world-nation/story/2021-05-13/covid-safe-buildings
10. "Ventilating complaints about air standards" https://cosmosmagazine.com/health/medicine/covid-ventilation-standards/
11. "Overseas Campus Interested in Researching Hallways in Makassar City" https://sulsel.suara.com/read/2020/11/11/145118/kampus-luar-negeri-tertarik-meneliti-lorong-di-kota-makassar; (https://theworldnews.net/id-news/kampus-luar-negeri-tertarik-meneliti-lorong-di-kota-makassar

12. "Experts weigh in on airborne transmission of COVID-19" https://www.colorado.edu/today/2020/07/09/experts-weigh-airborne-transmission-covid-19
13. "10 Signs a Store Isn't Protecting Against Coronavirus" https://www.rd.com/article/signs-store-isnt-protecting-against-coronavirus/
14. "It is a religious liberties issue": Weld County church cites hardware stores re-opening in lawsuit against Polis continuing to limit religious services amid pandemic" https://www.denverpost.com/2020/06/03/high-plains-harvest-church-lawsuit-polis-coronavirus/
15. "So Now You Need To Wear A Mask. Here's How" https://www.kunc.org/post/so-now-you-need-wear-mask-heres-how#stream/0 [Featured news at https://www.naefrontiers.org/ (May 14, 2020)]
16. "Some wear masks on the trail, others don't. Who is right?" https://www.lhvc.com/story/2020/04/29/covid-19/some-wear-masks-on-the-trail-others-dont-who-is-right/5432.html
17. Masks are having a moment in Colorado, though safety accessory also brings risks. April 12, 2020. https://www.denverpost.com/2020/04/12/coronavirus-face-masks-pandemic-colorado/
18. Your Questions About Face Masks, Answered. April 15, 2020. https://www.5280.com/2020/04/your-questions-about-face-masks-answered/
19. http://www.he.xinhuanet.com/zhuanti/fangtan/20170801/index.htm
20. "Pollutant tracking system wins gold at World IoT Expo", Dec. 6, 2016, http://www.colorado.edu/ceae/2016/12/06/pollutant-tracking-system-wins-gold-world-iot-expo; http://www.colorado.edu/industry/2016/12/09/cu-researchers-pollutant-tracking-system-wins-gold-world-iot-expo; http://www.colorado.edu/today/2016/12/09/cu-researchers-pollutant-tracking-system-wins-gold-world-iot-expo;
21. Media interviews on Urban Air pollutant Source Tracking Technology, 2016: http://news.cctv.com/2016/11/01/ARTIvMUtLISDGoV6WblAReCs161101.shtml; http://news.jstv.com/a/20161101/1477980265159.shtml; http://dz.xdkb.net/html/2016-11/02/content_446050.htm; http://news.jnwb.net/2016/1102/114030.shtml; etc.
22. "Mentoring program steers students toward STEM fields", Sep 27, 2015, http://rapidcityjournal.com/lifestyles/local/mentoring-program-steers-students-toward-stem-fields/article_c4268a56-92e3-519b-8d5b-a1a6dde3ee5f.html
23. "Science Can Set You Free! STEM Program Teaches Sustainable Building", August 25, 2015, http://indiancountrytodaymedianetwork.com/2015/08/25/science-can-set-you-free-stem-program-teaches-sustainable-building-161487
24. "Native Sun News: Tribal youth share traditions and technology", June 29, 2015, http://www.indianz.com/News/2015/017991.asp
25. "From the classroom to the rooftop", June 22, 2015, http://gridalternatives.org/news/classroom-rooftop
26. "Native American students tackle reservation's persistent engineering challenges", July 13, 2015, http://www.colorado.edu/news/features/native-american-students-tackle-reservations-persistent-engineering-challenges#sthash.Sr0cmFg3.dpuf
27. "Living Walls", Living on Earth, distributed by Public Radio International, December 20, 2013, http://www.loe.org/shows/segments.html?programID=13-P13-00051&segmentID=6
28. "Absolute Approach to Assessing Building Sustainability", Science for Environment Policy, http://ec.europa.eu/environment/integration/research/newsalert/pdf/38si3.pdf
29. "Multiscale Design and Integration of Sustainable Building Functions", Science Magazine, July, 2013, http://www.sciencemag.org/content/341/6143/247.full
30. "Students Participate in Summer Math and Science Program", August 16, 2013, http://www.trib-news.com/news/355-students-participate-in-summer-math-and-science-program
31. "CU-Boulder program teaching Native Americans sustainability on the reservations", Colorado Daily, July 16, 2013 http://www.coloradodaily.com/ci_23674231/cu-boulder-program-teaching-native-americans-sustainability-reservations
32. "The Hidden Effects of Green Homes", Boulder Weekly, January 24,2013, http://www.boulderweekly.com/article-10510-the-hidden-effects-of-green-homes.html
33. "Tool Helps Green Building Become Beautiful Building", RealEstateRama, March 2, 2012, http://www.concrete-greenbuilding.com/articles/57179/tool-helps-green-building-become-beautiful-buildin/

34. "CU-Boulder researchers receive $2M grant to develop 'living wall'", Boulder Daily Camera, http://www.dailycamera.com/news/ci_15966583,09/01/2010
35. "CU faculty awarded nearly $2 million to develop 'living wall' - Foundation boosts project that imitates nature to slash buildings' energy use", CU Faculty and Staff Newsletter, October 6, 2010, https://www.cusys.edu/newsletter/2010/10-06/living-wall.html
36. "CU Faculty Develop New 'Living Wall' Concept to Slash Energy Use", University of Colorado at Boulder, Top Stories, http://www.colorado.edu/news/r/593723d89181056e551d9249c4788696.html
37. "Living Wall", KUNC FM 91.5 Radio talk, KGNU Radio, 2010
38. "Reconstructing Baby Hearts, Air in Operating Rooms, Solving the Mysterious Shape of Red Blood Cells - Medical Highlights of the Fluid Dynamics Conference", American Physical Society, Minneapolis, Nov, 2009, http://www.aps.org/units/dfd/pressroom/news/loader.cfm?csModule=security/getfile&pageid=197144
39. "Renewable Energy: A Reality Check in Rural China", US NSF Video for our energy and bio-mass related research in China, 2009. (The video has been posted by a number of websites thereafter.) http://www.nsf.gov/news/special_reports/science_nation/renewableenergy.jsp
40. "The University of Colorado at Boulder awarded three $50,000 grants to projects as part of its Renewable Energy Proof of Concept grant program", Boulder County Business Report, May 29, 2009, http://www.bcbr.com/print_article.asp?aID=100358
41. "Energy Research Spotlight: Architectural Engineering Building Systems Program", University of Colorado at Boulder Energy Initiative, Newsletter 2009, Volume I.
42. "Renewable Energy: A Reality Check in Rural China", NSF featured video, recognizing CEAE graduate student and new Fulbright Fellow, Abby Watrous, and faculty advisor, Professor John Zhai, for environmental/energy research in China, http://www.nsf.gov/news/special_reports/science_nation/index.jsp
43. "Behind the Scenes: My Research: I Burn Stuff" by Abigail Watrous (PhD student of John Zhai), May 30, 2008, http://www.livescience.com/researchinaction/080530-bts-chinese-combustibles.html#comments
44. The Denver Post (Colorado business news roundup): The Charles A. and Anne Morrow Lindbergh Foundation awarded grants for two University of Colorado at Boulder projects. Nov 21, 2007, http://www.denverpost.com/ci_7519763?source=rss
45. DailyCamera (Local Briefs - Nov. 21): University of Colorado | Lindbergh Foundation awards grants for CU engineering projects, 2007, http://m.dailycamera.com/news/2007/Nov/21/no-headline---21adgt/
46. "Architects and Engineers Work Together on Sustainable Building Design", CUEngineering 2006, http://engineering.colorado.edu/news/cue/2006/features/civil.htm

## RESEARCH GRANTS SINCE 2003

**Funded PI Projects**

1. Evaluation of Hygrothermal and Energy Efficiency and Condensation Risk of Secondary Windows, *NSF BEST center*, 8/15/2023-7/14/2024, $65,000 (Share: 80%)
2. Evaluation of Field Methods for Assessment of Architectural Window Degradation, *NSF BEST center*, 8/15/2023-7/14/2024, $40,000 (Share: 100%)
3. Catalyst: Leaders – International Leader Fellowship, The Royal Society of New Zealand,2024-2026, NZ$150,000 (=US$90,000) (Share: 100%)
4. The Fulbright US Scholar, US Department of State, 2/21/2024-8/25/2024, $36,282 (Share: 100%)
5. Critical IAQ Parameters and Conditions in Residential Buildings, *AprilAire*, 11/2022-8/2023, $78,100 (Share: 100%)
6. Evaluation of Field Methods for Assessment of Architectural Window Degradation, *DOE-NREL*, 5/15/2022-5/13/2023, $87,691 (Share: 100%)
7. Evaluation of Field Methods for Assessment of Architectural Window Degradation, *NSF BEST center*, 8/15/2022-7/14/2023, $20,000 (Share: 100%)
8. Addition of Roof Top Temperature Information to the Climatic Design Conditions Chapter of the ASHRAE Handbook, *ASHARE,* 7/1/2022-6/30/2023, $59,528 (Share: 100%)
9. International Workshop on Urban Environment and Energy (IWUEE), *The JSPS US and Canada Alumni Association Seminar Program*, 2022, $5,000 (Share: 100%)
10. Modeling and Analysis of Indoor Air Quality at Hotel Public Areas under Different Operating and Cleaning

Conditions, *Marriott International Inc*, 9/2020-8/2022, $67,966 (Share: 100%)

11. Experimental Validation and Model Development for Urban Pollutant Source Tracking Method. *Tokyo Polytechnic University Wind Engineering Research Center,* Joint Usage/Research, 09/2019-07/2020, $23,000 (Share: 100%)
12. Development of Center for Renewable Energy and Energy Efficiency Development (CREED). *USAID-SHERA*, 7/2018–1/2022, $109,297 (Share: 100%)
13. The JSPS Invitational Fellowship, *The Japan Society for the Promotion of Science*, 7/2018-9/2018, 2018. $15,000 (Share: 100%)
14. STEM Research and Mentoring Experience for Tribal College Students. *The Outreach Committee of University of Colorado,* 9/2015–8/2016, $8,000 (Share: 100%)
15. NSF-EFRI Research Experience & Mentoring (REM): Sustainable Building Research for Tribal College Students and Professionals. *US National Science Foundation (NSF)*, 1/2016-6/2016, $15,500 (Share: 100%)
16. NSF-EFRI Research Experience & Mentoring (REM): Sustainable Building Research for Tribal College Students and Professionals. *US National Science Foundation (NSF)*, 4/2015-3/2016, $109,357 (Share: 100%)
17. Testing and Modeling Energy Performance of Active Chilled Beam Systems (1629-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 1/2014-5/2017, $140,259 (Share: 100%)
18. STEM Research and Mentoring Experience for Tribal College Students. *The Outreach Committee of University of Colorado,* 9/2014–8/2015, $8,000 (Share: 100%)
19. Test-Bed of Active Chilled Beam Systems. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Senior Undergraduate Project Grant)*, 2014-2015, $5,000 (Share: 100%)
20. NSF-EFRI Research Experience & Mentoring (REM): Sustainable Building Research for Tribal College Students and Professionals. *US National Science Foundation (NSF)*, 7/2014-6/2015, $100,000 (Share: 100%)
21. The Metropolitan Denver STEM SEL (Science Technology Engineering Math Student Enhancement Laboratory): a Grade 6-16 Colorado Collaborative. *US National Science Foundation (NSF)*, 8/2013-7/2014, $50,000 (Share: 100%)
22. NSF-EFRI Research Experience & Mentoring (REM): Sustainable Building Research for Tribal College Students and Professionals. *US National Science Foundation (NSF)*, 7/2013-6/2014, $120,000 (Share: 100%)
23. STEM Research and Mentoring Experience for Tribal College Students. *The Outreach Committee of University of Colorado,* 9/2013–8/2014, $7,600 (Share: 100%)
24. Turning Sand into Sandstone with Microbial Biomineralization. *The Innovative Seed Grant of University of Colorado*, 7/2011-5/2014, $44,000, Co-PI: Yunping Xi, Noah Fierer (EEB), Scott Bates (CIRES) (Share: 50%)
25. International: The Future of Rural China: Evaluation of an Agent-Based Model to Predict Home Heating and Cooking Practices on Energy Use. *US National Science Foundation (NSF) (OISE - IRES/DDEP)*, 8/2011-7/2012, $10,354 (Share: 100%)
26. EFRI-SEED: Living Wall Materials and Systems for Automatic Building Thermo-Regulation. *US National Science Foundation (NSF) (EFRI)*, 9/2010-8/2014, $1,967,446, Co-PI: Jerry Qi (MCEN), Yifu Ding (MCEN), Kurt Maute (ASEN), Fred Andreas (UC-Denver) (Share: 37%)
27. CFD Shootout Contest: Prediction of Duct Fitting Losses (1493-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 9/2010-12/2011, $20,000 (Share: 100%)
28. Low-Cost Modular Mounting System for Building Integrated Photovoltaic-Thermal Collector. *University of Colorado Technology Transfer Office – Proof of Concept Grant*, 2010-2011, $50,322, Co-PI: Michael Brandemuehl (CEAE) (Share: 50%).
29. Developing a Low-Cost Modular Building Integrated Photovoltaic-Thermal Collector for Electricity, Hot Water and Pre-heated Ventilation Air. *University of Colorado Undergraduate Research Opportunity Program (UROP)*, 9/2009-5/2010, $2,400 (Share: 100%)
30. Analysis and Optimization of Commercial Buildings in China and India. *U.S. Department of Energy (DOE) – National Renewable Energy Laboratory (NREL)*, 4/2009-3/2011, $105,377 (Share: 100%)
31. The Development of Simplified Rack Boundary Conditions for Numerical Data Center Models (1487-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 4/2009-9/2010, $84,714 (Share: 100%)
32. High Efficiency Low Cost Microchannel Heat Exchanger. *University of Colorado Energy Initiative (EI) and CU Technology Transfer Office – Proof of Concept Grant*, 5/2009-5/2010, $30,000 (Share: 100%)
33. Probability-Based Inverse Modeling Method for Identifying Indoor Airborne Contaminant Sources. *The*

*University of Hong Kong William M.W. Mong Engineering Research Fund – William Mong Visiting Research Fellowship in Engineering*, 2009-2010, $5,000 (Share: 100%)

34. Developing a Low-Cost Modular Building Integrated Photovoltaic-Thermal Collector for Electricity, Hot Water and Pre-heated Ventilation Air. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Senior Undergraduate Project Grant)*, 2009-2010, $5,000 (Share: 100%)
    *[As the highest ranking grant project, two complimentary trips were also granted to attend the 2010 ASHRAE Winter Conference in Orlando, FL.]*
35. Experimental Investigation of Hospital Operating Room (OR) Air Distribution. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Grant-in-Aid Award for James Mcneill, Ph.D. Student),* 2009-2010, $10,000 (Share: 100%)
36. Operating Room Thermal Manikins. *University of Colorado at Boulder, Engineering Excellence Fund (EEF)*, 2009-2010, $1,350 (Share: 100%)
37. Experimental Investigation of Hospital Operating Room (OR) Air Distribution (1397-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 9/2008-8/2010, $140,685, Co-PI: Jean Hertzberg (MCEN) (Share: 80%)
38. Optimizing the Trade Off between Grid Resolution and Simulation Accuracy: Coarse Grid CFD Modeling (1418-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 9/2008-8/2010, $85,605 (Share: 100%)
39. The Correlation between HVAC System Pressure Drop and Energy Savings*. National Air Duct Cleaners Association (NADCA),* 2/2008-1/2010, $196,812, Co-PI: Moncef Krarti (CEAE) (Share: 75%)
40. Asia-Pacific Partnership (APP): Development of Simulation Data Sets and Benchmark Models for the Chinese Commercial Building Sector. *U.S. Department of Energy (DOE) – National Renewable Energy Laboratory (NREL)*, 12/2008-10/2009, $84,516 (Share: 100%)
41. Numerical Investigation and Optimization of Thermal and IAQ Performance of Personalized HVAC Systems. *LG Electronics*, 9/2008-8/2009, $20,000 (Share: 100%)
42. Assess and Implement Natural and Hybrid Ventilation Models in Whole-Building Energy Simulations (1456-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 4/2008-9/2009, $89,463, Co-PI: Moncef Krarti (CEAE) (Share: 75%)
43. Probability Based Inverse Modeling to Identify Contaminant Sources in Indoor Environment. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Grant-in-Aid Award for Xiang Liu, Ph.D. Student),* 2008-2009, $10,000 (Share: 100%)
44. Developing Comfortable, Healthy and Energy Efficient Buildings: Modern Implication and Application of Ancient Building Technologies. *The Charles A. and Anne Morrow Lindbergh Foundation*, 9/2007-8/2008, $10,000 (Share: 100%)
45. Thermal Performance of Ventilated Breathing Walls under Varied Environmental Conditions. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Grant-in-Aid Award for Robert Slowinski, M.S. Student),* 2007-2008, $10,000 (Share: 100%)
46. Understand the Building with Your Eyes: Building and Environment Science and Technology Visualization Lab (BESTVisualLab). *University of Colorado at Boulder, Engineering Excellence Fund (EEF)*, 9/2007-8/2008, $15,595 (Share: 100%)
47. Application of Passive Technologies in Modern Building Design, A Learning Tool (APT). *University of Colorado at Boulder, Engineering Excellence Fund (EEF)*, 9/2007-8/2008, $2,000 (Share: 100%)
48. Protocols for Measuring and Reporting the On-site Performance of Buildings Except Low-Rise Residential Buildings (Special Project). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 2/2007-7/2007, $33,910 (Share: 100%)
49. Experimental Investigation of Thermal and Energy Performance of a Task/Ambient Conditioning System. *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) (Senior Undergraduate Project Grant)*, 9/2005-5/2006, $4,700 (Share: 100%)
50. Experimental Investigation of Thermal and Energy Performance of a Task/Ambient Conditioning System. *University of Colorado Undergraduate Research Opportunity Program*, 9/2005-5/2006, $2,400 (Share: 100%)
51. Developing New Computing Lab for Building Comfort and Safety Study. *University of Colorado Engineering College Dean Renovation Funds*, 9/2004-8/2005, $3,700 (Share: 100%)
52. Develop a Sustainable Pottery Site with Wood-Fired Kilns in City of Boulder. *The Outreach Committee of*

*University of Colorado,* 9/2004-5/2005, $5,000 (Share: 100%)

**Funded Co-PI Projects**

1. IUCRC Phase I: University of Colorado Boulder: Center for Building Energy Smart Technologies. NSF, PI: Moncef Krarti, 8/2021-7/2026, $750,000 (Share: 10%)
2. Estimating and Mitigating SARS-CoV-2 Exposure Risk in Mechanically Ventilated Spaces. *Carrier*, 10/2020-6/2022, $124,122, PI: Shelly Miller (Share: $30,000)
3. EAGER: Collaborative Research: Reinventing Cities via Smart Garden Alleys. *US NSF*, 9/2019-12/2023. $209,998, PI: Wangda Zuo (Share: $20,000)
4. EnergyPlus Whole Building Energy Modeling and Simulation Software Development. *US NREL*, 9/2018-12/2022. $ 175,000, PI: Moncef Krarti (Share: 10%)
5. IUCRC Pre-proposal: Planning: University of Colorado Boulder: Center for Building Energy Smart Technologies (BEST). *US National Science Foundation (NSF)*, 7/2018-6/2019, $ 15,000, PI: Moncef Krarti (Share: 10%)
6. Role of HVAC Systems in the Transmission of Infectious Agents in Buildings and Intermodal Transportation (1604-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE),* 9/2013-8/2015, $500,000, PI: Shelly Miller (MCEN) (Share: 15%)
7. Promoting Sustainable and Energy Efficiency Technologies for Buildings. *United States Agency for International Development (USAID)*, 2/2010-12/2012, $266,137, PI: Moncef Krarti (CEAE) (Share: 10%)
8. Green Development Standards Research Project. *Vail Resorts Inc.*, 6/2009-12/2009, $68,000, PI: Byron Koste (Leeds School of Business) (Share: 35%)
9. Sustainable Economic Development Projects. *Department of the Interior, Division of Energy and Minerals Development*, 1/2008-8/2008, $282,570, PI: Bernard Amadei (CEAE) (Share: 15%)
10. Project Development Facility for the Design and Analysis of Build Environment. *University of Colorado at Boulder, Engineering Excellence Fund (EEF)*, 8/2007-8/2009, $13,750, PI: Moncef Krarti (CEAE) (Share: 20%)
11. Identification, Classification and Correlation of Ultrafine Indoor Airborne Particulate Matter with Outdoor Values (1281-TRP). *American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE)*, 9/2004-8/2006, $109,972, PI: Shelly Miller (MCEN) (Share: 20%)
12. Curriculum Development for Sustainable Buildings. *United States Agency for International Development (USAID) and American Council on Education (ACE)*, 3/2004-2/2006, $77,680, PI: Moncef Krarti (CEAE) (Share: 25%)
13. Toolkit for Measurement Instruments for the Analysis of Building Performance. *University of Colorado at Boulder, Engineering Excellence Fund (EEF)*, 8/2004-5/2005, $11,000, PI: Moncef Krarti (CEAE) (Share: 20%)
14. P3 Award (Phase-1): A National Student Design Competition for Sustainability Focusing on People, Prosperity and Planet. *U.S. Environmental Protection Agency (EPA)*, 5/2004-4/2005, $10,000, PI: Anu Ramaswami (CE of CU-Denver) (Share: 30%)

## TEACHING ACTIVITIES SINCE 2003

**Principal Coursework Instructor: Existing Courses**

AREN 2120 **Fluid Mechanics and Heat Transfer***,* required undergraduate course
AREN 2121 **Heat Transfer***,* required undergraduate course
AREN 3130 **Building Energy Laboratory***,* required undergraduate lab course
AREN 3010 **Energy Efficient Buildings,** required undergraduate course

**Principal Coursework Instructor: New Courses Developed**

AREN 2830 **Sustainable Building Practices in Developed and Developing Countries**, technical elective course for freshmen and sophomores in various disciplines
AREN 5001 **Building Energy Systems***,* required entry level graduate core course
AREN 5002 **Building Science and Engineering II***,* required entry level graduate core course
CVEN 5830 **Sustainable Building Design**, required entry level graduate core course
CVEN 5830 **Computational Fluid Dynamics Analysis for Built and Natural Environment,** technical elective upper level graduate course
AREN 5830 **Building Systems Modeling and Simulation,** technical elective upper level graduate course

**Coursework Co-Instructor: Capstone Design Course**

AREN 4317 **Architectural Engineering Design**, required capstone design course for seniors

**Principal Advisor to Ph.D. Graduate Students**

1. **Xiang Liu**, 2004-2008 (Graduated)
   *Dissertation:* Identification of Indoor Airborne Contaminant Sources with Probability-Based Inverse Modeling Methods
2. **David Charles Denkenberger**, 2006-2010 (Graduated)
   *Dissertation:* Low-Cost High-Effectiveness Microchannel Heat Exchanger: Fabrication, Modeling, And Validation
3. **Abigail Thomas Watrous**, 2007-2012 (Graduated)
   *Dissertation:* Environmental Impacts of the Socioeconomic Factors Affecting Energy Use for Rural Families and Migrant Workers in China
4. **James Mcneill**, 2007-2020 (Graduated)
   *Dissertation:* Experimental and Numerical Investigation of Hospital Operating Room Air Distributions
5. **Haidong Wang**, 2008-2013 (Graduated)
   *Dissertation:* Fast CFD Simulation Method for Indoor Environment Modeling
6. **Saleh Al-Saadi**, 2009-2014 (Graduated)
   *Dissertation:* Modeling and Simulation of PCM-Enhanced Façade Systems
7. **Hyunwoo Lim**, 2011-2017 (Graduated)
   *Dissertation:* Prediction of Urban-Scale Building Energy Performance with a Stochastic-Deterministic-Coupled Approach
8. **Dareum Nam**, 2013-2019 (Graduated)
   *Dissertation:* Testing and Modeling Energy Performance of Active Chilled Beam Systems
9. **Jong-Hyo Choi**, 2014-2023
   *Dissertation:* Innovative Particle Control Techniques
10. **Ayeshah Alawadhi**, 2014-2023
    *Dissertation:* Thermoelectric Energy Storage Techniques for Building Systems
11. **Madison Likins-White,** 2021-
    *Dissertation:* Thermal Performance and Energy Impacts of Window Degradation
12. **Laksana Gema Perdamaian,** 2021-
    *Dissertation:* Affordable, Livable and Sustainable Apartment Housing for Indonesia

**Co-Principal Advisor to Ph.D. Graduate Students**

1. **Yu Xue**, 2011-2016 (Graduated) [Tianjin University, China]
   *Dissertation:* Research on Inverse Problems of Air Quality in Human Living Environment with Genetic Algorithm and Adjoint Method
2. **Shujie Yan**, 2020-2023 (Graduated) [Concordia University, Canada]
   *Dissertation:* Multizone Modeling of Airborne Virus Transmissions, Risks Mitigations, and Ventilation Evaluations in Buildings

**Principal Advisor to M.S. Graduate Students**

1. **Alexandra Pappas**, 2004-2006 (Graduated)
   *Thesis:* Energy Modeling of a Double Skin Façade – A Method Using CFD and EnergyPlus
2. **Brian Erickson**, 2005-2007 (Graduated)
   *Thesis:* Validation of Soil Moisture Load Estimation and CFD Analysis of Crawl Space Building Code Requirements
3. **Jonathan Previtali**, 2005-2007 (Graduated)
   *Report:* A Methodology for Categorizing Vernacular Architecture and Assessing Energy Performance
4. **Michael Bendewald**, 2006-2008 (Graduated)
   *Thesis:* Using Carrying Capacity as a Baseline for Building Sustainability Assessment
5. **Robert Slowinski**, 2006-2009 (Graduated)
   *Thesis:* Thermal Performance of Ventilated Breathing Walls under Varied Environmental Conditions and Analysis of Selected Design Parameters

6. **Jessica Rivas**, 2007-2009 (Graduated)
   *Report:* Estimating Energy Consumption of Variable Refrigerant Volume Systems – Developing and Validating the VRF-dat
7. **Stephen Johnson**, 2008-2009 (BS-MS, Graduated)
   *Report:* Laboratory Project on Energy Savings Dependence on Pressure Drops in HVAC Systems
8. **Mary-Hall Dale Johnson**, 2008-2009 (Graduated)
   *Thesis:* Assess and Implement Natural and Hybrid Ventilation Models in Whole-Building Energy Simulations
9. **Ian Metzger**, 2008-2009 (Graduated)
   *Report:* Numerical Investigation and Optimization of Personalized Ventilation Systems
10. **Vergil Mueller**, 2007-2010 (Graduated)
    *Report:* Developing Low-Cost Household-Based Bio-Digester Systems for Cold Climates
11. **Eric Wilson**, 2008-2010 (Graduated)
    *Thesis:* The Correlation between HVAC System Pressure Drop and Energy Savings
12. **Lesley Anne Herrmann**, 2008-2010 (Graduated)
    *Thesis:* Analysis and Optimization of Commercial Buildings in China and India
13. **Knud Hermansen**, 2009-2011 (Graduated)
    *Thesis:* Development of Simplified Rack Boundary Conditions for Numerical Data Center Models
14. **Boston Edward Nyer**, 2009-2011 (Graduated)
    *Thesis:* The Use of Biomass in High Efficiency Tobacco Curing for Small Holder Farmers in Bangladesh
15. **Eric Kai Tu**, 2009-2011 (Graduated)
    *Report:* Adapting Pilot to Portfolio Methodology for Historical Building Energy Efficiency Retrofits
16. **Michael Goodrum**, 2009-2012 (Graduated)
    *Thesis:* How Do Beauty and Inspiration Impact Building Performance?
17. **Katherine Marie Dumez**, 2009-2012 (Graduated)
    *Thesis:* Analysis and Optimization for Energy Efficient Curtain Walls in Highrise Buildings
18. **Noble Lilliestierna**, 2011-2012 (BS-MS, Graduated)
    *Thesis:* Potential for Construction Materials Created Through Bioprecipitation
19. **Andrew Porter Yates**, 2012-2013 (Graduated)
    *Thesis:* An Evaluation and Model of the Chinese Kang System to Improve Domestic Comfort in Northeast Rural China
20. **Andrea Salazar**, 2012-2014 (Graduated)
    *Report:* Assessing the Optimal Level of Submetering as it Relates to Energy Analytics Implementations
21. **Michael Austin Gartman**, 2013-2014 (BS-MS, Graduated)
    *Project:* The Vertical Farming Façade
22. **Saad Gondal**, 2013-2015 (Graduated)
    *Thesis:* Mobile Renewable Energy (MORE) Platform: Design and Optimization
23. **Porawit Preechawuttidet**, 2013-2015 (Graduated)
    *Report:* Simulation Study of Air Ventilation in Operating Rooms
24. **Qi Jin**, 2013-2015 (Graduated)
    *Thesis:* Contaminant Source Identification in Building HVAC Systems Using Adjoint Probability Method
25. **Jacob Helman**, 2013-2015 (Graduated)
    *Report:* Creation of a Future Weather Data Tool and Its Application in Predicting Changes in Energy Consumption
26. **Laksana Perdamaian**, 2014-2017 (Graduated)
    *Report:* Enhanced Wind-Driven Infiltration Model by Incorporating Wind Direction for Design Purpose
27. **Amanda Luketa**, 2013
    *Report:* Quantitative Analysis and Comparison of Conceptual Designs of Residential Building
29. **Brittany Carl**, 2014
    *Report: Feasibility and Application of Creeping Flow Ventilation*
28. **Danielle Vitoff**, 2014
    *Thesis:* Net-Zero-Energy Community Design and Optimization
29. **Austin Robinson**, 2021 (Graduated)
    *Thesis:* Demand Controlled Air Curtains to Reduce Respiratory Infection Risks for Indoor Environments with Displacement Ventilation

30. **Bryce Letcher**, 2021 (Graduated)
    *Thesis:* Computational Methodology for Leak Location in Low Volume, Steady-State, Nonlooped Piped Distribution Systems
31. **Alec Bronson**, 2021-2022 (Graduated)
    *Thesis:* Optimization and Selection of Cost-Effective, Low-Carbon Building Envelope for Prefabricated Residential Buildings
32. **Adam Joseph Ferrer**, 2021-2022 (Graduated)
    *Thesis:* Energy Impact of the Use of Transparent Photovoltaic Windows in a Mid-Rise Commercial Building
33. **Mohammad Alattar**, 2022-2023 (Graduated)
    *Thesis:* Energy Impacts of Microclimate
34. **Adam Collins**, 2022-2023
    *Thesis:* Net-Zero Energy, Carbon and Emission Commercial Buildings
35. **Abdullah Alkhamees**, 2023-2025
    *Thesis:* Evaluation of Field Methods for Assessment of Architectural Window Degradation

**Principal Advisor to Undergraduate Students for Research Experience**

1. **Nicholas Robinson**, AREN Student, 6/2021-8/2021
   *Research Topic:* Vertical Farming in Atrium of High-Rise Buildings
2. **Seth Porter**, AREN Student, 5/2019-8/2019
   *Research Topic:* Bed-Edge Air Curtain Design Research for Hospital Operating Rooms
3. **Martin Tudesq,** Visiting BS Student, ENTPE, France, 4/2017-8/2017
   *Research Topic:* Apply Biomimicry Principles for PM2.5 Removal
1. **Andrew Moscovich**, EVEN Student (Earn-Learn Apprenticeship Program), 2014
   *Research Topic:* Regional STEM Center
2. **Janay Griego, Brent Johnson, Walter Shoup, Ken Takahashi**, AREN Student, 2014-2015
   *Research Topic:* Active Chilled Beam
3. **Adeline Mollard**, Visiting BS Student, ENTPE, France, 4/2015-8/2015
   *Research Topic:* Thermal-Storage Walls
4. **Marc Prades** (Balsells Internship Program), Visiting Student, Spain, 2013
   *Research Topic:* Vertical Farming Façade
5. **Matthew Kincaid**, AREN Student (Earn-Learn Apprenticeship Program), 2012-2013
   *Research Topic:* Vertical Farming Window
6. **Michael Austin Gartman**, CVEN Student, 2012-2013
   *Research Topic:* Vertical Farming Window
7. **Brian Charles Carpenter**, AREN Student, 2012
   *Research Topic:* Vertical Farming Window
8. **James Zdrowski**, AREN Student, 2009-2010
   *Research Topic:* Developing a Low-Cost Modular Building Integrated Photovoltaic-Thermal Collector for Electricity, Hot Water and Pre-heated Ventilation Air
9. **Noble Lilliestierna**, AREN Student, 2009-2010
   *Research Topic:* Developing a Low-Cost Modular Building Integrated Photovoltaic-Thermal Collector for Electricity, Hot Water and Pre-heated Ventilation Air
10. **Steven Gregory Morgan**, AREN Student, 2009
    *Research Topic:* Experimental Study of Energy Performance of Breathing Wall
11. **James Boulden**, AREN Student, 2006
    *Research Topic:* Energy Efficient Residential Buildings for Thailand
12. **Eric Boxer**, AREN Student, 2005-2006
    *Research Topic:* Experimental Investigation of Floor-Based Task-Ambient Conditioning Systems
13. **Kevin Passmore**, MCEN Student, 2005-2006
    *Research Topic:* Experimental Investigation of Floor-Based Task-Ambient Conditioning Systems
14. **Drew Bailey**, ENVS Student, 2004-2005
    *Thesis Topic:* The Benefits of Applying Ecological Principles to a Green Building Rating System (summa cum laude honor for graduation)

15. **Rebecca Newton**, MCEN Student, 2004-2005
    *Research Topic:* Numerical Simulation of Wood-Fired Kiln Thermal Performance
16. **Malia Maunakea**, CVEN Student, 2004
    *Research Topic:* Design a Sustainable Art Learning Center with Advanced Renovation Technologies
17. **James Woods**, AREN Student, 2004
    *Research Topic:* Experimental Investigation of Ceiling-Based Task-Ambient Heating Systems

**Principal Advisor to Visiting Research Scholars**

1. **Haiying Peng,** Visiting PhD Student, from Dalian University of Technology, China, 6/2022-5/2024
   *Research Topic:* Building Microenvironment and Impacts from BIPV
2. **Dr. Chanjuan Sun**, Visiting Scholar, from University of Shanghai for Science and Technology, 11/2019-10/2021
   *Research Topic:* Comfortable and Healthy Indoor Environment
3. **Dr. Lingjiang Huang**, Visiting Scholar, from Wuhan University, 01/2019-03/2020
   *Research Topic:* Comfortable Passive Heating Design for Buildings at High Elevation
4. **Huize Sun,** Visiting Scholar, from Northern Survey and Design Institute of Geotech, China, 2/2019-8/2019
   *Research Topic:* Geotechnical Engineering and Technologies
5. **He Li,** Visiting PhD Student, from Donghua University, China, 12/2018-12/2019
   *Research Topic:* Breathing Double Skin Façade for Pollution Treatment
6. **Jia Yu,** Visiting PhD Student, from Donghua University, China, 12/2018-12/2019
   *Research Topic:* Underground Building Energy Efficiency
7. **Dr. Baogang Zhang**, Visiting Scholar, from Dalian University of Technology, 10/2017-10/2018
   *Research Topic:* Building Retrofit Practices
8. **Dr. Ming Liu**, Visiting Scholar, from Dalian University of Technology, 10/2017-10/2018
   *Research Topic:* Integrated Light and Comfort Study
9. **Chang Yue,** Visiting PhD Student, from Hunan University, China, 10/2017-10/2018
   *Research Topic:* Micro Heat Pipes for Data Center Rack
10. **Dr. Li Lan**, Visiting Scholar, from Shanghai Jiaotong University, China, 12/2016-12/2017
    *Research Topic:* Thermal Comfort in Sleeping Environments
11. **Dr. Chunhui Yang**, Visiting Scholar, from University of Science & Technology Beijing, 11/2016-11/2017
    *Research Topic:* Design of Mobile Power Vehicles with Renewable Resources
12. **Haosu Lin,** Visiting PhD Student, from Beijing University of Technology, China, 11/2016-5/2017
    *Research Topic:* Application of Phase Change Materials for Green Houses
13. **Fang Bu,** Visiting Scholar, from Energy Conservation and Environment Protection Centre of China Aerospace Science and technology Corporation, China, 9/2016-8/2017
    *Research Topic:* Atmospheric Pollution and Detection
14. **Louis Orta,** Visiting MS Student, from ENTPE, France, 4/2016-8/2016
    *Research Topic:* Building Energy Optimization and Design
15. **Dr. Wei Shi**, Visiting Scholar, from Northeast Dianli University, 3/2016-3/2017
    *Research Topic:* Thermal Storage Techniques and Applications in Buildings
16. **Dr. Xiuling Cao**, Visiting Scholar, from Shijiazhuang University of Economics, 10/2015-10/2016
    *Research Topic:* BIM-based Pre-Fabricated Building Design and Application
17. **Zhongshan Wang**, Visiting Scholar, from Dalian University of Technology, 9/2014-8/2015
    *Research Topic:* Improvement of Heating and Cooking Systems for Rural Dwellings of Northern China
18. **Dr. Mohamed El Mankibi**, Visiting Scholar, from University of Lyon, France, 9/2014-8/2015, 6-8/2016
    *Research Topic:* Living Wall Performance Prediction
19. **Dr. Hongwei Li**, Visiting Scholar, from Northeast Dianli University, 8/2014-7/2015
    *Research Topic:* Network System Modeling and Optimization
20. **Dr. Feng Qi**, Visiting Scholar, from Zhejiang Forestry University, 6/2014-5/2015
    *Research Topic:* Applications of GIS in Urban Energy Prediction
21. **Amr Mamdoh Ali**, Visiting PhD Student, from Assuit University, Egypt, Co-Advisor, 9/2013-8/2015
    *Research Topic:* Design Tool for Architectures with BIPV
22. **Yu Xue**, Visiting PhD Student, from Tianjin University, China, Co-Advisor, 9/2011-7/2015
    *Research Topic:* Inverse Prediction and Design Method for Indoor Environments

23. **Dr. Quan Zhang**, Visiting Scholar, from Hunan University, 3/2013-2/2014
    *Research Topic:* Active Thermal Storage Integrated Mechanical Systems
24. **Dr. Jing Li**, Visiting Scholar, from Dalian University of Technology, 1/2012-12/2012
    *Research Topic:* Education in Construction Engineering Management
25. **Dr. Yan Tong**, Visiting Scholar, from Nanjing University of Technology, 8/2011-8/2012
    *Research Topic:* Natural Ventilation and Fire Smoke Management
26. **Dr. Xiangli Li**, Visiting Scholar, from Dalian University of Technology, 8/2011-8/2012
    *Research Topic:* Energy Storage Technologies for Residential Communities
27. **Wentao Wu**, PhD student, from Aarhus University, Denmark, Co-Advisor, 1/2011-6/2011
    *Research Topic:* Natural Ventilation for Animal Facilities
28. **Dr. Ling Wei**, Visiting Scholar, from Nanjing University of Technology, China, 3/2009-2/2010
    *Research Topic:* Modeling Technologies for Data Center
29. **Mr. Jiangjiang Wang**, Visiting Ph.D. Student, from North China Electric Power University, China, Co-Advisor, 9/2009-2/2010
    *Research Topic:* Operation Strategy Optimization of Distributed CCHP System and Its Multi-Criteria Evaluation Method
30. **Mr. Zhuolun Chen**, Ph.D. Student, from South China University of Technology, China, Co-Advisor, 9/2007-10/2009
    *Research Topic:* Community-Based Micro-Climate Environmental Design and Optimization
31. **Dr. Chuixiang Yi**, Senior Research Associate, University of Colorado at Boulder, 1/2007-6/2007
    *Research Topic:* Modeling Canopy Turbulent Flow over Complex Terrain
32. **Dr. Jae-Yoon Koh**, Research Associate, from LG Electronics, South Korea, 7/2006-7/2009
    *Research Topic:* Investigation on High-Performance Building Mechanical Systems
33. **Dr. Ky-Bum Jeong**, Visiting Scholar, from Yuhan College, South Korea, 1/2005-2/2006, 1/2010-8/2011
    *Research Topic:* Numerical Investigation on Cooling Characteristics of Partition Air Supply System
34. **Ms. Fedrigo Claudia**, Ph.D. Student, from University of Trieste, Italy, Co-Advisor, 9/2004-5/2005
    *Research Topic:* Influence of Fire on Large-Scale Building Structure

**Student Awards**

1. **Madison Likins-White,** Ph.D. student, received the US DOE IBUILD Fellowship (1 out of 8 in the US), 2022
2. **Colin Yu**, High School advisee, named a top 300 Scholar in the 81st Regeneron Science Talent Search (STS) – the nation's oldest and most prestigious science and mathematics competition for high school seniors, 2022
3. **Ayeshah Alawadhi**, Ph.D. student, received the Best Paper Award at the International Alliance for Sustainable Urbanization and Regeneration (IASUR2019), Xi'an, China, March 2019.
4. **Yu Xue**, Ph.D. student, received the ASHRAE Graduate Student Grant-In-Aid Award ($10,000) for the 2012-2013 academic year.
5. **Lesley Herrmann**, M.S. student, received the 2nd Place Award at the 1st Annual Energy Showcase at CU-Boulder for her M.S. thesis based article entitled "Identifying Strategies to Improve Chinese Office Building Code Standards".
6. **Abby Watrous**, Ph.D. student, received the 2009-2010 Fulbright Scholarship to conduct her research in China.
7. **James Mcneill**, Ph.D. student, received the ASHRAE Graduate Student Grant-In-Aid Award ($10,000) for the 2009-2010 academic year. Among the graduate-student nominees, James holds the added distinction of being named the "Life Member Club Grant Recipient" as one of the top two rated applicants.
8. **Mary-Hall Dale Johnson**, M.S. student, received the WIRES Scholarship for the First Annual International Summit for Women (Women's International Research Engineering Summit – WIRES) in 2009, sponsored by US NSF.
9. **Xiang Liu**, Ph.D. student, was nominated by CEAE for The 2008-2009 College Outstanding Dissertation Award.
10. **Xiang Liu,** Ph.D. student, received the ASHRAE Graduate Student Grant-In-Aid Award ($10,000) for the 2008-2009 academic year.
11. **Dave Denkenberger**, Ph.D. student, received the ASHRAE Graduate Student Grant-In-Aid Award ($10,000) for the 2008-2009 academic year.
12. **Brian Erickson**, M.S. student, received the 2008 Best Paper Award from the International Journal of Building Simulation, for his M.S. thesis based article.
13. **Xiang Liu,** Ph.D. student, received the Albert Thumann Scholarship from Association of Energy Engineers

Foundation in 2008.

14. **Michael Bendewald**, M.S. student, received the NSF East-Asia-Pacific Summer Institute Award ($4,000) in 2008 to conduct research in Japan.
15. **Xiang Liu**, Ph.D. student, received ASHRAE Rocky Mountain Scholarship ($1,000) for the 2007-2008 academic year.
16. **Robert Slowinski**, M.S. student, received the ASHRAE Graduate Student Grant-In-Aid Award ($10,000) for the 2007-2008 academic year.
17. **Robert Slowinski**, M.S. student, received the Beverly Sears Graduate Student Grant ($1,000) for the 2007-2008 academic year.
18. **Abby Watrous**, Ph.D. student, received the CU Benjamin Brown Fellowship ($10,000) to continue her research in China during 2007-2008.
19. **Abby Watrous**, Ph.D. student, received the NSF East Asia and Pacific Summer Institute Fellowship ($4,000) in 2007 to conduct her research in China.
20. **Drew Bailey**, ENVS B.S. student, received summa cum laude honor for graduation in 2005, with his thesis entitled "The Benefits of Applying Ecological Principles to a Green Building Rating System" supervised by Dr. Zhai.
21. **Alexandra Pappas**, M.S. student, received the Best Student Poster Award at the First IBPSA-USA Conference – SimBuild04 in 2004 for her M.S. thesis related work.

**Other Teaching Activities**

- Guest Lecturer for
    - AREN 1316 Introduction to Architectural Engineering
    - AREN 2110 Thermodynamics
    - AREN 3010 Mechanical Systems for Buildings
    - AREN 4317 Architectural Engineering Design
    - CVEN 5080 Computer Simulation of Building Energy Systems
    - CVEN 5565 Life-Cycle Engineering of Civil Infrastructure Systems
    - GEEN 1400 First Year Engineering Projects
    - GEEN 1500 Introduction to Engineering
- MS/PhD examination committee member for more than 150 students
- Academic Adviser for about 150 Architectural Engineering Undergraduate Students (meet individuals twice a year), 2006-2023
- AREN Freshmen Advisor, 2007-2009
- Faculty for Graduate Visit Day in March, 2004-2009
- Faculty for Explore CU Engineering Day on March 8th, 2008
- Faculty Speaker to CU Admitted Students Day on April 4th, 2009 (three information sessions)
- Instructor for High School Honors Institute (HSHI)
    - Build a Solar Energy Module, July 25 and 26 (about 80 students), 2005
    - Design an Energy Efficient Building, July 24 and 25 (about 70 students), 2006
    - Energy Efficient Building Design and Modeling, July (two sessions for 80 students), 2007
    - Energy Efficient Building Design and Modeling, July (two sessions for 80 students), 2008
- Jury Member for
    - CU-Boulder Architectural Engineering Senior Design Project, 2003, 2004 and 2005
    - CU-Boulder Architecture Undergraduate Design Studio, 2004
    - CU-Denver Architecture Graduate Solar and Sustainable Design Project, 2004
    - CU-Denver Architecture Graduate Design Studio, 2005

**SERVICE ACTIVITIES SINCE 2003**

**International and National**

- Member of
    - International Society of Indoor Air Quality and Climate (ISIAQ) (Fellow)
    - International Building Performance Simulation Association (IBPSA) (Fellow)

    - American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) (Fellow)
    - American Society for Engineering Education (ASEE)
    - US Green Building Council (USGBC)
    - China Green Building Council (CGBC)
- Editorial Duties
    - Associate Editor and Guest Editor for Energy and Buildings Journal
    - Associate Editor for Science and Technology for the Built Environment Journal
    - Associate Editor for The Open Civil Engineering Journal (till 2016)
    - Guest Editor: World Review of Science, Technology and Sustainable Development Journal
    - Guest Editor for Renewable and Sustainable Energy Reviews
    - Guest Editor for Building and Environment
    - Guest Editor for Renewable Energy
    - Guest Editor for Solar Energy
    - Guest Editor for Applied Energy
    - Guest Editor for Underground Space
    - Guest Editor for Energy
    - Guest Editor for Architecture, Structures and Construction
    - Guest Editor and Editorial Board Member for Sustainable Cities and Society
    - Guest Editor and Editorial Board Member for Buildings
    - Guest Editor and Editorial Board Member for Building Simulation: An International Journal
    - Editorial Board Member for Indoor and Built Environment Journal
    - Editorial Board Member for Scientific Reports of Nature
    - Editorial Board Member for Energy and Built Environment Journal
    - Editorial Board Member for Journal AIMS Energy
    - Editorial Board Member for Scientific World Journal
    - Editorial Board Member for Journal of HV&AC (in Chinese)
    - Editorial Board Member for Journal of Building Energy Efficiency (in Chinese)
    - Editorial Board Member for Journal of Energy (till 2017)
    - Editorial Board Member for Journal of Building Physics (till 2018)
- Vice Chair of the Academic Committee of the International Joint Research Center for Building Service Science and Underground Space Environment, Shaanxi (China), 2023~
- Vice-President of Commission, The International Institute of Refrigeration (IIR), 2020-~
- Vice-President, The International Society of Energy and Built Environment (ISEBE), 2020-~
- Council Member to The Key Lab of Building Energy and Environment in Tianjin University, 2020-~
- Council Member to International United Lab on Energy and Environment (IULEE), 2017-~
- Vice Chair for ASHRAE Standard 200 “Methods of Testing Chilled Beams”, 2016-~
- Voting member and ASHRAE Learning Institute Coordinator of ASHRAE Technical Committee 4.10 – Indoor Environmental Modeling, 2004-2023
- Member of ASHRAE Technical Committee 4.10 Project Monitoring Subcommittee (PMS) for Research Project 1321-TRP, 2007-2010
- Co-Author and Voting Member, ASHRAE GPC 33: Guideline for Documenting Indoor Airflow and Contaminant Transport, The PCVM- Project Committee, 2010-2012
- Corresponding member of ASHRAE Technical Committee 5.6 – Control of Fire and Smoke; Technical Committee 4.3 – Ventilation Requirements and Infiltration; and Technical Committee 5.3 – Room Air Distribution, 2005-~
- Member of Technical Committee – Conservation and Solar Buildings of The Solar Energy Division, American Society of Mechanical Engineers (ASME), 2009-~
- Invited Panel Reviewer for National Laboratory Assessment, The US National Academies and National Research Council (NRC), 2009-2010
- Invited Member for The Committee on Protecting Occupants of DoD Buildings From Chemical or Biological Release (Immune Buildings), The US National Academies and The Defense Threat Reduction Agency (DTRA), 2006

- The Steering Committee Member of the International Virtual Environmental Control: Buildings and Energy Network (VEC-BEN), 2012-2016
- Member of the IEA Energy Conservation through Energy Storage (ECES) Executive Committee – Annex 31: Energy storage with Net Zero Energy Buildings and Districts: Optimization and Automation), 2013-2016
- Invited Organizer for 2011 US Frontiers of Engineering Conference by National Academy of Engineering of US
- Invited Reviewer for
    - Qatar National Research Fund (QNRF)
    - National Office for Science and Technology Awards (NOSTA) of China
    - National Research Foundation (NRF), United Arab Emirates
    - Ministry of Education, UAE
    - Hong Kong Research Grants Council (RGC)
    - Hong Kong Food and Health Bureau (FHB)
    - Hong Kong's University Grants Committee, the Healthy Longevity Catalyst Awards
    - Georgian National Science Foundation (GNSF)
    - Natural Sciences and Engineering Research Council of Canada (NSERC)
    - US National Science Foundation (NSF)
    - PSE&G Energy Technology Grant program
    - CRC Press/Taylor and Francis Group
    - King Fahd University of Petroleum & Minerals (KFUPM)
    - University of Cyprus Research Committee
    - National Research Foundation of Korea
    - Shota Rustaveli National Science Foundation
    - National Research Foundation, Prime Minister's Office, Singapore
    - US Department of Energy (DOE)
    - Beijing Natural Science Foundation
    - King Abdulaziz University, Saudi Arabia
    - The University of Nebraska Research Initiative
    - University's Applied Research Grant (ARG): City University of Hong Kong
    - Natural Environment Research Council, UK
    - U.S. Department of Energy's (DOE) BER Urban Integrated Field Laboratories (IFL)
    - The U.S.-Israel Binational Industrial R&D (BIRD) Foundation
    - Programme for Research in Epidemic Preparedness And REsponse (PREPARE), Singapore
    - Swiss National Science Foundation (SNSF)
- Invited Tenure and Promotion Reviewer:
    - Kansas University
    - Drexel University
    - Texas A&M University
    - The University of Texas at Austin
    - University of Nebraska-Lincoln
    - University of Wyoming
    - The Pennsylvania State University
    - Purdue University
    - University of Wollongong, Australia
    - Tsinghua University
    - Fudan University
    - Tongji University
    - Huazhong University of Science and Technology
    - Zhejiang University
    - Shenzhen Institute of Advanced Technology
- Conference Chair and Scientific Committee
    - Scientific Committee Member of ISHVAC 2023, the 13th International Symposium on Heating, Ventilation and Air-conditioning, November 14-16, 2023, Beijing, China

- Scientific Committee Member of RoomVent Conference 2024, April 22-25, 2024, Stockholm, Sweden
- Scientific Committee Member for SuDBE2023, August 14-18, 2023, Espoo, Finland
- Co-Chair for the 3rd International Chinese Conference on Energy and Built Environment, July 29-31, 2023, Shanghai, China
- Scientific Committee Member of the 11th International Conference on Indoor Air Quality, Ventilation & Energy Conservation in Buildings – IAQVEC 2023, May 20-23, 2023, Tokyo, Japan
- Steering Committee Member for Healthy Buildings 2023 (Asia and Pacific Rim), July 17-19, 2023, Tianjin, China
- Scientific Committee Member for the Building Simulation 2023 conference, Sept 4-6, 2023, Shanghai, China
- Scientific Committee Member of the 16th ROOMVENT Conference– ROOMVENT 2022, 9/16-9/19, 2022, Xi'an, China
- Co-Chair for 2022 COBEE Conference, July 25-29, 2022, Montreal, Canada
- Co-Chair for the 2nd International Chinese Conference on Energy and Built Environment, July, 2021, Chengdu, China.
- Co-Chair for 2021 AEI Conference, April, 2021, Denver, CO, US.
- Member of the Advisory and Scientific Committee, The ISHVAC 2021 and 2021 KIAEBS Autumn Conference, 24-26 November 2021, Seoul, Korea
- Technical program committee member for the 2021 ASTECHNOVA-EPIC Joint Conference, 8/24-8/25, 2021, Gadjah Mada University, Indonesia.
- Scientific Committee Member for the 1st International Conference on Underground Space Environments (IC-USE 2021), 11/27-11/28, 2021, Xi'an, China.
- International Scientific Committee Member of Indoor Air 2020 – The 16th Conference of the International Society of Indoor Air Quality & Climate (IA2020), July 20-24, 2020, COEX, Seoul, Korea.
- Member of the Scientific Committee (SC) of the 15th International Conference on Durability of Building Materials and Components, June 30 - July 3, 2020, Barcelona, Spain.
- Scientific Committee Member of RoomVent 2020, June 14-17, 2020, Turin, Italy.
- Scientific Committee Member of Chine Rock 2019, Nov 18-21, 2019, Beijing, China.
- International Scientific Committee Member of Annual International Energy Conference Astechnova 2019, October 30-31, 2019, Yogyakarta, Indonesia.
- Scientific Committee Member of International Conference on Green Energy and Environment, September 3-4, 2019, Bangka Belitung, Indonesia.
- Member of the International Scientific Committee (ISC) of Healthy Buildings 2019 – Asia, October 22–25, 2019, Changsha, China.
- Co-Chair for the First International Chinese Conference on Energy and Built Environment, July 19-22, 2019, Chengdu, China.
- International Scientific Committee Member and Workshop Chair for the 11th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC2019), July 12-15, 2019, Harbin, China.
- International Advisory Committee Member of the 2nd International Symposium on Biomass/Wastes Energy and Environment (BEE 2019), May 23-26, 2019, Tianjin, China.
- Conference Chair for 2018 International Conference on Urban and Rural Energy and Environment (UREE 2018), July 11-14, 2018, Jilin, Jilin, China
- Chair for The IULEE 2018 Workshop, May 7-13, 2018, Boulder, CO, US
- International Scientific Committee Member for the 7th International Conference of Building Physics (IBPC 2018), September 23-26, 2018, Syracuse, NY, US
- Conference International Committee Member for the 4th International Conference on Building Energy and Environment (COBEE2018), Feb 5-9, 2018, Melbourne, Australia
- Technical Program Committee Member for ASTECHNOVA 2017 - International Energy Conference, 1-2 Nov. 2017, Yogyakarta, Indonesia
- Workshop Chair and International Scientific Committee Member for ISHVAC 2017, October 19-22, 2017, Jinan, Shandong, China
- International Scientific Review Panel (ISRP) of World Sustainable Built Environment Conference 2017

(WSBE17 Hong Kong), June 5-7, 2017, Hong Kong
- Scientific Committee Member for Urban Transitions Global Summit 2016, Sept 5-9, 2016, Shanghai, China
- International Scientific Committee Member for Indoor Air 2016, July 3-8, 2016, Ghent, Belgium
- Session Chair and International Scientific Committee Member for the 9th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2016), October 23-26, 2016, Seoul (Songdo), Korea
- Scientific Committee Member for International Building Physics Conference 2015 (IBPC 2015), June 14-17, 2015, Torino, Italy
- Vice President for the 9th International Symposium on Heating, Ventilation and Air Conditioning and the 3rd International Conference on Building Energy and Environment (ISHVAC-COBEE 2015), July 12-15, 2015, Tianjin, China
- Vice President for the Healthy Buildings 2015 North America Conference, July 19-22, 2015, Boulder, Colorado, US
- Session Chair and International Scientific Committee (ISC) Member for Cold Climate HVAC 2015, Oct 20-23, 2015, Dalian, China
- International Scientific Committee (ISC) Member for Indoor Air 2014, July 7-12, 2014, Hong Kong
- International Scientific Committee (ISC) Member for Building Simulation 2013 Conference, Aug 25-30, 2013, Chambery, France
- Keynote Speaker and International Scientific Committee (ISC) Member for The APEC Conference on Low Carbon Town and Physical Energy Storage, May 25-26, 2013, Changsha, Hunan, China
- Session Chair for International Symposium on Green Manufacturing and Applications (ISGMA 2013), June 25-29, Honolulu, HI, US
- General Chair for the 2nd International Conference on Building Energy and Environment (COBEE2012), August 1-4, 2012, Boulder, Colorado
- International Scientific Committee (ISC) Member for Building Simulation 2011 Conference, Nov 14-16, 2011, Sydney, Australia
- International Scientific Committee (ISC) Member for IAQVEC2010 Conference, August, 2010, Syracuse, New York
- Track Chair for the 4th ASME International Conference on Energy Sustainability (ES2010), May, 2010, Phoenix, AZ, USA
- Scientific Committee Member for the 11th IBPSA Building Simulation Conference (BS2009), July, 2009, Glasgow, Scotland
- Session Chair for the 3rd ASME International Conference on Energy Sustainability (ES2009), July, 2009, San Francisco, California, USA
- International Scientific Committee (ISC) Member for ROOMVENT 2009 International Conference, May, 2009, Pusan, Korea
- Session Chair for the 5th International Workshop on Energy and Environment of Residential Buildings and the 3rd International Conference on Built Environment and Public Health (EERB-BEPH 2009), May, 2009, Guilin, Guangxi Province, China
- Chair for Seminars and Transactions at ASHRAE Winter and Summer Conferences, 2008-2009
- Conference Co-Chair of the First International Conference on Building Energy and Environment (COBEE08), July, 2008, Dalian, China
- Session Chair for the 10th International Building Performance Simulation Association Conference and Exhibition (BS2007), September, 2007, Beijing, China
- Session Chair for the 10th International Conference on Indoor Air Quality and Climate (Indoor Air 2005), September, 2005, Beijing, China
- Session Chair for the First IBPSA-USA Conference (SimBuild2004), August, 2004, Boulder, CO

- Invited Reviewer for over 30 journals

**Local Community**

- Member of ITERSP (International Team for Environmental Research and Sustainable Policy) for International

Centers for Appropriate Technology and Indigenous Sustainability (iCATIS), 2012-2015.
- Sustainable Building and Kiln Design Consultant for the City of Boulder, Colorado, 2004-2006
- Sustainable Building Design Consultant for Denver and Commence City, Colorado, 2004, 2008
- Invited Judge for Pangea Institute Architecture Design Contest, Colorado, 2005

**College and University**
- Chair of The Ad Hoc Personnel Committee of the Graduate School, 2021
- The Faculty Award Committee of Engineering College, 2021-2022
- The First-Level Review Committee (FLRC) of Engineering College, 2020-2023
- CU Lead of the Research Working Groups (RWG), The Renewable and Sustainable Energy Institute (RASEI), 2021
- The RASEI Big Energy Seminar Series Coordinator, 2013-2015
- Executive Committee Member of the Mortenson Center, 2012-2015
- Member of Campus Environment and Sustainability Visioning Committee, 2012-2013
- Faculty Affiliate of The Renewable and Sustainable Energy Institute (RASEI) of CU-Boulder, 2008-~
- Served on The College Physics Review Committee, 2007-2008
- Served on the Task Force on International Graduate Education at the Graduate School of CU-Boulder, 2006
- Served as an adviser for several multi-disciplinary programs, including, the Consortium on Advanced Life Cycle Engineering for Sustainable Civil Environments (COALESCE), Engineering for Developing Communities (EDC) Program, and Engineers Without Borders (EWB) Program.

**Department of Civil, Environmental and Architectural Engineering**
- Faculty Meeting Secretary, 2003-2004: summarize bi-weekly faculty meetings
- Operations Committee, 2003-2006, 2010: graduation audit for all Architectural Engineering (AREN) students
- Facilities Committee, 2006-2007: assist the remodel of 1B41 and 1B47 classrooms; 2014-2017: lead Larson Lab major renovation
- Curriculum Committee, 2006-2010: lead the development of the new AREN curriculum that was officially implemented in Fall 2009
- Faculty Search Ad Hoc Committee, 2007-2008, 2016-2017: lead interviews for different faculty positions
- CEAE Research Committee, 2008-2010: assist the development of the departmental research strategic plan
- Faculty Co-Advisor for ASHRAE-CU Branch, 2006-~: promote ASHRAE activities among CU students
- Faculty Mentoring Committee, 2010-2017: mentor junior faculty
- Coordinator for AREN Joint Evaluation Committee (JEC) meeting, 2012 and 2015: coordinate JEC meeting
- Primary Unit Evaluation Committee of Environment Design Program, 2012: recruit and evaluate faculty
- Graduate Committee, 2012-2014: recruit, review and admit AREN graduate students
- Chair of AREN Faculty Search Committee, 2012-2013: recruit and evaluate new faculty
- Faculty Director for AREN, 2014-2016: recruit and manage AREN students
- Personnel Committee, 2015-Now: review and vote on faculty tenure and promotion
- Executive Committee, 2018-2023: manage the CEAE operations
- Tenure (PUEC) and post-tenure reviewers for multiple cases
- The Site Director of the NSF BEST Center, 2022-2023
- AREN program director/coordinator, 2023