

Jialei Shen, PhD
Assistant Professor
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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
2025 - Present	Associate Scientist University of Alabama at Birmingham (UAB) Center for the Study of Community 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 (<i>PREP program with NIST</i>) - 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 - Fall 2025 • EGR 150, Computer Methods in Engineering - Spring 2026 • CE 434/534, Air Quality Modeling & Monitoring
	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

Spring 2024	Course Juror Washington State University
	• ARCH 531, Advanced Tectonics
Spring 2020 Fall 2021, 2019	Teaching Assistant Syracuse University
	• ECS 104, Engineering Computational Tools
	• MEE 416, Mechanical Engineering Laboratory

GRANTS, PROJECTS & FELLOWSHIPS

Grants (as PI or Co-PI)

2025 - 2027	Halton Foundation Grant , Developing Standardized Guidelines and a Performance Database for Low-Cost Indoor Air Quality Monitors (Grant: \$60,000, Role: PI)
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Project Participations *(not as PI/co-PI)*

2024 - 2025	NIH U01 , Housing, Environment, And Living Conditions for Transformed Health (HEALTHe Birmingham) (Role: Participant)
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)
2018 - 2020	ASHRAE RP-1614 , Developing a Test Method to Determine the Effectiveness of UVC Systems on Commercial Cooking Effluent. (Role: PhD student)

Fellowships

2018, 2020	Graduate Fellowship , Syracuse University
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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	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: 1000, h-index: 14, i10-index: 16 (Google Scholar, 12/2025)

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

- 2025 18. Dols, W.S., **Shen, J.**, Polidoro, B.J., Lorenzetti, D.M., Mills, R., Cole, W.T.S., Sohn, M.D., 2025. Development and application of CONTAM APIs. *Building Simulation*.
17. Lu, Y., Ma, N., Arsano, A.Y., Brown, N., Chung, J., Dilsiz, A., Dong, B., Franconi, E., Han, X., Jiang, Z., Jones, N.L., Kyropoulou, M., Mermelstein, R., Passe, U., Rakha, T., **Shen, J.**, Sherif, T., Sun, Q., Thompson, J., Wang, Z., Xu, Y., Ye, Y., Zhang, X., 2025. Towards high-performance buildings for thermal resilience and health. *Energy and Buildings*, 116367.
- 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.

- 2018
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)
 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

- 2025
20. **Shen, J.**, Usmani, M., 2025. A Computational Framework for Modeling Air Quality Exposure: From Outdoor to Indoor Environments. *AGU25 Annual Meeting*, New Orleans, LA.
 19. Liu, Z., **Shen, J.**, Zhang, R., Liang, W., Won, D., Guo, B., Huang, W., Zhang, J., Sadovnik, N., Daturi, M., Serre, C., Qin, M., 2025. Predicting The Impact of a Formaldehyde Selective Metal-Organic Framework Material on Indoor Air Quality. *6th International Conference on Building Energy and Environment (COBEE)*, Eindhoven, Netherlands.
- 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 design based on assessing spatial distribution of ventilation efficiency in regional space. *The 9th International Conference on Applied Energy (ICAE 2017)*, Cardiff, United Kingdom.
1. 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.

Invited Talks & Seminars

- 2024 6. “Air Quality and Human Health in Built and Urban Environments”, Invited Talk at Pulmonary Grand Rounds, *Lung Health Center at UAB*, 2024, Birmingham, AL.
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. (471 downloads to date).

PROFESSIONAL SERVICES

Journal Editorial Board

2024 - Present **Building Simulation**, Youth Editor (*Q1, IF = 5.9*)

Committee Member

2025 **Design Lab Search Committee**, UAB School of Engineering
2024 **Research Strategic Planning Committee**, UAB School of Engineering

Professional Community Participation

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

- Advisor of ASHRAE UAB Student Branch (2025 - Present)
- Technical Committee 2.3 Gaseous Air Contaminants and Gas Contaminant Removal Equipment
- Technical Committee 2.4 Particulate Air Contaminants and Particulate Contaminant Removal Equipment
- Technical Committee 4.3 Ventilation Requirements and Infiltration
- Technical Committee 4.10 Indoor Environmental Modeling
 - Voting Member (2025 - Present)
 - Membership Officer (2025 - Present)

International Building Performance Simulation Association (IBPSA)

International Society of Indoor Air Quality and Climate (ISIAQ)

American Geophysical Union (AGU)

National Environmental Health Association (NEHA)

Peer Reviewer

Journals

- Building and Environment
- Building Simulation
- Energy and Buildings
- Indoor Environments
- Journal of Hazardous Materials
- Journal of Cleaner Production
- 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
- IBPSA conferences

Others

- NIST Publication System
- ASHRAE Handbook