Xini Chai

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EDUCATION

Southeast University, M.Arch in Intelligent Design & Construction (Architecture) 2022.9 – 2025.6

- **Average Score:** 90 / 100 (Top 15%)
- **Core Courses:** Design Theory and Method of BIM-CIM, Modern Urban Design Methodology, Big Data Analysis and Urban Application, Computational Design and Digital Fabrication

Hunan City University, B.Eng in Architecture 2011.9 – 2016.6

- **GPA:** 3.04 / 4.0 (Top 20%)
- **Core Courses:** Architecture Design, Architectural Construction, Advanced Mathematics, Architectural Physics, Principle of Urban Planning, Introduction to Urbanology

RESEARCH INTERESTS

- BIM and GIS data integration for building lifecycle management
- Semantic Web and ontology modeling in construction informatics
- Computer vision for construction progress monitoring
- Prefabricated and industrialized building systems

PUBLICATIONS

[1] ***Chai, X.***, Zhang, H., Zhu, A.,et al.BIM-based Visualization and Semantic Web Integration for Component-Level Construction Progress Management. (Manuscript completed, under submission)

[2] Zhu, A., ***Chai,X.***, Li, Q.,et al. BIM-based Image Recognition Framework for Robotic Space Localization. *Automation in Construction* (under review)

[3] Zhu, A., Shao, Z., ***Chai, X.***,et al. Component-based BIM-Semantic Web Integration for Enhanced Robotic Visual Perception. *Automation in Construction,2025* (SCI, IF 9.6, JCR-Q1).

[4] Zhou, C., Zhang, H., ***Chai, X.***,et al. Research on the design of prefabricated curved structure production capacity residential energy system: a case study of an entry of 2022 China International Solar Decathlon Competition-'Solar Ark 3.0'. *Architectural Intelligence,2024*.

[5] Chen, X., Zhou, Y., ***Chai, X.***,et al. Algae Reactor: A 3D-printed façade module for cultivating chlorella with indoor CO_2. *The 6th Conference on Computational Design and Robotic Fabrication,2024*.

RESEARCH EXPERIENCE

Master Thesis: Research on BIM-Based Standardization Quantification Methods and Design Optimization of Prefabricated Curved Surface Structure Components

Author | Advisor: Prof. Hong Zhang 2024.6 – 2025.6

- This research aims to apply BIM technology to calculate and improve the standardization of prefabricated curved structural components, reducing costs and increasing assembly efficiency.
- Developed a Rhino-based plugin to calculate the standardization rates of curved structural components and connection nodes.

National Key R & D Program: Green Retrofit and Carbon Neutral Technology for Existing Buildings

Researcher | Advisor: Dr. Aiyu Zhu 2024 – 2025

- Explored methods for robot indoor space localization using vision technology (CNN models). Submitted research outcomes to Automation in Construction journal, currently under review.
- Established a semantic web framework for prefabricated architecture based on BIM data. Utilized YOLO models to align image data with component semantics, enabling robot recognition of component information. Published in Automation in Construction journal.

Sub-project of "High-Quality Green Building Design and Smart Collaboration Platform"

Researcher | Advisor: Prof. Hong Zhang 2023 – 2025

- Focused on UHPC architectural component design and construction methods, and evaluation methods for prefabricated component standardization. Integrated research findings into master's thesis and presented at Southeast University's graduate academic conference.

Textbook Project: "Green Building BIM Construction and Design"

Researcher | Advisor: Prof. Hong Zhang 2024 – 2025

- Authored Chapter 3 on Standardized Design of Curved Prefabricated Structures.
- Developed BIM-based tools for component coding and construction list automation.

2024 Solar Decathlon Design Challenge

Deputy Team Leader | Advisor: Prof. Hong Zhang 2023.11 – 2024.4

- Led building performance design and evaluation with a team of 5, using Energy Plus, Ladybug, and OneClick tools for energy and carbon assessments, and authored evaluation reports.
- Implemented eco-materials (straw insulation), prefabricated steel modules, and solar photovoltaics to achieve A-level embodied carbon and near-zero energy goals; the team won 1st place internationally.

Course Project: Algae Reactor: A 3D-printed façade module for cultivating Chlorella with indoor CO_2

Researcher | Advisor: Dr. Hao Hua 2023.10 – 2024.3

- Developed a modular facade structure for indoor air purification via biophotonic processes. Printed modules using KUKA robots and PETG materials. Integrated a photosynthesis-based algae cultivation system powered by solar panels and air pumps. Presented as a conference paper at CDRF2024.

Course Project: A Smart Community Greening Co-governance System Based on Computer Vision and the IoT

Team Leader | Advisor: Dr. Li Li 2023.4 – 2023.8

- Led a team to survey aging Wuxi communities, analyzed issues, and interviewed residents. Developed "Community Garden" WeChat mini-program and soil environment monitoring hardware system. Our team won the national 3rd prize at the NCDA.

WORK EXPERIENCE

Science and Technology Development Center of Jiangsu Province

Internship in Green Building Division, Jiangsu, China 2023.10 – 2024.1

- Participated in 2 research projects:"High-Quality Green Building Implementation Plan for Changzhou Institute of Building Science" and "Pathways for Green Credit Supporting Low-Carbon Green Building".
- Compiled 2 books: *Award-Winning Works Collection of New Era Rural Party-Crowd Service Center Architectural Design Competition* and *Quality Residential Case Studies*.

Yanfei Architecture Studio

Architect, Shanghai, China 2016.8 – 2022.3

- Served as project leader or sub-project leader, coordinating a team of 5-7 members. Responsibilities covered conceptual design, detailed construction drawings, project management, and delivery.
- Responsible for and participated in over 10 projects, with 6 successfully implemented. Projects spanned various types, including hotels, schools, offices, and residential buildings.

AWARDS AND HONORS

University-Level: Outstanding Graduate Student. 2024

1st Place: U.S. Solar Decathlon Design Challenge (Education Building Division). 2024

The Excellence Award: Delta International Solar Building Design Competition. 2023

The First Prize: Southeast University Postgraduate Academic Scholarship. 2023

The Third Prize: 11th National College Digital Art and Design Awards. 2023

SKILLS

Programming & Data: Python, PyTorch, ROS2 (basic), SPSS, HTML5 (basic)

BIM & Parametric Design: Rhino, Grasshopper, Revit, PKPM, SketchUp, AutoCAD

Visualization & Simulation: D5, Enscape, Adobe Suite, EnergyPlus, ClimateStudio, Ladybug

Languages: Chinese(Native), English(CET-6, Prepare for IELTS)