**ZHANG, Shu-yang (Shawn), PhD**

**CV | 2012-2025**

**Citizenship**: Chinese

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**RESEARCH INTERESTS**

• Urban building energy model (UBEM)

• Urban microclimate

• Mobility and heat risk

• Inequity in heat exposure

• Resilient urban design under extreme weather

**SKILLS**

• Coding: Python (Machine learning, Deep learning)

• Geography: ArcGIS, QGIS (UMEP), ENVI, SAGA

• Simulation: DesignBuilder, Ecotect, Radiance, Daysim, Dpethmap, Ladybug, Honeybee, Dragonfly, Eddy3D

• 3D Modeling: Rhino + Grasshopper, SketchUp

• 2D Graphic: AutoCAD, Photoshop, InDesign, Illustrator, PowerPoint

• Statistics: Excel, SPSS, Minitab, Origin

• Rendering: Enscape, V-ray

• Video Editing: Premiere, Audition

**EDUCATION**

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| • 2020.08 – 2025.09 | **School of Architecture, Tsinghua University** | Beijing, China |
| *Ph.D. in Engineering (Supervisor: Prof. Nian-xiong Liu)*  *Dissertation: Design Optimization of Outdoor Thermal Environment and Building Form Layout under Extreme Climate Risks* | |
| • 2023.10 – 2024.10 | **Department of Architecture, National University of Singapore** | Singapore |
| *Visiting Ph.D. student of Architecture (Supervisor: Associate Prof. Chao Yuan)* | |
| • 2017.08 – 2020.06 | **School of Architecture, South China University of Technology** | Guangzhou, China |
| *M.Arch of Architecture (Supervisor: Prof. Yang Wang)*  *Dissertation: Research on Space and Morphology Design of Umbrella Structures Building* | |
| • 2012.08 – 2017.06 | **School of Architecture and Art, Hefei University of Technology** | Hefei, China |
| *B.arch of Architecture* | |

**LIST OF ACADEMIC PUBLICATIONS**

(† co-first author; \* Corresponding Author)

ORCID: <https://orcid.org/0000-0002-3677-1363>

Web of Science Researcher ID: [OIR-4914-2025](https://www.webofscience.com/wos/author/record/OIR-4914-2025) (Total citations: 61, H-index: 5)

Google Scholar: <https://scholar.google.com/citations?user=GW_6fuUAAAAJ> (Total citations: 77, H-index: 5)

Scopus: <https://www.scopus.com/authid/detail.uri?authorId=57349228300> (Total citations: 62, H-index: 4)

ResearchGate: <https://www.researchgate.net/profile/Shuyang-Zhang-17/research> (Total citations: 75, H-index: 5)

• **Publications in Refereed Journals** (published 11 papers, with 7 of them as the first author):

1. **Zhang S**, Liu N\*, Wu X, Han Y, Li W, Guo F, Song X, Yuan C\*. (2025). An empirical study on the compound effects of extreme weather and UHI on building energy consumption under urban microclimate. ***Building and Environment***, 113824. (SCI Q1, IF=7.6, In Press) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5552898>
2. **Zhang S**, Yuan C, Chen T, Ma B, Liu N\*. (2024). A cross-scale indicator framework for the study of annual stability of land surface temperature in different land uses. ***Sustainable Cities and Society***, *116*, 105936. (SCI Q1, IF=12, 7 citations) <https://doi.org/10.1016/j.scs.2024.105936>
3. **Zhang S**, Yuan C, Ma B, Liu N\*, Li W. (2024). Coupling effects of building-vegetation-land on seasonal land surface temperature on street-level: A study from a campus in Beijing. ***Building and Environment***, 262, 111790. (SCI Q1, IF=7.6, 13 citations) <https://doi.org/10.1016/j.buildenv.2024.111790>
4. **Zhang S**, Liu N\*, Li W, Yan S. (2022). Umbrella structure building design method via case-based design and statistical analysis of structural morphological parameters. ***Journal of Building Engineering***, 45, 103542. (SCI Q1, IF=7.4, 9 citations, the article is cited in ***Nature Structural & Molecular Biology***) <https://doi.org/10.1016/j.jobe.2021.103542>
5. **Zhang S**, Liu N\*, Ma B, Yan S. (2024). The effects of street environment features on road running: An analysis using crowdsourced fitness tracker data and machine learning. ***Environment and planning B: Urban analytics and city science***, 51(2), 529-545. (SSCI Q1, IF=3.1, 34 citations) <https://doi.org/10.1177/23998083231185589>
6. **Zhang S**, Wang Y\*. (2020).Balance of form and force: research on architectural design strategies based on application of eccentric umbrella structure. ***The Architect***, 2020(03), 91-99 (in Chinese, Tier 2 Chinese National Core Journal in Building Science) <https://d.wanfangdata.com.cn/periodical/jzs202003013>
7. **Zhang S**, Wang Y\*. (2020). The historical evolution and contemporary value of umbrella structure: cases study based on the practice in Western Europe and Latin America since the 20th century. ***South Architecture***, 2020(06), 22-29 (in Chinese, Tier 3 Chinese National Core Journal in Building Science, 4 citations) <https://d.wanfangdata.com.cn/periodical/nfjz202006004>
8. **Zhang S**, Wang Y\*.(2019). Dynamic exterior sunshade design and shading effect analysis of southeast and southwest facing buildings in Guangzhou. ***Building Energy Efficiency***, 47(08), 91-95+100 (in Chinese, Tier 3 Chinese National Core Journal in Building Science, 10 citations) <https://d.wanfangdata.com.cn/periodical/fcyyy201908022>
9. Zhang X, Chen T\*, **Zhang S**, Yuan C, PY Tan. (2025). Toward healthy neighborhood thermal environments: Interpretation of thermal comfort and rapid identification of hotspot areas using image-based metrics and explainable machine learning. ***Sustainable Cities and Society***, 106648 (SCI Q1, IF=12, 2 citations) <https://doi.org/10.1016/j.scs.2025.106648>
10. Chen T, Singh V K, **Zhang S**, Zhang L, Yuan C\*. (2025). A city-scale mapping tool for assessing effects of urban greenery and morphologies on thermal comfort: A case study in Singapore. ***Building and Environment***, 113760. (SCI Q1, IF=7.6) <https://doi.org/10.1016/j.buildenv.2025.113760>
11. Li W, Zhou Z\*, **Zhang S**, Feng J. (2022). Study on relationship between shading and outdoor air temperature based on the comparison of two high-rise residential estates with field measurements. ***Buildings***, 12(11), 1813. (SCI Q2, IF= 3.1, 5 citations) <https://doi.org/10.3390/buildings12111813>
12. Wang Y, Lin M, Xu K, **Zhang S**, Ma H\*. (2021). Energy consumption analysis of glass house using electrochromic window in the subtropical region. ***Journal of Engineering, Design and Technology***, 19(1), 203-218. (SCI Q1, IF= 2.7, 5 citations, the article is cited in ***Cell Reports Physical Science***) <https://doi.org/10.1108/JEDT-12-2019-0348>

• **Publications Under Review** (Recent research works):

1. **Zhang S**, Chen T, Zhang X, Liu N\*, Yuan C\*. UBEM driven by localized weather data for addressing urban building energy risks under compound heatwaves and UHI: a Beijing campus case study. ***Sustainable Cities and Society***. (SCI Q1, IF=12, First-round review, originally submitted in August 2025) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5555721>
2. **Zhang S**, Wu X, Xu P, Liu N\*, Li N\*. Local UHI mitigation and utilization: Urban building energy modeling, simulation, and urban design responses based on localized weather data.***Building Simulation***. (SCI Q1, IF=5.9, First-round review, originally submitted in September 2025) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5555862>
3. Xu P†, Zhao P†, Xia B, Zhao Z, **Zhang S**\*, Du J\*. A free-form and structural-redundant timber reciprocal frame configuration: intelligent design, optimization and fabrication. ***Nature communication***. (SCI Q1, IF=15.7, Third-round review, originally submitted in September 2024) <https://doi.org/10.21203/rs.3.rs-4799666/v1>

• **Manuscripts in Preparation:**

1. **Zhang S**, Chen T, Liu N, Li N, Yuan C. Planting evergreen and deciduous trees: A study on the balance between cooling effects and radiative heat gains in Beijing's summer and winter.
2. **Zhang S†**, Chen T†, Liu N, Li N, Yuan C. Spatial-temporal variations in mobility flow heat risks in China's megacities under heatwave.

• **Theses:**

1. **Zhang S**. (2025). Design Optimization of Outdoor Thermal Environment and Building Form Layout under Extreme Climate Risks. ***Tsinghua University***, PhD thesis, (Excellent PhD Thesis Award, Supervisor: Prof. Nian-xiong Liu)
2. **Zhang S**. (2020). Research on Space and Morphology Design of Umbrella Structures Building. ***South China University of Technology***, M.Arch thesis, (Supervisor: Prof. Yang Wang)

• **Book Chapters:**

1. Liu N et al. (2021). A data supported object and performance-based design method for green dwellings. ***Beijing: Tsinghua University Press*** (in Chinese, **Authored Chapter 2**)
2. Zhang Y, Liu N, Cheng X et al. (2025). Design Theories and Indicator Framework for High-Quality Green Building. ***Beijing: China Architecture Publishing Press*** (in Chinese, **Co-authored Chapter 6**)

**PATENTS**

• **Granted Patents:**

1. Hao C, **Zhang S**, Shi S, Liu S, Zhao S, Song Y, Chu Y. (2025). High airtight flush doors with replaceable thresholds and construction methods. China: CN113914746A. (Invention patents)

• **Patents** **Pending:**

1. Liu N, **Zhang S**, Shi S, Lin B. A simulation method for urban building energy consumption based on localized weather data and photovoltaic systems. (Invention patents, originally submitted in July 2025)
2. Liu N, **Zhang S**, Wu X. A method for calculating heat exposure risk considering urban mobility flows and built environment dynamics. (Invention patents, originally submitted in July 2025)
3. Liu N, **Zhang S**. A method and device for calculating the height and canopy distribution of urban evergreen and deciduous trees based on GF-7 satellite imagery. (Invention patents, originally submitted in July 2025)

**AWARDS AND GRANTS**

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| • 2025 | **Excellent PhD Thesis Award**  *Tsinghua University, School of Architecture* |
| • 2023 | **National Postgraduate Scholarship-Joint PhD Training Program**  *China Scholarship Council, Grant Amount: SGD 26,400, Grant No. 202306210331* |
| • 2017 | **Graduate Freshman Scholarship**  *South China University of Technology* |
| • 2017 | **Outstanding Bachelor’s Graduate**  *Hefei University of Technology* |

**RESEARCH PROJECTS**

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| • 2022-2025 | **The National Key R&D Program of China, Supervisor as Co-PI** (Subproject coordinator, Principal Researchers)  *Funding amount: CNY 3,200,000, Grant No.2022YFC3803801* |
| • 2021-2025 | **The National Natural Science Foundation of China (Key Program), Supervisor as Co-PI** (Participation)  *Funding amount: CNY 3,000,000, Grant No.52130803* |
| • 2020-2025 | **The National Natural Science Foundation of China (General Program), Supervisor as PI** (Participation)  *Funding amount: CNY 580,000,* *Grant No.52078262* |
| • 2016-2020 | **The National Key R&D Program of China, Supervisor as PI** (Participation)  *Funding amount: CNY 2,690,000, Grant No.2016YFC0700206* |

**ARCHITECTURE DESIGN**

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| • 2021.02 - 2021.03 | **Ceramic cultural and creative park** | Zibo, Shandong, China |
|  | *Plan drawing with CAD* | |
| • 2019.06 - 2019.07 | **Gymnasium, Yihua Experimental School** | Yueyang, Hunan, China |
|  | *Schematic design* | |
| • 2019.05 - 2019.06 | **New campus planning for the Vocational Institute of Ceramic Arts and Crafts (built)** | Jingdezhen, Jiangxi, China |
|  | *Campus planning, training and laboratory center design, dormitory design* | |
| • 2019.03 - 2019.05 | **Urban design competition for the Core Area of the High-speed Rail Business District (3rd Prize)** | Jingdezhen, Jiangxi, China |
|  | *Concept design and southern building cluster planning* | |
| • 2018.11 - 2018.12 | **Integrated practical training center，Vocational School of Health and Medicine (built)** | Yantai, Shandong, China |
|  | *Schematic design* | |
| • 2018.05 - 2019.07 | **Foreign Languages Vocational College (Built)** | Rizhao, Shandong, China |
|  | *Detailed construction plan, sunlight analysis report* | |
| • 2017.11 - 2018.01 | **Jilin University - Zhuhai campus (built)** | Zhuhai, Guangdong, China |
|  | *Specialist apartments and national academy building design* | |

**DESIGN AWARDS**

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| • 2017 | **i.FUTURE 1st "Future Cities" International Concept Design Competition** | 2nd Prize (2/2)  *Award: CNY 5,000* |
|  | *China Institute of Urbanization, Zhejiang University* | |
| • 2016 | **The 6th IDEA-KING International Landscape Planning & Design Competition** | The Excellence Award (3/4) |
|  | *International Landscape Design Industry Association* | |
| • 2015 | **Shekou Prince Bay Public Cultural Architecture Design Competition** | Top 50 (1/2) |
|  | *Young Bird Plan, China* | |
| • 2014 | **National Green Building Design Competition, Light Green Category** | 3rd Prize (2/3) |
|  | *China Green Building Association* | |

**PRESENTATIONS**

• **Invited Talks**

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| • 2024.02 | **Earth observation and urban morphometrics for urban microclimate research**  *Department of Architecture, National University of Singapore, Singapore* |

**TEACHING EXPERIENCE**

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| • 2022.02-2022.06 | **Teaching Assistant**, “***Building Physics - Thermal Environment***” (junior undergraduate professional theory course), **Tsinghua University**  *Assisted with teaching, supervised experiments, and graded assignments (TA stipend provided)* |
| • 2018.09-2018.12 | **Teaching Assistant**, “***Expert Studio Design***” **and** “***Youth Apartment Design***”(second-year undergraduate professional design course), **South China University of Technology**  *Assist in design guidance, calculate grades, and scan design drawings for archiving* |

**REVIEWER ASSIGNMENTS**

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| • Since 2025.07 | ***Sustainable Cities and Society****,* ***Cities*** |

**PROFESSIONAL AFFILIATIONS**

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| --- | --- |
| • Since 2022 | **The Architectural Society of China** (Member) |

**WORKSHOP PARTICIPATION**

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| • 2017.11 - 2017.12 | **The Skycourt and Skygarden: Towards a Vertical City Theory**  *School of Architecture, South China University of Technology* |

*October 6, 2025*