

# Hang XU

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## EDUCATION

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### Georgia Institute of Technology (GaTech)

Atlanta, US

*Doctor of Philosophy in Architecture*

08/2024-present

- **Relevant coursework:** Data Mining and Statistical Learning, Machine Learning in Environment Science, Computational Data Analytics(Machine Learning)

### The University of Sheffield (TUoS)

Sheffield, UK

*Master of Science in Sustainable Architecture Studies (Distinction)*

07/2020-11/2021

- **Relevant coursework:** Principle of Building Physics for Sustainable Design, Environment and Technology in Design, Building Environment Simulation and Analysis, Building Information Modelling

### Nanjing Institute of Technology (NJIT)

Nanjing, China

*Bachelor of Engineering in Architecture*

09/2015-06/2020

- **Relevant coursework:** Architecture Design, Architecture Mechanics, Architecture Material, Architecture Structure, Computer Aided Architectural Design, Programming Language C

## PUBLICATION AND MANUSCRIPTS

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- [1] **Xu, H.**, Li, C., Dogan, T., Kastner, P. (2025). Understand Urban Building Energy Consumption with Explainable Machine Learning Approaches. In: CAAD Futures 2025 (under review)
- [2] Wang, C., Shi, Y., Ma, C., **Xu, H.**, and Kastner, P. (2025). Reimagining Chinese Garden Design: An Interactive Approach Using Stable Diffusion. In: CAADRIA 2025, Tokyo, Japan (accepted)
- [3] Zhuang, J., Li, G., **Xu, H.**, and Xu J. (2024). TEXT-TO-CITY: Controllable 3D Urban Block Generation with Latent Diffusion Model. In: CAADRIA 2024, Singapore, April 23–25, 2024, 169–178.
- [4] **Xu, H.**, and Wang, T. (2023). A Generative Computational Workflow to Develop Actionable Renovation Strategies for Renewable Built Environments: A Case Study of Sheffield. *International Journal of Architectural Computing*, 21 (3), 516-535.
- [5] **Xu, H.**, and Wang, T. (2022). An Integrated Parametric Generation and Computational Workflow to Support Sustainable City Planning. In: CAADRIA 2023, Sydney, Australia, April 9–15, 2022, 535–544.

## WORK EXPERIENCE

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### Architectural Design and Research Institute of Tsinghua University Co., Ltd (THAD)

Beijing, China

*Research Architect*

07/2022-08/2023

- Developed full life-cycle design of high-performance building projects; contributed to building modeling, performance simulation and optimization under domestic sustainability principles; evaluated feasibility of proposed green building plans and presented projects to clients
- Conducted background analysis and concept design in research-based projects of urban renovation projects; created digital-twin database of existing building stock for specific historic blocks
- Led a team of four in studying AI-generated content tools in early stage of architectural design; trained customized text-to-image AI models for the company and completed several generative design schemes for bidding projects

### Tianhua Architecture Planning and Engineering Co., Ltd

Shenzhen, China

*Junior Architect*

02/2022-06/2022

- Worked as a parametric designer in AICO (Shenzhen) office for public buildings, focusing on architectural morphology study based on performance analysis; optimized facade system to balance design and budget
- Proposed story lines and developed operation strategies for urban complex project in a low-carbon and environmentally-friendly context to meet economic requirements of global clients

## SELECTED RESEARCH EXPERIENCE

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### Building Energy Demand Prediction Interface

Georgia Institute of Technology

Team leader

08/2024-11/2024

- Lead a team in Vertically Integrated Projects (VIP) at Gatech to develop tools for sustainable decision making
- Designed and implemented advanced data mining algorithms in Python to extract, process, and integrate complex datasets from the National Renewable Energy Laboratory (NREL)
- Developed and optimized a machine learning pipeline for predictive modeling, which included feature engineering, feature importance analysis, and performance benchmarking across multiple machine learning algorithms
- Developed an interactive web interface to deploy the predictive model, presented the project at Georgia Undergraduate Research Conference (GURC 2024)

### Text Prompt to City: 3D Urban Generation with Latent Diffusion Model

Tsinghua University

Group researcher

05/2023-08/2023

- Worked in a group to study text-to-image models based on deep learning; proposed an AI-aided generative pipeline to create 3D city models in early design utilizing a fine-tuned latent diffusion model
- Developed an algorithm in Python environment to extract feature of urban depth map; created an automatic script to generate hybrid datasets of image and label for model training
- Adjusted hyperparameters to fine-tuned models and obtained a best model for urban plan generation
- Designed a quantitative evaluation system to test the relevance between input prompts and output images
- Edited an academic paper for the project and submitted the manuscript [1] to *CAADRIA 2024*

### Decarbonising Sheffield with Renewable Energy

University of Sheffield

Postgraduate Thesis

02/2021-08/2021

- Conducted studies on engineering-based approach of urban building energy model (UBEM); evaluated the potential renovation strategies for Sheffield city region to reduce carbon emissions
- Proposed a customized workflow to generate LoD1 urban model utilizing an integrated GIS data package; classified buildings into 12 archetypes for energy simulation.
- Developed a simulation programme to translate archetypes into thermal models for predicting heating and cooling demand; implemented PV-T panels and efficient building envelope as renewables to create supply model
- Compared demand and supply model under several energy benchmarks, observed potential peak carbon emission reduction in typical winter day and summer day in the studied region.
- Presented a brief version of this project [3] at *CAADRIA 2022*; published the full paper [2] in *IJAC*

## SELECTED PROJECT EXPERIENCE

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### Whole Process Design of Sports Center in Baoding

Tsinghua University

Research Architect

07/2022-08/2023

- Assisted the senior architect to complete morphology modeling and structure design for a series of stadiums in the sports center; proposed passive design strategies and edited life-cycle assessment documents for the audit
- Schematic Design: Studied the physical features of saddle surface and applied a similar hyperboloid geometry to the canopy of stadium, reducing the volume of steel structure by around 20%
- Design Development: Developed a parametric script to control shading device in the facade system; found the best facade option according to user sight line and artificial light performance analysis
- Construction Document: Cooperated with Department of Building Information Modelling to rebuild digital building models for project management; refined the building skin and detailed node of the cladding
- Completed feasibility report of a centralized energy station; employed medium-depth geothermal heat pump systems as renewables, reducing operating costs by 30.6% compared to decentralized energy methods