Rong Huang

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Research Statement

Research Interests

- My research focuses on **Human-AI Collaboration for Environmental Design**, primarily utilizing Generative AI and Human-Computer Interaction methodologies in two stages of the design process:
  - **Perception:** exploring and enhancing Generative AI's capability to perceive, reason, and align with complex human-centric values.
  - **Action:** designing and evaluating collaborative systems using HCI principles to integrate AI capabilities into real-world environmental design workflows for both designers and non-designers.

Personality

- Creative, well-motivated for novel research, with a strong blend of analytical and empathetic skills.

Education

2022 – now
- **Ph.D. Candidate, Computational Media and Arts** in The Hong Kong University of Science and Technology (Guangzhou), China
  Supervisors: *Prof. Wei Zeng*, and *Prof. Kang Zhang*
  Human-AI Collaboration | Human-Computer Interaction | Generative AI

2019 – 2022
- **M.Eng., Architecture** in Tongji University, China
  Thesis title: *Economic Benefit Measurement of Street Space Quality and Urban Design Guidance: Based on Multi-source Data and Machine Learning*
  Supervisors: *Prof. Yu Ye*
  Urban Data Analysis | Data-Driven Urban Design

2014 – 2019
- **B.Arch., Architecture** in Hunan University, China
  Outstanding Graduate.
  Architecture Design | Urban Design

Research Publications

First Author Publications

1. **PlantoGraphy: Incoporating iterative design process into generative artificial intelligence for landscape rendering** in *Proceedings of ACM CHI Conference on Human Factors in Computing Systems*, 2024. DOI: 10.1145/3613904.3642824.
   Rong Huang, Hai-chuan Lin, Chuanzhang Chen, Kang Zhang, and Wei Zeng* *(CCF-A)*

2. **SceneWeaver: A multi-agent collaborative system for 3D scene creation in video games** in *Proceedings of the International Symposium on Visual Information Communication and Interaction*, 2025. DOI: 10.1145/3769534.3769540.
   Rong Huang, Chenxi Ruan, Bingchuan Jiang, and Wei Zeng*

3. **Synthetic data generation with spatial and semantic fidelity for multimodal large language model on architectural heritage interpretation** *Major revision at npj Heritage Science.* 2025.
   Rong Huang, Hai-chuan Lin, and Wei Zeng*

4. **Introducing ManyViews: An AI-assisted tool to support citizens' engagement in the design of urban spaces** *Major revision at International Journal of Human-Computer Studies.* 2025.
Rong Huang, Yihan Hou, and Wei Zeng*

Co-Author Publications

1. **Unified visual comparison framework for human and AI paintings using neural embeddings and computational aesthetics** in *IEEE Computer Graphics & Applications*, vol. 45, no. 2, 2025. DOI: 10.1109/MCG.2025.3555122.
Yilin Ye, Rong Huang, Kang Zhang, and Wei Zeng* *(SCI Q3)*

2. **VISAtlas: An image-based exploration and query system for large visualization collections via neural image embedding** in *IEEE Transactions on Visualization and Computer Graphics*, vol. 30, no. 7, 2024. DOI: 10.1109/tvcg.2022.3229023.
Yilin Ye, Rong Huang, and Wei Zeng* *(SCI Q1)*

3. **Is it the end? guidelines for cinematic endings in data videos** in *Proceedings of ACM CHI Conference on Human Factors in Computing Systems*, 2023. DOI: 10.1145/3544548.3580701.
Xian Xu, Aoyu Wu, Leni Yang, Zheng Wei, Rong Huang, Yip David, and Huamin Qu* *(CCF-A)*

4. **A data-informed analytical approach to human-scale greenway planning: Integrating multi-sourced urban data with machine learning algorithms** in *Urban Forestry & Urban Greening*, vol. 56, 2020. DOI: 10.1016/j.ufug.2020.126871.
Ziyi Tang, Yu Ye, Zhidian Jiang, Chaowei Fu, Rong Huang, and Dong Yao *(SCI Q1)*

5. **HeritageExplorer: Interactive visualization and dialogue system for multi-modal architectural heritage exploration** in *Proceedings of the International Symposium on Visual Information Communication and Interaction*, 2025.
Yusong Wang, Yihan Hou, Rong Huang, and Wei Zeng*

6. **GAMA: A grammar-aware multi-agent system for natural language graph annotation** *Under review at ACM CHI Conference on Human Factors in Computing Systems.* 2026.
Yilun Fan, Xiao Wang, Rong Huang, Ying Zhao, Fangfang Zhou, and Wei Zeng*

7. **ColorMAS: A multi-agent system with phase-aware rule representation for color design** *Under review at ACM CHI Conference on Human Factors in Computing Systems.* 2026.
Yihan Hou, Rong Huang, Bingchuan Jiang, and Wei Zeng*

Research Projects

2025.01 – 2027.12

- **Guangxi Key Research and Development Program:** "Key Technologies for Trustworthy Intelligent Integration of Guangxi Traditional Architecture Based on Multimodal Data" (PI: Prof. Wei Zeng)
  Funding: ¥600K out of ¥1.5M.
  Role: Project Coordinator
  - Contribute to the grant proposal, defining the core technical roadmap and the project timeline.
  - Lead and manage the research team, and responsible for the core technical development and key research outputs.
  - Prepare progress reports and technical documentation.

2020.01 – 2022.06

- **National Natural Science Foundation of China:** "Measuring public space quality: An evaluation model and its design support based on multi-sourced urban data and deep learning algorithms" (PI: Prof. Yu Ye)

  Role: Student Researcher

  - Multi-sourced urban dataset construction using Python and GIS.
  - Statistical analyses to support the development of the evaluation model.

2020.01 – 2021.12

- **National Natural Science Foundation of China:** "Walkability of street interfaces: A fine-scale measurement and design control methods" (Case study: Shenzhen) (PI: Prof. Yu Ye)

  Role: Student Researcher

  - Performed data statistical analysis using Python.
  - Managed the visualization and layout of research findings for publication.

Work Experience

2019 – 2022

- **Research Assistant,** the Computational Urban Design Research Centre (PI: Dr. Yu Ye), Joint Laboratory for International Cooperatuon on Eco-Urban Design (Tongji University), Ministry of Education, China.

2021.06 – 2021.09

- **Urban Design Intern,** Skidmore, Owings & Merrill LLP (SOM), Urban Design Department, Shanghai Office, China.

2018.06 – 2018.09

- **Architecture Design Intern,** URBANUS architecture and urban design practice, Shenzhen Office, China.

Awards

2019.12

- **First Prize,** Shanghai Urban Design Challenge (award ¥100K about $14,000). The best team among 105 teams from different countries.

2016.06

- **Research Prize,** Architecture and Urban Design: Case Study House in USA (award ¥20K about $3,000). Only the top 1% students were prized among 500 peers.

Skills

Design Tools

- Interactive Prototyping (Figma), 3D Modeling & Animation (Rhino, SketchUp, Cinema4D, Unity, Unreal Engine), Adobe Suites

Analysis & Programming

- Python, ArcGIS, SPSS, P5.js, PyTorch, C# (Unity)

HCI Methods

- User-Centered Design, Qualitative Methods (Thematic Analysis, Interviews), Quantitative Methods (Statistical Analysis), Prototyping

Languages

- Mandarin (Native), English (Professional Proficiency), Cantonese, Hakka