

CHANG SHU

Curriculum Vitae, July 2026

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SUMMARY

- Principal Investigator leading **\$2.5M+** in climate-resilient and low-carbon building research.
- Published **24 journal articles**, **30+ conference papers**, **h-index=16**, **975 citations** as of July 2026.
- Editorial Board member of the journal *Energy and Buildings*; peer-reviewer for 35 journals.
- 10+ years in field studies of indoor environments, mechanical system, and urban environment.
- 10+ years in indoor/outdoor thermal airflow measurement, visualization, and aerosol sampling.
- 10+ years in numerical simulation of airflow, urban climate, energy system, and building performance.

PROFESSIONAL EXPERIENCE

Mar. 2022–Present	Research Officer, Ventilation and Indoor Air Quality (VIAQ) Group, National Research Council Canada (NRCC), Ottawa, ON, Canada
May. 2025–May. 2026	Acting Team Lead, Ventilation and Indoor Air Quality (VIAQ) Group, National Research Council Canada (NRCC), Ottawa, ON, Canada
Aug. 2021–Mar. 2022	Integrated Building Performance (IBP) Group, NRCC, Ottawa, Canada
Visiting Worker	COVID transmission experiments, numerical simulation, and model development
Oct. 2019–Aug. 2021	Façade System and Products (FSP) Group, NRCC, Ottawa, Canada
Student Employee	Generating bias-corrected climate datasets and regional climate modelling (WRF)
May. 2019–Aug. 2020	Meteorological Research Division, Environment and Climate Change Canada (ECCC), Montréal, QC, Canada
Part-time Student	Generating land use land cover data for urban areas and climate modelling (GEM)
Sep. 2017–Apr. 2022	Centre for Zero Energy Building Studies (CZEBS), Concordia University, Montréal, QC, Canada
Research Assistant	

Academic & Editorial Appointments

Nov. 2025–Present	Editorial Board Member, <i>Energy and Buildings</i>
Jul. 2025–Present	Adjunct Research Professor, Department of Civil and Environmental Engineering, Carleton University, Ottawa, ON, Canada
Dec. 2024–Present	Adjunct Professor, Department of Civil Engineering and Building Engineering, Université de Sherbrooke, Sherbrooke, QC, Canada

EDUCATION

Sep. 2017–Dec. 2021	Concordia University, Montréal, Québec, Canada Ph.D., Building Engineering
Sep. 2014–Apr. 2017	Tongji University, Shanghai, China M.Sc., Engineering Thermophysics
Sep. 2009–Jun. 2013	Chongqing University, Chongqing, China B.E., Built Environment and Facility Engineering

TEACHING EXPERIENCE

Jan. 2021–Apr. 2021	Concordia University, Montreal, QC, Canada.
Teaching Assistant	CIVI 6601: Modeling in Building and Environmental Engineering.

	Designed and presented 3 lectures, and tutorials on multiple CFD software.
	Answer questions, grade assignments & exams, and guide & grade student projects.
Sep. 2020–Dec. 2020	Concordia University, Montreal, QC, Canada.
Teaching Assistant	BLDG 6651: Fire and Smoke Control in Buildings.
	Tutorials on FDS (Fire Dynamics Simulation) and evacuation software.
	Answer questions, grade assignments & exams, and guide & grade student projects.
Sep. 2018–Dec. 2018	Concordia University, Montreal, QC, Canada.
Teaching Assistant	CIVI 6601: Modeling in Building and Environmental Engineering.
	Responsibilities and activities like the 2 nd time in 2021.
Mar. 2016–Jun. 2016	Tongji University, Shanghai, China.
	Engineering Thermodynamics.
Teaching Assistant	Answer questions, grade assignments & exams.

STUDENT SUPERVISION & MENTORSHIP

Jan. 2026 - Present	Elahe Moazzen, Ph.D., Carleton University (Co-supervise with Prof. Cara Lozinsky)
Sep. 2025 - Present	Xinshuai Geng, Ph.D., Université de Sherbrooke (Co-supervise with Prof. Dahai Qi)
Apr. 2025 - Present	Danlin Hou, Postdoctoral Fellow, University of British Columbia (Co-supervise with Prof. Haibo Feng)
Apr. 2025 - Present	Andy Dinh, M.Sc. / Undergraduate, Carleton University (Co-supervise with Prof. Cara Lozinsky)
Jan. 2024 – Jun. 2025	Qixuan Li, M.Sc., University of Ottawa (NRC co-op student program)
Sep. 2023 – Nov. 2023	Zhihong Luo, Undergraduate, University of Toronto (NRC co-op student program)

AWARDS & HONORS

Nov. 2022	FRL Director's Award of Excellence at NRCC (150 CAD)
Sep. 2021	Concordia University Conference and Exposition Award (1,200 CAD)
May. 2021	Concordia Accelerator Award (5,000 CAD)
Sep. 2019	Concordia University Conference and Exposition Award (1,000 CAD)
Dec. 2018	Concordia University Conference and Exposition Award (1,000 CAD)
Apr. 2017	Concordia International Tuition Award of Excellence (35,600 CAD)
Sep. 2014	Postgraduate Student Academic Scholarship in Tongji University (3,750 CAD)
Nov. 2012	HITACHI Design Scholarship in Chongqing University (400 CAD)

TECHNICAL SKILLS

CAD/CAE	AutoCAD, Solidworks, SketchUp, Rhino
Meshing	ICEM, GAMBIT, HyperMesh
Climate modelling	Weather Research and Forecast (WRF) modelling and postprocessing in Python, R, NCL, ncView, GrADS, ARWpost, NCO
CFD	ANSYS-Fluent, Star-CCM+, OpenFOAM, ENVI-met, and postprocessing in ParaView, Tecplot, CFD-post
GIS	GDAL, OGR, QGIS, Google Earth Engine (GEE)
Building simulations	EnergyPlus, DeST, eQuest, DesignBuilder, Grasshopper (Honeybee, Ladybug), CONTAM
Fire/Smoke Simulation	Pyrosim (FDS), Pathfinder, FDS
Data analysis	Python, R, Origin, RapidMiner, Excel-VBA
Writing	Markdown, LaTeX, R Markdown
Workflow	Pure (Neo)Vim, Vim emulators in IDEs (VS Code, PyCharm, Rstudio)

Version Control	Git, GitHub, GitLab
Experiments	Wind Tunnel, Particle Image Velocimetry (PIV), Thermal Breathing Manikin, Thermal Imaging, Particle Generation and Particulate Sampling, Tracer Gas, Aerosol Sampling, Blower-Door Test, Sub-scaled Experiment Design, Single-pass Filter Test, Field Measurement of Air Quality and Thermal Environment, Sensor Calibration, Low-cost Indoor Environment Sensors, Omni-directional Anemometer, 3D-ultrasonic Anemometer.
Programming	Python, R, Shell, MATLAB, C/C++, SQL, HTML/CSS, Javascript
Language	English, Chinese

PROFESSIONAL SOCIETIES

Mar. 2018-Present	The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Member
Jun. 2025-Present	International Building Performance Simulation Association, Canada (IBPSA-Canada), Member
Jan. 2024-Present	International Association for Urban Climate (IAUC), Member
Jul. 2020-Apr.2022	International Society of Indoor Air Quality and Climate (ISIAQ), Student Member
Under application	Ontario Professional Engineering

JOURNAL REVIEWER, EDITOR

Peer Reviewer	<i>Environmental International</i> (ISSN: 1873-6750), <i>Applied Energy</i> (ISSN: 0306-2619), <i>Sustainable Cities and Society</i> (ISSN: 2210-6707), <i>Energy and Buildings</i> (ISSN: 0378-7788), <i>Building and Environment</i> (ISSN: 0360-1323), <i>Atmospheric Research</i> (ISSN: 0169-8095), <i>Urban Climate</i> (ISSN: 2212-0955), <i>Landscape and Urban Planning</i> (ISSN: 0169-2046), <i>Journal of Cleaner Production</i> (ISSN: 0959-6526), <i>Journal of Building Engineering</i> (ISSN: 2352-7102), <i>Building Simulation</i> (ISSN: 1996-3599), <i>Journal of Thermal Biology</i> (ISSN: 0306-4565), <i>Science and Technology for the Built Environment</i> (ISSN: 2374-4731), <i>City and Environment Interactions</i> (ISSN: 2590-2520), <i>Advances in Space Research</i> (ISSN: 1879-1948) <i>International Journal of Ventilation</i> (ISSN: 1473-3315), <i>Geography and Sustainability</i> (ISSN: 2666-6839), <i>Geo-spatial Information Science</i> (ISSN: 1009-5020), <i>Energy and Built Environment</i> (ISSN: 2666-1233), <i>Heliyon</i> (ISSN: 2405-8440), <i>Global Health Action</i> (ISSN: 1654-9716), <i>Climatic Change</i> (ISSN: 0165-0009), <i>Geomatics, Natural Hazards and Risk</i> (ISSN: 1947-5705), <i>AIMS Geosciences</i> (ISSN: 2471-2132), <i>Environmental Challenges</i> (ISSN: 2667-0100), <i>Natural Hazards Research</i> (ISSN: 2666-5921), <i>Energies</i> (ISSN: 1996-1073), <i>Remote Sensing</i> (ISSN: 2072-4292), <i>International Journal of Environmental Research and Public Health</i> (ISSN:1660-4601), <i>Buildings</i> (ISSN: 2075-5309), <i>Sustainability</i> (ISSN: 2071-1050), <i>Atmosphere</i> (ISSN: 2073-4433), <i>Applied Sciences</i> (ISSN 2076-3417), <i>Land</i> (ISSN 2073-445X), <i>Fire</i> (ISSN 2571-6255),
Guest Editor	Special Issue "Climate Change and Building Energy Efficiency" on <i>Buildings</i>
Guest Editor	Special Issue "Indoor Carbon Dioxide - Ventilation, Indoor Air Quality and Human Health" on <i>Indoor Environments</i>
Guest Editor	Special Issue " Key Technologies of Sustainable Energy System Management: Opportunities and Challenges" on <i>Frontiers in Energy Research</i> (ISSN: 2296-598X)

ACADEMIC SERVICES

<i>Jan. 2025-Jun. 2026</i>	14th eSim Building Simulation Conference (eSim 2022), Université de Sherbrooke, Lounge, Quebec, Canada
<i>Organization</i>	Conference Chair: Prof. Dahai Qi, Université de Sherbrooke
<i>Scientific Committee</i>	Act as part of the organization and scientific committee of the conference
<i>Dec. 2020-Jul. 2022</i>	5th International Conference on Building Energy and Environment (COBEE 2022), Concordia University, Montréal, Québec, Canada
	Conference Chair: Prof. Liangzhu (Leon) Wang, Concordia University.
<i>Organization</i>	Responsible for reviewing papers, publicity of conferences, and managing the website
<i>Scientific Committee</i>	(www.cobee2022.org) and social network.
<i>Session Chairs</i>	Thermal Comfort 1; Building Physics, Building Envelope and Material 8.
<i>Jun. 2022</i>	12th eSim Building Simulation Conference (eSim 2022), Carleton University, Ottawa, Ontario, Canada
	Conference Chair: Prof. Burak Gunay, Carleton University.
<i>Workshop Instructor</i>	Multi-zone indoor air quality and ventilation modelling with CONTAM (https://carleton.ca/esim22/en_homepage/workshops/)
<i>Apr. 2013</i>	Launching Ceremony of National Centre for International Research of Low-carbon and Green Buildings & Sustainable Built Environment and Green Building Forum, Chongqing University, Chongqing, China
	Conference Chair: Prof. Baizhan Li, Chongqing University.
<i>Volunteer Leader</i>	Responsible for volunteer group management, and the reception of the attendees.

EXTRA-CURRICULAR

<i>Aug. 2016</i>	International Student Symposium on Power and Mechanical Engineering at Okayama 2016, Okayama, Japan
<i>International Exchange</i>	Okayama University Summer Seminar Program

RESEARCH PROJECTS

<i>Sep. 2023- present</i>	Retrofits to Improve Resilience of Residential Buildings to Overheating Stress and Wildfire Smoke Exposure
<i>Principal Investigator</i>	Funding: Climate Resilient Built Environment (CRBE) Initiative at NRCC (CAD 1.8M)
<i>Apr. 2026- present</i>	Performance Characterization of Radiative Cooling at the Canadian Centre for Housing Technology and Simulation for British Columbia Climates
<i>Principal Investigator</i>	Funding: BC Hydro (CAD 125 K)
<i>Apr. 2022- present</i>	Measuring Contaminant Emissions from Artificial Indoor Sports Turf using Robotic Arms
<i>Principal Investigator</i>	Funding: Health Canada (CAD 75 K)
<i>Dec. 2021- present</i>	Thermal Airflow Analysis in Human-Ventilation Interaction Using Particle Image Velocimetry and Thermal Breathing Manikins
<i>Principal Investigator</i>	Funding: Addressing Air Pollution (AAP) initiative at NRCC (CAD 250 K)
<i>Apr. 2022- Apr. 2023</i>	Review of the Design and Operation of Inflatable Sports Domes
<i>Principal Investigator</i>	Funding: Health Canada (CAD 75 K)
<i>Apr. 2024- present</i>	Field Study of Radon Concentrations in Canadian Housing Undergoing Energy Retrofit Renovations
<i>Project member</i>	Funding: Addressing Air Pollution (AAP) initiative at NRCC
<i>Apr. 2024- present</i>	Residential Ventilation Practices in Response to Wildfire Smoke Events
<i>Project member</i>	Funding: Health Canada

<i>Apr. 2022 - present</i>	Assess and Monitor the Performance of Ventilation Improvement Measures Implemented in Public and Residential Buildings
<i>Technical Lead</i>	Funding: Health Canada
<i>Apr. 2022 - present</i>	Control of Airborne Disease Transmissions Using Portable Air Cleaners in Classrooms and Multi-Unit Residential Buildings (MURBs)
<i>Technical Lead</i>	Funding: Health Canada
<i>Sep. 2021- Present</i>	Assess Priority Technologies and Strategies for Effectiveness and Consequences on Viral Aerosol Transmission
<i>Technical Lead</i>	Funding: National Research Council Canada (NRCC).
<i>Apr. 2021- Present</i>	Reducing the Risk of Viral Contagion from the Airborne Transmission of Pathogens within Buildings
<i>Project collaborator</i>	Funding: EUREKA (NOVIRALRISK Eureka Network Project).
<i>Oct. 2019-Apr.2022</i>	Climate Resilient Buildings and Core Public Infrastructure
<i>Research Assistant</i>	Funding: Infrastructure Canada.
<i>Apr. 2019–Apr. 2022</i>	Assessment and Mitigation of Summertime Overheating Conditions in Vulnerable Buildings of Urban Agglomerations
<i>Technical Lead</i>	Funding: The Natural Sciences and Engineering Research Council of Canada (NSERC Advancing Climate Change Science in Canada Program)
<i>Dec. 2020- Oct. 2022</i>	Air Movement and Control Association (AMCA) COVID White Paper on Un-ducted Fans (including air curtains, ceiling, and circulating fans)
<i>Research Assistant</i>	Funding: The Air Management and Control Association (AMCA).
<i>Nov. 2017-Nov. 2018</i>	Air Movement and Control Association (AMCA) Project on Air Curtain Energy Performance and ASHRAE Standards 90.1
<i>Technical Lead</i>	Funding: The Air Management and Control Association (AMCA), the Berner International, the Mars Air Systems, the Powered Aire, and the Hickman Group.
<i>Feb. 2018–Aug. 2018</i>	Energy Efficiency and Deicing of Lafontaine Tunnel
<i>Research Assistant</i>	Funding: Ministère des Transports, de la Mobilité durable et de l'Électrification des transports
<i>Sep. 2017-Feb. 2018</i>	Airflow and Thermal Management in NutraPonics Growing System for Quality Food Crop Production
<i>Technical Lead</i>	Funding: NutraPonics Canada Corporation, The Natural Sciences and Engineering Research Council of Canada (NSERC Engage Grants Program).
<i>Nov. 2014–Jun. 2017</i>	Study on the Vertical Pollutant Inter-flat Transmission Mechanism of High-rise Residential Buildings
<i>Research Assistant</i>	Funding: The National Science Foundation of China (No.51278348).
<i>Nov. 2014–Jan. 2016</i>	Urban Microclimate Study Based on Urban Planning Land Function Units
<i>Technical Lead</i>	Funding Source: ENN Group Co., Ltd.
<i>May. 2016–Jan. 2017</i>	New Gas Cooktop with Drop-in Sheet Metal Burner Design
<i>Technical Lead</i>	Funding: FOTILE Kitchen Ware Co., Ltd.
<i>Jan. 2015–Sep. 2015</i>	Design and Optimize the Air Conditioning of the Passenger Compartments and Heat Exchange of Equipment Compartments on High-speed Train
<i>Technical Lead</i>	Funding: CRRC Changchun Railway Vehicles Co., Ltd.
<i>Dec. 2014–Jun. 2015</i>	Performance Evaluation of Sand Filters of High-speed Electric Multiple Units (EMUs) Based on Multiphase Flow Analysis
<i>Technical Lead</i>	Funding: CSR Sifang Rolling Stock Co., Ltd.

PUBLICATIONS

Journal Papers

- 2026 Andrew Persily, Liangzhu (Leon) Wang, Maria Justo-Alonso, **Chang Shu**, “Indoor Carbon Dioxide–Ventilation, Indoor Air Quality and Human Health”, *Indoor Environments* SI (2026): 100152
- Shujie Yan, Liangzhu (Leon) Wang, Jiwei Zou, **Chang Shu**, Justin Berquist, Zhiqiang (John) Zhai, “Bayesian Grey-Box Modeling of Classroom Ventilation Using CO2 Measurements in Canadian Primary Schools”, *Building and Environment* Vol. 293 (2026): 114332
- 2025 Shujie Yan, Jiwei Zou, **Chang Shu**, Justin Berquist, Vincent Brochu, Marc Veillette, Danlin Hou, Caroline Duchaine, Liang (Grace) Zhou, Zhiqiang (John) Zhai, Liangzhu (Leon) Wang, “Implementing Bayesian inference on a stochastic CO2-based grey-box model.”, *Indoor Environments* Vol. 2 (2025): 100079
- Fuad Baba, Zihan Xie, Hua Ge, Radu Zmeureanu, Liangzhu Leon Wang, **Chang Shu**, Daniel Baril, Dahai Qi, “Field assessment of thermal conditions in naturally ventilated classrooms during spring: microclimate and passive cooling impacts in cold climate”, *Smart and Sustainable Built Environment* (2025): 1-25.
- 2024 Lili Ji, **Chang Shu**, Abhishek Gaur, Lin Wang, Michael Lacasse, “A state-of-the-art review of studies on urban green infrastructure for thermal resilient communities.”, *Building and Environment* 257 (2024): 111524
- Ibrahim Reda, Eslam Ali, Justin Berquist, **Chang Shu**, Xin Zhang, Monireh Aram, Dahai Qi, Liang (Grace) Zhou, Liangzhu (Leon) Wang, Theodore Stathopoulos, Andreas Athienitis, “Exploring high-rise preventive ventilation: Experimental investigation of inter-zone air pressurization with tracer gas analysis”, *Building and Environment* (2024), Vol(258): 111566
 - Liang (Grace) Zhou, **Chang Shu**, Justin Berquist, Janet Gaskin, Greg Nilsson, “A controlled intervention study of portable air cleaners in two Canadian schools”, *REHVA European HVAC Journal* (2024) June
 - Senwen Yang, Dongxue Zhan, Theodore Stathopoulos, Jiwei Zou, **Chang Shu**, Liangzhu (Leon) Wang, “Urban microclimate prediction based on weather station data and artificial neural network”, *Energy and Buildings* (2024), Vol(314): 114283
- 2023 **Chang Shu**, Abhishek Gaur, Liangzhu (Leon) Wang, Michael Lacasse, “Evolution of the local climate in Montreal and Ottawa before, during and after a heatwave and the effects on urban heat islands.”, *Science of the Total Environment* 890 (2023): 164497
- Jiwei Zou, Henry Lu, **Chang Shu**, Lili Ji, Abhishek Gaur, Liangzhu (Leon) Wang, “Multiscale numerical assessment of urban overheating under climate projections: A review”, *Urban Climate*
 - Senwen Yang, Liangzhu (Leon) Wang, Paul Raftery, Michael Ivanovich, Christian Taber, William P. Bahnfleth, Pawel Wargocki, Jovan Pantelic, Jiwei Zou, Mohammad Mortezaazadeh, **Chang Shu**, Runzhong Wang, Scott Arnold, “Comparing Airborne Infectious Aerosol Exposures in Sparsely Occupied Large Spaces Utilizing Large-Diameter Ceiling Fans”, *Building and Environment* (2023): 110022

- Abdelaziz Laouadi, Lili Ji, **Chang Shu**, Liangzhu (Leon) Wang, Michael Lacasse, "Overheating risk analysis in long-term care homes – development of overheating limit criteria", *Buildings* (2023), 13(2):390
- 2022 Lili Ji, **Chang Shu**, Abdelaziz Laouadi, Michael Lacasse, Liangzhu (Leon) Wang, "Quantification of building thermal resilience from summertime extreme heat events.", *Building and Environment*, (2022): 109914.
- Saeed Rayegan, **Chang Shu**, Hamza Mbareche, Jisoo Jeon, Justin Berquist, Patrique Tardif, Liang (Grace) Zhou, Liangzhu (Leon) Wang, Hua Ge, "A Review on Indoor Airborne Transmission of COVID-19 – Approaches and Mitigations", *Journal of Building Engineering*, (2022): 105599.
- **Chang Shu**, Abhishek Gaur, Liangzhu (Leon) Wang, Michal Bartko, Abdelaziz Laouadi, Lili Ji, Michael Lacasse, "Added value of convection permitting climate modelling in urban overheating assessments", *Building and Environment*, 207 A (2022): 108415.
- Lili Ji, Abdelaziz Laouadi, **Chang Shu**, Abhishek Gaur, Michael Lacasse, Liangzhu Wang, "Evaluating Approaches of Selecting Extreme Hot Years for Assessing Building Overheating Conditions during Heatwaves", *Energy and Building*, 254 (2022): 111610
- 2021 Dahai Qi, Senwen Yang, **Chang Shu**, Liangzhu Wang, Andreas Athienitis, "An exploratory study on road tunnel with semi-transparent photovoltaic canopy - From energy saving and fire safety perspectives", *Building Simulation*, (2021)
- Lili Ji, Abdelaziz Laouadi, **Chang Shu**, Liangzhu Wang, Michael Lacasse, "Evaluation and improvement of the thermoregulatory system for a two-node bioheat model", *Energy and Buildings*, 249 (2021): 111235.
- 2020 Abhishek Gaur, Michael Lacasse, Marianne Margaret Armstrong, Henry Lu, **Chang Shu**, Allan Fields, Francisco Salamanca Palou, Yujia Zhang, "Effects of using different urban parametrization schemes and land-cover datasets on the accuracy of WRF model over the City of Ottawa" *Urban Climate*, 35 (2020): 100737
- **Chang Shu**, Liangzhu (Leon) Wang, Mohammad Mortezaazadeh, "Dimensional analysis of Reynolds independence and regional critical Reynolds numbers for urban aerodynamics", *Journal of Wind Engineering and Industrial Aerodynamics*, 203: 104232, 2020
- Cheng Zhang, Senwen Yang, **Chang Shu**, Liangzhu (Leon) Wang, Ted Stathopoulos, "Wind pressure coefficients for buildings with air curtains", *Journal of Wind Engineering and Industrial Aerodynamics*, 205: 104265, 2020
- **Chang Shu**, Liangzhu (Leon) Wang, Cheng Zhang, Dahai Qi, "Air curtain effectiveness rating based on aerodynamics", *Building and Environment*, 169: 106582, 2020
- 2017 Di Mu, **Chang Shu**, Naiping Gao, Tong Zhu, "Wind tunnel tests of inter-flat pollutant transmission characteristics in a rectangular multi-storey residential building, part B: Effect of source location", *Building and Environment*, 114: 281-292, 2017.
- 2015 Qiaoxia Yang, Meng Liu, **Chang Shu**, Daniel Mmereki, Md. Uzzal Hossain, Xiang Zhan, "Impact analysis of window-wall ratio on heating and cooling energy consumption of residential buildings in hot summer and cold winter zone in China", *Journal of Engineering*, Vols. (2015), 2015.

Conference Proceedings and Presentations

- 2026 **Chang Shu**, Xinshuai Geng, Qixuan Li, Dahai Qi, "Assessing Overheating and Wildfire Smoke Exposure in a Canadian Long-Term Care Facility", *2026 ASHRAE Winter Conference*, Las Vegas, NV, USA, January 31- February 4, 2026
- Duy Anh (Andy) Dinh, **Chang Shu**, Cara Lozinsky, Elahe Moazzen, Qixuan Li, Fatima Sultani, Justin Berquist, Liang (Grace) Zhou, "Evaluating Particulate Matter and VOC Exposures and Mitigation Using Portable Air Cleaners in Canadian Community Housing during the Colder Season", *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Xinshuai Geng, **Chang Shu**, Dahai Qi, "Ventilation Performance Evaluation for a Long-Term Care Facility Room Based on CFD Simulations", *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Zhonglin Gu, Dahai Qi, Hachimi Fellouah, Ahmed Taha, Xinshuai Geng, **Chang Shu**, "CFD-based evaluation of green firebreak design for wildfire smoke dispersion and building protections", *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Kexin Zheng, Xinshuai Geng, Clément Nevers, Murad Aldoum, Theodore Potsis, Xin Zhang, **Chang Shu**, Dominique Derome, Ted Stathopoulos, Liangzhu (Leon) Wang, Dahai Qi, "CFD-based evaluation of green firebreak design for wildfire smoke dispersion and building protections", *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Ibrahim Reda, **Chang Shu**, Liangzhu (Leon) Wang, Dahai Qi, "How Much Accuracy Do We Lose with Fewer Simulations? Evaluating Reduced CFD Training Datasets for Indoor Airflow Prediction", *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Xinshuai Geng, Dahai Qi, **Chang Shu**, "Protecting Older Adults in a Warming Canada: Heatwaves, Wildfire Smoke, and the Built Environment", *20e édition des Journées scientifiques du RQVR*, Sherbrooke, Quebec, Canada, April 8 – 9, 2026
- 2025 **Chang Shu**, Simon Hunt, Fatima Sultani, Qixuan Li, Andy Dinh, Liang (Grace) Zhou, "Investigating Particle and VOC Emissions from Artificial Turf in Controlled Conditions", *the IEQ 2025 conference*, Montreal, Quebec, Canada, September 24-26, 2025
- 2024 **Chang Shu**, Lili Ji, Justin Berquist, Liang (Grace) Zhou, "Summertime Resilience in an L-Shaped Long-Term Care Facility with Mixed Natural Ventilation and Pressurized Corridors", *the 44th AIVC -12th TightVent & 10th venticool Conference*, Dublin, Ireland, October 9-10, 2024
- 2023 Senwen Yang, Dongxue Zhan, Jiwei Zou, **Chang Shu**, Ted Stathopoulos, Liangzhu (Leon) Wang, "Prediction of the impact of Urban Environment on Building Energy by Artificial Neural Network", *13th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC 2023)*, Beijing, China, November 14-16, 2023
- Liang (Grace) Zhou, **Chang Shu**, Justin Berquist, Greg Nilsson, Janet Gaskin, "Impact and benefits of the air cleaning measures implemented in two schools", *43rd AIVC (Air Infiltration and Ventilation Centre) conference "Ventilation, IEQ and health in sustainable buildings"*, Copenhagen, Denmark, October 04-05, 2023
 - Sepehrdad Tahmasebi, Liangzhu (Leon) Wang, **Chang Shu**, Senwen Yang, "AMCA COVID Guidance for UNDUCTED Fans – Air Curtains", *11th International Conference on Indoor Air Quality, Ventilation & Energy Conservation in Buildings (IAQVEC 2023)*, May 20-23, 2023, Tokyo, Japan.

- 2022 **Chang Shu**, Abhishek Gaur, Michael Lacasse, Liangzhu (Leon) Wang, "Interaction between the Urban Heat Island effect and the occurrence of Heatwaves: Comparison of Days with and without Heatwaves", *5th International Conference on Building Energy and Environment (COBEE 2022)*, Montreal, Canada, July 25-29, 2022
- **Chang Shu**, Zihan Xie, Lili Ji, Daniel Baril, Lin Wang, Xuechen Bai, Senwen Yang, Hua Ge, Radu Zmeureanu, Michael Lacasse, Abdelaziz Laouadi, Abhishek Gaur, Liangzhu (Leon) Wang, "Comparing Multiple Overheating Assessment Metrics Using Measured Data", *5th International Conference on Building Energy and Environment (COBEE 2022)*, Montreal, Canada, July 25-29, 2022
 - **Chang Shu**, Liangzhu (Leon) Wang, "Smoke Spreading Simulation of a High-rise Office building based on Evacuation Analysis", *5th International Conference on Building Energy and Environment (COBEE 2022)*, Montreal, Canada, July 25-29, 2022
 - Lili Ji, **Chang Shu**, Abdelaziz Laouadi, Abhishek Gaur, Michael Lacasse, Liangzhu (Leon) Wang, "Evaluation and mapping indoor thermal risk of older people residing in long-term care (LTC) buildings to local weather conditions", *5th International Conference on Building Energy and Environment (COBEE 2022)*, Montreal, Canada, July 25-29, 2022
 - Lili Ji, **Chang Shu**, Abdelaziz Laouadi, Hua Ge, Radu Zmeureanu, Michael Lacasse, Liangzhu (Leon) Wang, "Quantification of building thermal resilience against heatwaves.", *5th International Conference on Building Energy and Environment (COBEE 2022)*, Montreal, Canada, July 25-29, 2022
 - **Chang Shu**, Abhishek Gaur, Liangzhu (Leon) Wang, Michal Bartko, Lili Ji, Abdelaziz Laouadi, Michael Lacasse, "Impact of Spatial Distributions of Climate Condition on Building Overheating", *REHVA 14th HVAC World Congress (CLIMA 2022)*, Rotterdam, The Netherlands, May 22-25, 2022
 - Lili Ji, **Chang Shu**, Danlin Hou, Abdelaziz Laouadi, Liangzhu (Leon) Wang, Michael Lacasse, "Predicting indoor air temperatures by calibrating building thermal model with coupled airflow networks", *REHVA 14th HVAC World Congress (CLIMA 2022)*, Rotterdam, The Netherlands, May 22-25, 2022
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- 2021 **Chang Shu**, Abhishek Gaur, Michael Lacasse, Liangzhu (Leon) Wang, “Statistical–dynamical High-Resolution Modeling of the Ottawa–Montreal Regional Climate”, *101st American Meteorological Society Annual Meeting (AMS 2021)*, Virtual, January 12-15, 2021
- **Chang Shu**, Abhishek Gaur, Michael Lacasse, Liangzhu (Leon) Wang, “Modeling Outdoor and Indoor Overheating Conditions during an Extreme Overheating Event in the Ottawa–Montreal Region”, *101st American Meteorological Society Annual Meeting (AMS 2021)*, Virtual, January 12-15, 2021

Invited Talks

- 2026 “Retrofits to Improve Resilience of Residential Buildings to Overheating Stress”, *TG-Overheating 2030-07 Meeting, National Building Code Canada Committee*, January 14, 2026
- 2025 “Building Climate Resistance: Resilient Indoor Environments for Older Adults during Extreme Heat and Wildfire Smoke Events”, *AGE-Well Webinar*, December 10, 2025

Books/Chapters

- 2020 Liangzhu (Leon) Wang, **Chang Shu**, “Chapter 2: Assessment of the Effect of Urban Heat Island on Buildings”, *Urban Heat Island Mitigation – in Hot and Humid Cities*, Springer.

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- 2026 Janet Gaskin, Grace Zhou, **Chang Shu**, Qixuan Li, Jeffery Smyth, Patrique Tardif, Simon Hunt, “Health Canada Radiation Protection Bureau Interdepartmental Letter of Agreement 2026 Radon Research Report”, National Research Council Canada (NRCC), Pages: 29, March 2026
- 2025 **Chang Shu**, Simon Hunt, Fatima Sultani, Qixuan Li, Andy Dinh, Grace Zhou, “Measuring Contaminant Emissions from Artificial Indoor Sports Turf”, National Research Council Canada (NRCC), Pages: 38, March 2025
- 2024 Dahai Qi, Gerhard Hofer, Pierre Jaboyedoff, Lili Ji, **Chang Shu**, et al., “Resilient Cooling of Buildings Field Studies Report (Annex 80)”. Energy in Buildings and Communities Technology Collaboration Programme, International Energy Agency (IEA), Pages: 188, May 2024
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- 2020 **Chang Shu**, “Generating climate datasets and WRF modelling”. National Research Council Canada (NRCC), Pages: 105, March 2020
- 2018 Liangzhu (Leon) Wang, **Chang Shu**, “Air curtain project – evaluation and application of existing air curtain effectiveness methodology – relating aerodynamics performance to air curtain effectiveness – AMCA Air Curtain Project Phase V”. The Air Movement and Control Association (AMCA). Pages: 68, December 2018

Submitted Papers

- 2026 **Chang Shu**, Abhishek Gaur, Michael Lacasse, Liangzhu (Leon) Wang, “Synthesized Representative Urban Effect Preserved (SYRUP) climate dataset for future projection of urban heat island”, (*Under Preparation*)
- **Chang Shu**, Wenping Yang, Simon Hunt, Fatima Sultani, Qixuan Li, Andy Dinh, Greg Nilson, Liang (Grace) Zhou, “Development of a Dynamic Wear-and-Tear Platform for Emission Testing of Artificial Turf”, (*Under Preparation*)
 - **Chang Shu**, Wenping Yang, Simon Hunt, Fatima Sultani, Qixuan Li, Andy Dinh, Greg Nilson, Liang (Grace) Zhou, “Comparative Analysis of Particulate Matter and VOC Emissions from Artificial Turfs”, (*Under Preparation*)
 - Lili Ji, Ahmed Marey, Adam Wills, Liangzhu (Leon) Wang, **Chang Shu**, “Predicting and interpreting residential building energy use and retrofit needs by climate zones and end uses with explainable AI”, Submitted to *Energy and Buildings*
 - **Chang Shu**, Xinshuai Geng, Dahai Qi, Qixuan Li, “Impact of Door Operation on Indoor Air Quality and Thermal Conditions in Long-term Care Buildings”, Submitted to *14th eSim Building Simulation Conference*, Longueuil, Quebec, Canada, June 17 – 19, 2026
 - Janet Gaskin, **Chang Shu**, Qixuan Li, Grace Zhou, “Effect of energy retrofits on indoor radon in townhouses”, Submitted to *Frontiers in Public Health*
 - **Chang Shu**, Duy Anh (Andy) Dinh, Elahe Moazzen, Cara Lozinsky, Qixuan Li, Simon Hunt, Justin Berquist, Liang (Grace) Zhou, “Assessment of Overheating and Wildfire Smoke Exposure in Residential Buildings Using Low-Cost Sensor Networks”, Submitted to *46th AIVC - 14th TightVent & 12th venticool Conference*, Songdo International District, Incheon, South Korea, September 30 – October 1, 2026