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**	MS	Architectural Engineering
2011 - 2015	**Xi'an Jiaotong University**	BS	Mechanical Engineering

PROFESSIONAL EXPERIENCE

2024 - Present   **Assistant Professor**
University of Alabama at Birmingham (UAB)
• Civil, Construction, and Environmental Engineering | School of Engineering
• Environmental Health Sciences | School of Public Health

2024 - Present   **Associate Scientist**
University of Alabama at Birmingham (UAB)
• Lung Health Center | School of Medicine

2022 - 2024   **Postdoctoral Research Associate**
National Institute of Standards and Technology (NIST)
• Building Energy and Environment Division | Engineering Laboratory
University of Maryland, College Park *(PREP program with NIST)*
• Chemistry and Biochemistry | College of Computer, Mathematical, and Natural Sciences

2018 - 2022   **Research Assistant**
Syracuse University
• Mechanical and Aerospace Engineering | College of Engineering and Computer Science

TEACHING EXPERIENCE

Instructor
University of Alabama at Birmingham
Spring 2025   • CESC 614, Smart Cities Technologies

Guest Lecturer
University of Maryland, College Park
Fall 2023   • ENME 422, Indoor Environment and Mechanical Systems
Syracuse University
Spring 2022   • MAE 658, Building Environmental Modeling and Simulations

Course Juror
Washington State University
Spring 2024   • ARCH 531, Advanced Tectonics

Teaching Assistant
Syracuse University

Spring 2020	• ECS 104, Engineering Computational Tools
Fall 2021, 2019	• 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 PREP**, 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: 852, h-index: 14, i10-index: 15 (Google Scholar, 02/2025)

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

2024 5. "Designing the Future: Healthy and Sustainable Buildings and Communities", Student Seminar for *Mechanical and Material Engineering at UAB*, 2024, Birmingham, AL.

4. "New CONTAM: Bridging Indoor Air Quality with Health Assessment, Energy Analysis, Smart Controls, and Urban Environments", Invited Talk to *The 17th CHAMPS Forum and Workshop*, 2024, Syracuse, NY.

2023 3. "Performance and Cost of Airborne Infection Mitigation Strategies", Seminar 12: Balancing Virus Risk Control and Energy Consumption for Better Building Operation, *ASHRAE Annual Conference*, 2023, Tampa, FL.

2021 2. "Ozone Emission Sources and Surface Removal in Indoor Environments", Seminar 14: Reducing Ozone: A Critical Factor in Improving IAQ, *ASHRAE Annual Conference*, 2021, Virtual.

2019 1. "Green Design Studio for Healthy and Sustainable Buildings and Communities: Exploration of an Innovative Approach", *The 17th New York State Green Building Conference*, 2019, Syracuse, NY.

Software Development

2023 1. ANT: Multizone indoor air quality (IAQ) and ventilation analysis plug-in on Rhino Grasshopper. *Food4Rhino* (food4rhino.com/app/ant), 2023. *(387 downloads to date)*.

PROFESSIONAL SERVICES

Journal Editorial Board

2024 - Present **Building Simulation**, Youth Editor

Committee Member

2024 **Research Strategic Planning Committee**, UAB School of Engineering

Professional Community Participation

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Technical Committee 4.10 Indoor Environmental Modeling
• Voting Member (2025 - Present)
• Membership Officer (2025 - Present)
International Building Performance Simulation Association (IBPSA)
American Geophysical Union (AGU)
International Society of Indoor Air Quality and Climate (ISIAQ)

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