Ziru Wei

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Research Interests: Bring AI capabilities into everyday physical environments to advance human lives

I aim to (1)construct AI-backed infrastructure that enables new interactive dimensions, (2)augment existing interactive systems for more contextually appropriate and less disruptive interactivity, and (3)understand and model user behavior and perception to inform both.

Education

Carnegie Mellon University May 2026
- Master of Science in Computational Design (research-based), GPA: 4.14/4.33
- Thesis Topic: *Toward Interacting with Proactive Intelligence in Everyday Physical Environments* (Advised by Prof. Alexandra Ion)
- Selected Courseworks: 05-899 Computational Methods for Interactive Systems, 15-112 Fundamentals of Computer Science, 05-610 User-Centered Research and Evaluation, 15-387 Computational Perception, 05-899 Interactive Extended Reality

Soochow University Jun 2024
- Bachelor of Architecture, GPA: 3.7/4.0

Research Works

[R1] **(Ongoing) ROchestrator: Steering Proactive Robot Behavior via Task-Aware Interruptibility Estimation**
Ziru Wei, Alexandra Ion

[R2] **(In submission) "Let Me Lend You a Hand": Understanding Contextual Perceptions of Physical Proactivity in Small-Scale Personal Assistance Robots**
Ziru Wei, Violet Yinuo Han, Tanvi Handoo, Alexandra Ion

[R3] **(In submission) Embodiment and Interaction Influence Perceptions of Robotic Collaborators in Everyday Physical Tasks**
Violet Yinuo Han, Ziru Wei, Aiden Yiliu Li, Chris Wu, Alexandra Ion

[R4] **Embodied Generative Taskscape: Re-Connect Cultural-Ecological Perception in 5-Animal Play**
Ziru Wei, Jimmy Cheng. Abstract accepted to the *50th Annual Meeting of the Society for Social Studies of Science (4S 2025)*, Seattle, WA, Sept 3–6, 2025.

[R5] **On-site Holographic Building Construction: A Case Study of Aurora**
Sijie Liu, Ziru Wei, Sining Wang. *Proceedings of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA)*, 2022 (peer-reviewed, ~30% acceptance, top-tier computational design conference)

Experience

Research Student | Interactive Structures Lab, Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University Mar 2025 - Present
- Advisor: Prof. Alexandra Ion
- Developing a computational system for task-aware interruptibility estimation; leveraging multimodal LLMs to infer urgency, importance, and semantic relevance of robot goals relative to user activity; optimize robot interruption timing, trajectory, and notification details in high-stakes environments (See R1)
- Led a Wizard-of-Oz study (N=15) examining user perception of proactive robots; designed a 2×3 experiment (proactivity type × level) across 3 environments; mixed-methods analysis revealed environment and proactivity type shape perceived helpfulness and distraction; articulated design implications around privacy, agency, and trust (See R2)
- Contributed to a human-robot interaction study investigating the interplay between robotic arm mounting formats and assistance initiative levels (See R3)

Research Intern | WHY Research Lab, School of Architecture, Carnegie Mellon University Aug 2024 - Jan 2025
- Advisor: Prof. Daragh Byrne
- Replicated an e-waste scanner by disassembling and re-soldering disk drives, integrating a Raspberry Pi controller; built the WasteStation database in Notion to map components and their potential reuse applications

Research Intern | Humachine Lab, Architecture Department, Soochow University May 2021 - Aug 2022
- Advisor: Prof. Sining Wang
- Designed MR workflows and four on-site collaboration methods for nonlinear façade assembly with limited devices and a small construction team; documented the design-to-construction process and contributed to the literature review part in paper writing (See R5)

Skills

Technical
- Hardware: Arduino, Raspberry Pi
- Programming: Python, PyTorch, Rstudio, C#, Pascal, HTML, CSS, JavaScript

Design & Production
- Software: Unity, Rhino, Grasshopper with GHPython, Blender, AutoCAD, Adobe Creative Suite, Figma, Procreate
- Fabrication: 3D printing, Soldering and electronic wiring, Welding (basic), Woodworking

Languages
- English (Fluent), Mandarin (Native), Portuguese (Beginner)

Awards and Honors

Computational Design Commendation, Carnegie Mellon University 2025

Computational Design Commendation, Carnegie Mellon University 2024

Merit Scholarship, Carnegie Mellon University 2024

Outstanding Undergraduate Thesis (Top 1%), Soochow University 2024

Excellence Award, Shanghai Youth Architectural Design Competition 2023

Innovation & Academic Excellence Scholarship, Soochow University 2020 - 2022

Overall Excellence Award Winner, Solar Decathlon China 2022

First Prize (Top 2%) in "Zijin Award" of Architectural Design Contest 2022

METTLER TOLEDO Scholarship (Top 2%) 2019

Activities

Course Guest Reviewer | 62-275 Fundamentals of Computational Design in 25 Spring, Carnegie Mellon University Jan 2025 - May 2025
- Provided feedback on team-based computational design projects for over 50 students

Student Volunteer | des[AI]gn conference 2024, American Institute of Architecture Students Oct 2024
- Assisted in workshop setup, documented the sessions through photography, and facilitated the use of interactive swatch-making software for creating knit samples in Textiles Lab, Carnegie Mellon University
- Coordinated logistics and facilitated the setup for an AI panel discussion and the opening session of the conference

Design Exhibition Curatorial Assistant | Soochow University May 2021
- Organized featured models and drawings for the exhibition, assisting in the re-arrangement of the architecture department's showcase