

Changda Ma

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Research Interests: Urban Health System, Spatial Analytics, AI for Urban and Architecture, Acoustic and Noise Environment, Spatial Sound

EDUCATION

Georgia Institute of Technology. The US

Master of Science in Music Technology and Master of Science in Architecture(High Performance Building)

08/2024-12/2026

Georgia Institute of Technology. The US

Master of Architecture

08/2022-05/2024

Guizhou University. China

Bachelor of Architecture

09/2017-07/2022

PUBLICATION

D Hu., C Ma. & T Rakha. (2025). **An Integrated Framework for Rooftop Solar Viability Assessment: Enhancing Building Reuse and Urban Sustainability through UAV-Derived 3D Modeling and Performance Simulation** " Energy and Buildings, <https://doi.org/10.1016/j.enbuild.2025.116847> (Published)

C Ma., Y Shi., C Wang., & P Kastner. (2025). **Establishing a Fire Risk Map Based on Planned Spatial Layouts and Environment in Rural Planning:A Case Study of a Stereotype Village in China** In Proceedings of 27th International Conference on Human-Computer Interaction (HCI International 2025). (Accepted)

C Wang., Y Shi., C Ma., H Xu., & P Kastner. (2025). **Reimagining Chinese Garden Design: An Interactive Approach Using Stable Diffusion**. In Proceedings of The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2025.(Published)

Y Shi., C Ma., C Wang., T Wu., & X Jiang. (2024). **Harmonizing Emotions: An AI-Driven Sound Therapy System Design for Enhancing Mental Health of Older Adults**. In H. Degen & S. Ntoa (Eds.), Artificial Intelligence in HCI (pp. 439–455). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-60615-1_30 (Published)

Y Shi., C Ma., M Mamoli. (2023). **A Study on Shape Grammar-based Creating Methods and Generative Design of Cellular Bracket on Dong Drum Towers**. In Proceedings of 2024 Academic Conference of Computational Design Professional Committee of the Architectural Society of China. (Published)

RESEARCH EXPERIENCE

Neuroarchitecture: Urban Built Environments' Impact on Mental Health – A Systematic Literature Review

Atlanta, The US

Researcher|Advisor: Prof. Patrick Kastner and Prof. Shalaila S. Haas

08/2024-05/2025

- Learned how to write the structure and content of a systematic literature review, and study systematic literature reviews that have been published in journals.
- Identified selected terms for the study; searched for papers using appropriate boolean formulas in various databases and imported into Covidence(Systematic Review Tool);
- Screened titles and abstracts, developed eligibility criteria, screened full-texts, and drafted data extraction
- Used “OCR Scanning” for extracting all words in filtered papers, and developed Natural Language Processing Models such as “NLTK” and “Word2vec” for data preprocessing.
- Visualized text mining into Cosine similarity Matrix, Correlation Matrix, Hierarchical Agglomerative Clustering, Cross Correlation Matrix and 2D relationship Projection and data analytics.

Data-Driven Fire Risk Mapping in Rural Planning: A Case Study of Stereotype Villages

Atlanta, The US

Researcher|Advisor: Prof. Patrick Kastner

01/2024-05/2024

- Reviewed literature related to urban or suburban fire risk management, found there are two research gaps: i. Only research on a single factor to manage fire risk in an area, without considering the impact of the interaction of different factors; ii. more research on building materials and emergency infrastructure to assess fire, but not in a data-driven way through the micro-climate, topography, and spatial layout of the area.
- Used the plugin “Urbano” in Grasshopper to simulate the spatial layout of the village investigated, divided into 100 cells; utilizing the spatial syntax plugin “decoding space” in Grasshopper to simulate the visibility of houses to evacuation routes. Combined the length of the evacuation route with the area of the visual field gives the coefficients of fire assessed by spatial layout.
- Studied the CFD-based grasshopper plug-ins “Butterfly” and “Eddy3D” to simulate the wind environment in the area; analyzing the terrain slope using the plug-in ladybug; and collecting “Monthly Mean Precipitation Probability” data for the study area.
- Researched “BehavePlus 5.0” (fire calculation software) to calculate Wind adjustment factors (WAF), mid-flame wind speeds, flame lengths, and maximum surface fire spread rates. Based on this data, obtained the coefficients of fire assessed by environmental factors.
- Combined the coefficients of fire assessed by spatial layout and environment to get the fire risk map simulated the fire risk management.

Sound Therapy System Design for Enhancing Mental Health of Older Adults

Atlanta, The US

Researcher|Advisor: Dr. Yousef

08/2023-12/2023

- Collected evidence from global reports and studies to assess the emotional well-being of elderly during the COVID-19 pandemic.
- Developed different types of songs and using “mirtoolbox” in MATLAB to analyze the brightness, flatness, centroid, and spread of high-mid and low-mid, pulse strength and rhythmic clarity as well as novelty. Through the theoretical models of arousal and valence, connecting the obtained music feature data to the theoretical models
- Participated in setting up an Arduino-based setup for precise HRV measurement and incorporated strategies to minimize error and noise.
- Designed the UI of the Sound Therapy robot and the guardian mobile app.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant Of Georgia Tech

Atlanta, The US

AI and Robotics in digital fabrication

01/2026-05/2026

- Set up AI-integrated robotic workflows for material handling.
- Assemble hardware and integrate sensors/feedback systems.
- Develop ROS-based robot programs, and design and build robotic end effectors.

Graduate Research Assistant Of Georgia Tech

Atlanta, The US

Sustainable Urban Systems Lab led by Prof. Patrick Kastner

01/2025-05/2025

- Developed data extraction from the filtered papers in "Neuroarchitecture" Systematic Literature Review.
- Collected all words from the filtered paper in "Neuroarchitecture" Systematic Literature Review using "OCR Scanning" method.
- Conducted Natural Language Processing(NLP) model such as Word2Vec and NLTK for preprocessing among all extracted words.
- Visualized Text Mining results by Cosine Similarity Matrix, Correlation Matrix, Cross correlation Matrix, and 2D relationship Projection.

Graduate Teaching Assistant Of Georgia Tech

Atlanta, The US

M.Arch Required Course "Media Modelling II" Fall 2024 Teaching Assistant

08/2024-12/2024

- Evaluated the assignment on "Mathematical Surfaces + 3D Attractor" and "Building System".
- Developed tutorials for "Enscape for Rhino" and "How to install Grasshopper toolkit"
- Managed daily attendance and solve students' problems on Grasshopper.(44 students across two teaching sections)

Lab Research Assistant Of Georgia Tech

Atlanta, The US

I2CE Lab Research Assistant led by Prof. Rocker

05/2024-07/2024

- Conducted 3D modeling and created layouts and sections for the Georgia Tech Art Square Urban Design Study
- Calculated areas (sqft) for various types and floor layouts.

Graduate Teaching Assistant Of Georgia Tech

Atlanta, The US

M.Arch Required Course "Integrated Building Systems II" Spring 2024 Teaching Assistant

01/2024-05/2024

- Conducted tutorials and provided guidance on Revit and Rhino, focusing on collaborative workflows.
- Assisted in identifying structural and construction-related issues.
- Organized and maintained weekly sign-up sheets for group reviews, overseeing 23 students across 6 groups.
- Created instructional content on "How to Collaborate in Teams in Revit", enhancing students' technical skills.

Atelier Global Limited

Shenzhen, China

Architecture Internship

06/2023-08/2023

- Developed design schemes, 3D models, and reports for the Qingdao Zhongshan Road No.78 Renovation Project.
- Created interior renderings for the Zhengzhou East Railway Station.
- Contributed to exhibition modeling for Atelier Global Limited showcases.

Galaxy Global International LLC

Atlanta, The US

Packaging Designer Internship

05/2023-06/2023

- Designed packaging for prepared dishes, seafood, and frozen products.

Survey and Design Research Institute of Guizhou University

Guiyang, China

Old Town Renewal Internship

03/2022-06/2022

- Conducted on-site investigations in Yunyan District, Guiyang City, including surveying, documentation, and stakeholder communication.
- Designed and detailed plans for facade rehabilitation and roofing replacements of existing buildings.
- Created Rhino models for integrated building design and analyzed the role of public spaces in old towns.

SOFTWARE SKILLS

Design & Modeling

Rhinoceros (master), Sketchup (master), AutoCAD (master), Revit (master)

Visualization & Representation

Adobe Suit(Photoshop (master), Illustrator (master), InDesign (master)), TouchDesigner (Medium)

V-ray (master), Enscape (master), Lumion (medium), Keyshot (medium)

Parametric Design

Grasshopper (master), Processing (medium), P5.js (medium)

Programming Language

C/C++ (medium), Python (master), Java (medium), Javascript (master), R (medium)

Office

Word (master), Excel (master), Power Point (master)

AI Tools

Midjourney (Medium), Stable Diffusion (Master)

Game & Animation

Unity (Master), Blender (Master)

Audio Production & Sound Design

Ableton Live (Master), FL Studio (Master), Max/MSP/Jitter (Medium)

Hardware & Prototyping

Arduino (Medium)

UI/UX Design

Figma (Master)

GIS & Spatial Analysis

ArcGIS Pro (Master), Arcgis Online (Medium), Arcgis Storymap (Medium)

LANGUAGE&INTEREST

Language

Mandarin (Native), English (Fluent)

Interest

Guitar, Electric Piano, Drum, Singing, Basketball