

Jialei Shen, PhD

Assistant Professor

University of Alabama at Birmingham

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EDUCATION

2018 - 2023	Syracuse University	PhD	Mechanical and Aerospace Engineering
2015 - 2018	Nanjing University	ME	Architectural Engineering
2011 - 2015	Xi'an Jiaotong University	BE	Mechanical Engineering

PROFESSIONAL EXPERIENCE

2024 - Present	Assistant Professor University of Alabama at Birmingham (UAB) <ul style="list-style-type: none">Civil, Construction, and Environmental Engineering School of EngineeringEnvironmental Health Sciences School of Public Health
2024 - Present	Associate Scientist University of Alabama at Birmingham (UAB) <ul style="list-style-type: none">Lung Health Center School of Medicine
2022 - 2024	Postdoctoral Research Associate National Institute of Standards and Technology (NIST) <ul style="list-style-type: none">Building Energy and Environment Division Engineering Laboratory University of Maryland, College Park (<i>PREP program with NIST</i>) <ul style="list-style-type: none">Chemistry and Biochemistry College of Computer, Mathematical, and Natural Sciences
2018 - 2022	Research Assistant Syracuse University <ul style="list-style-type: none">Mechanical and Aerospace Engineering College of Engineering and Computer Science

TEACHING EXPERIENCE

	Instructor University of Alabama at Birmingham <ul style="list-style-type: none">Spring 2025: CESC 614, Smart Cities Technologies
	Guest Lecturer University of Maryland, College Park <ul style="list-style-type: none">Fall 2023: ENME 422, Indoor Environment and Mechanical Systems Syracuse University <ul style="list-style-type: none">Spring 2022: MAE 658, Building Environmental Modeling and Simulations
	Course Juror Washington State University <ul style="list-style-type: none">Spring 2024: ARCH 531, Advanced Tectonics

Teaching Assistant

Syracuse University

Spring 2020
Fall 2021, 2019

- ECS 104, Engineering Computational Tools
- MEE 416, Mechanical Engineering Laboratory

GRANTS, PROJECTS & FELLOWSHIPS

Project Participations *(not as PI/co-PI)*

- 2024 - 2028 **IEA-EBC Annex 92**, Smart Materials for Energy-Efficient Heating, Cooling and IAQ Control in Residential Buildings (Role: Participant)
- 2020 - 2025 **IEA-EBC Annex 86**, Energy Efficient Indoor Air Quality Management in Residential Buildings (Role: Participant)
- 2022 - 2024 **NIST**, Ventilation and Indoor Air Quality in Low-Energy Buildings (Role: Postdoc)
- 2021 - 2024 **Honeywell**, Indoor Air Quality Research (Role: PhD student)
- 2021 - 2024 **Carrier**, Investigation into Needlepoint Bipolar Ionization (NPBI) Technology for Indoor Air Purification (Role: PhD student)
- 2022 - 2023 **Carrier**, IAQ Sensor Testing and Evaluation (Role: PhD student)
- 2020 - 2023 **Carrier**, Effectiveness of Building Systems Strategies for Mitigation of Airborne Transmission of SARS-CoV-2 (Role: PhD student)
- 2020 - 2022 **DOE Advanced Building Construction (ABC) Project**, Integrated Whole-Building Energy Efficiency Retrofit Solution for Residences in Cold/Very Cold Climates (Role: PhD student)
- 2018 - 2022 **National Concrete Masonry Association (NCMA) Foundation**, Making the Case for CMU Residential Design and Construction (Role: PhD student)

Doctoral Fellowships

- 2018, 2020 **Graduate Fellowship**, Syracuse University

AWARDS & HONORS

- 2024 **Postdoc and Early-Career Association of Researchers (PEAR) Technical Accolade Finalist**, National Institute of Standards and Technology (NIST)
- 2024 **Distinguished Associate Award**, National Institute of Standards and Technology (NIST)
- 2024 **Best Application Paper Award**, SimBuild 2024 Conference
- 2022 **Best Paper Award**, RoomVent 2022 Conference
- 2019 **Excellent Dissertation Honor**, Ministry of Education of Jiangsu Province, China
- 2018 **Graduation with Honor**, Nanjing University
- 2017 **National Scholarship**, Ministry of Education of China
- 2017 **ISIAQ Student Conference Support Award**, International Society of Indoor Air Quality and Climate (ISIAQ)
- 2017 **Excellent Student Honor**, Nanjing University
- 2013 **Excellent Student Honor**, Xi'an Jiaotong University

PUBLICATIONS & PRESENTATIONS

Citations: 790, h-index: 14, i10-index: 15 (Google Scholar, 10/2024)

Book Chapters

- 2022 1. Zhang, J., **Shen, J.**, Gao, Z., 2022. Managing IAQ at Multiple Scales - from Urban to Personal Microenvironments. *Handbook of Indoor Air Quality*, 1–42.

Journal Articles

- 2023** 16. Xu, F., **Shen, J.**, Gao, Z., 2023. A field measurement study of the effects of outdoor pollutants and room volumes on indoor fine particle and ozone concentrations in residential buildings in Nanjing. *Journal of Building Engineering* 78, 107615. (co-first author)
- 2022** 15. Guo, X., Buccolieri, R., Gao, Z., Zhang, M., Lyu, T., Rui, L., **Shen, J.**, 2022. On the effects of urban-like intersections on ventilation and pollutant dispersion. *Building Simulation* 15 (3), 419-433.
- 2021** 14. **Shen, J.**, Kong, M., Dong, B., Birnkrant, M.J., Zhang, J., 2021. Airborne transmission of SARS-CoV-2 in indoor environments: A comprehensive review. *Science and Technology for the Built Environment* 27 (10), 1331-1367.
13. Guo, X., Gao, Z., Buccolieri, R., Zhang, M., **Shen, J.**, 2021. Effect of greening on pollutant dispersion and ventilation at urban street intersections. *Building and Environment* 203, 108075.
12. **Shen, J.**, Kong, M., Dong, B., Birnkrant, M.J., Zhang, J., 2021. A systematic approach to estimating the effectiveness of multi-scale IAQ strategies for reducing the risk of airborne infection of SARS-CoV-2. *Building and Environment* 200, 107926.
11. Peng, Y., Gao, Z., Buccolieri, R., **Shen, J.**, Ding, W., 2021. Urban ventilation of typical residential streets and impact of building form variation. *Sustainable Cities and Society* 67, 102735.
10. Zhang, M., Gao, Z., Guo, X., **Shen, J.**, 2021. Ventilation and pollutant concentration for the pedestrian zone, the near-wall zone, and the canopy layer at urban intersections. *International Journal of Environmental Research and Public Health* 18 (21), 11080.
9. **Shen, J.**, Krietemeyer, B., Bartosh, A., Gao, Z., Zhang, J., 2021. Green Design Studio: A modular-based approach for high-performance building design. *Building Simulation* 14, 241–268.
- 2019** 8. Guo, C., Gao, Z., **Shen, J.**, 2019. Emission Rates of Indoor Ozone Emission Devices: A Literature Review. *Building and Environment* 158, 302–318.
7. **Shen, J.**, Gao, Z., 2019. Commuter Exposure to Particulate Matters in Four Common Transportation Modes in Nanjing. *Building and Environment* 156, 156–170.
6. Huang, Y., Rui, L., Gao, Z., **Shen, J.**, 2019. Research progress on reaction between ozone and human occupants. *Journal of Environment and Health* 36(02), 182–187. (in Chinese language)
- 2018** 5. **Shen, J.**, Gao, Z., 2018. Ozone removal on building material surface: A literature review. *Building and Environment* 134, 205–217.
4. Yang, Z., **Shen, J.**, Gao, Z., 2018. Ventilation and Air Quality in Student Dormitory in China: A Case Study during Summer in Nanjing. *International Journal of Environmental Research and Public Health* 15(7), 1328.
3. Rui, L., Buccolieri, R., Gao, Z., Ding, W., **Shen, J.**, 2018. The Impact of Green Space Layouts on Microclimate and Air Quality in Residential Districts of Nanjing, China. *Forests* 9, 224.
2. You, W., **Shen, J.**, Ding, W., 2018. Improving residential building arrangement design by assessing outdoor ventilation efficiency in different regional spaces. *Architectural Science Review*.
- 2017** 1. **Shen, J.**, Gao, Z., Ding, W., Yu, Y., 2017. An investigation on the effect of street morphology to ambient air quality using six real-world cases. *Atmospheric Environment* 164, 85–101.

Conference Articles & Presentations

- 2024**
18. Guo, X., Guo B., Liu Z., **Shen, J.**, Love, D., McKinney P.J., Zhang, J., 2024. Method of experimental evaluation of MOx sensors for real-time indoor VOCs monitoring. *IBPC 2024*, Toronto, Canada.
 17. **Shen, J.**, Dols, W.S., Polidoro, B.J., 2024. ANT: A Multizone Indoor Air Quality (IAQ) and Ventilation Analysis Plug-in for Algorithm Aided Design. *SimBuild 2024*, Denver, CO. **(Best Application Paper Award)**
 16. **Shen, J.**, Dols, W.S., Polidoro, B.J., 2024. An approach to develop a community-scale model for building indoor air quality (IAQ) analysis and human exposure assessment. *The 1st International Workshop on Building and Simulation (BAS 2024)*, Syracuse, NY.
- 2023**
15. Hu, Y., **Shen, J.**, Zhang, J., Gao, Z., 2023. A CFD approach to reduce the risk of Covid-19 airborne transmission in a typical office. *IAQVEC 2023*, Tokyo, Japan.
- 2022**
14. **Shen, J.**, Nabutola, K., Birnkrant, M.J., McKinney, P.J., Dong, B., Zhang, J., 2022. Estimation of infection risk through airborne transmission in large open spaces with different air distributions. *RoomVent 2022*, Xi'an, China. **(Best Paper Award)**
 13. **Shen, J.**, Liu, Z., Guo, B., Love, D., Dekold, M., Birnkrant, M.J., Dong, B., Zhang, J., 2022. Performance of in-duct bipolar ionization devices on pollutant removal and potential byproduct formation in indoor environments. *Indoor Air 2022*, Kuopio, Finland.
 12. Liu, Z., **Shen, J.**, Guo, B., Zhang, J., 2022. Modeling Secondary Emissions from Indoor Chemical Reactions Initiated by Ozone and Hydroxyl Radicals. *Indoor Air 2022*, Kuopio, Finland.
 11. Liu, Z., Parry-Nweye, E., Dhaouadi, Y., Wang, X., **Shen, J.**, Guo, B., Ramirez, M., Gupta, B., Ren, D., Dong, B., Zhang, J., 2022. A Comprehensive Approach to Testing Air Cleaning Devices Under Realistic Room Conditions. *Indoor Air 2022*, Kuopio, Finland.
- 2021**
10. **Shen, J.**, Liu, Z., Hu, Y., Birnkrant, M.J., Gao, Z., Dong, B., Zhang, J., 2021. Effectiveness of combined displacement ventilation and partitions for reducing airborne transmission of respiratory diseases in office settings. *Healthy Buildings 2021 America*, Honolulu, HI.
 9. **Shen, J.**, Kong, M., Dong, B., Birnkrant, M.J., Zhang, J., 2021. Effectiveness of IAQ strategies for mitigating the airborne infection risk of SARS-CoV-2. *IBPC 2021*, Copenhagen, Denmark.
- 2019**
8. **Shen, J.**, Zhang, J., 2019. An approach to develop a green technology database for residential buildings. *IAQVEC 2019*, Bari, Italy.
 7. **Shen, J.**, Gu, R., Bartosh, A., Krietemeyer, E., Zhang, J., 2019. Modular-based Green Design Studio for Sustainable Building. *The 17th New York State Green Building Conference*, Syracuse, NY.
- 2017**
6. **Shen, J.**, Chen, J., Zhang, X., Zou, S., Gao, Z., 2017. Outdoor and Indoor Ozone Concentration Estimation Based on Artificial Neural Network and Single Zone Mass Balance Model. *ISHVAC 2017*, Jinan, China.
 5. **Shen, J.**, Gao, Z., 2017. Commuter Exposure to Particulate Matter of Different Transportation Modes in Nanjing. *ISHVAC 2017*, Jinan, China.
 4. **Shen, J.**, Gao, Z., 2017. Steady State and Dynamic Indoor Ozone Estimation Model with Indoor Ozone Source. *Healthy Buildings 2017 Europe*, Lublin, Poland.
 3. **Shen, J.**, Gao, Z., Ding, W., You, W., 2017. Study on Relationship of Residential Building Form Variations to Pollutant Dispersion in Streets. *Healthy Buildings 2017 Europe*, Lublin, Poland.
 2. You, W., **Shen, J.**, Ding, W., 2017. Improving Wind Environment of Residential Neighborhoods by Understanding the Relationship between Building Layouts and Ventilation Efficiency. *The 8th International Conference on Applied Energy (ICAE 2016)*, Beijing, China.

1. You, W., **Shen, J.**, Ding, W., 2017. Improving wind environment design based on assessing spatial distribution of ventilation efficiency in regional space. *The 9th International Conference on Applied Energy (ICAE 2017)*, Cardiff, United Kingdom.

Invited Talks & Seminars

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| 2024 | <ol style="list-style-type: none"> 6. “New CONTAM: Bridging Indoor Air Quality with Health Assessment, Energy Analysis, Smart Controls, and Urban Environments”, Invited Talk to <i>The 17th CHAMPS Forum and Workshop</i>, 2024, Syracuse, NY. 5. “Engineering in Healthy and Sustainable Buildings and Communities”, Invited Talk to <i>Washington State University</i>, 2024, Pullman, WA. 4. “Indoor Air Quality and Public Health in Built Environments”, Invited Talk to <i>The University of Alabama at Birmingham</i>, 2024, Birmingham, AL. |
| 2023 | <ol style="list-style-type: none"> 3. “Performance and Cost of Airborne Infection Mitigation Strategies”, Seminar 12: Balancing Virus Risk Control and Energy Consumption for Better Building Operation, <i>ASHRAE Annual Conference</i>, 2023, Tampa, FL. |
| 2021 | <ol style="list-style-type: none"> 2. “Ozone Emission Sources and Surface Removal in Indoor Environments”, Seminar 14: Reducing Ozone: A Critical Factor in Improving IAQ, <i>ASHRAE Annual Conference</i>, 2021, Virtual. |
| 2019 | <ol style="list-style-type: none"> 1. “Green Design Studio for Healthy and Sustainable Buildings and Communities: Exploration of an Innovative Approach”, <i>The 17th New York State Green Building Conference</i>, 2019, Syracuse, NY. |

Software Development

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| 2023 | <ol style="list-style-type: none"> 1. ANT: Multizone indoor air quality (IAQ) and ventilation analysis plug-in on Rhino Grasshopper. <i>Food4Rhino</i> (food4rhino.com/app/ant), 2023. (360 downloads to date). |
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PROFESSIONAL SERVICES

Journal Editorial Board

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| 2024 - Present | Building Simulation , Youth Editor |
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Committee Member

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| 2024 | Research Strategic Planning Committee , UAB School of Engineering |
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Professional Community Participation

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Member of Technical Committee 4.10 Indoor Environmental Modeling

Member of Technical Committee 4.3 Ventilation Requirements and Infiltration

International Building Performance Simulation Association (IBPSA)

Member of Membership and Chapters Committee

International Society of Indoor Air Quality and Climate (ISIAQ)

Association for Computer Aided Design in Architecture (ACADIA)

Peer Reviewer

Journals

- Building and Environment
- Building Simulation
- Indoor Environments
- Journal of Hazardous Materials
- Sustainable Cities and Society

- Science and Technology for the Built Environment
- Journal of Building Engineering
- International Journal of Ventilation
- Indoor and Built Environment
- Air Quality, Atmosphere & Health

Conferences

- ASHRAE conferences (2023, 2024, 2025)
- IBPSA conferences (SimBuild 2024)

Others

- NIST Publication System