Yihan Zhang
Senior-year Undergraduate Student
School of Information and Library Science
The University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
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EDUCATION

B.S **The University of North Carolina at Chapel Hill**, NC, USA
Aug 2023 - Dec 2025 (expected) | **Information Science; Minor in Studio Art & Geography**

Wenzhou-Kean University, Wenzhou, China (Kean University, NJ, USA – Wenzhou Campus)
Aug 2021 - May 2023 | Computer Science *[pandemic period transition]*

CORE COURSEWORK

- GIS Analyze with R (A)
- Information Visualization (A)
- Product Management (A)
- Human-Computer Interaction UI/UX Design (A)
- Object-Oriented Programming with Java
- Applied Arts [Painting, Photography] (A)

RESEARCH STATEMENT

My academic work focuses on solving real-world problems by building deployable, human-centered intelligent systems. I combine social and behavioral data modeling with multi-sensor perception and coverage-first planning; e.g., **zigzag full coverage with local avoidance, paired with incentive-driven interfaces to close the loop from source reduction to field operations.** I emphasize fast, low-cost prototyping (3D printing, laser cutting, Arduino/edge inference) and clear, reproducible evaluation (e.g., pilot runs showing [≥ 25%] higher coverage rate and [≥ 30%] fewer false positives under strong glare).

Long-term, I aim to establish a **replicable, scalable workflow** that unites sensor–algorithm co-design with usable HCI, **translating field-validated prototypes** into robust services and sustainable urban applications, especially in **high-density environments and commercialization** settings.

INDUSTRIAL R&D & SELECTED PATENTS

R&D Team Member, Wenzhou Jiawei Environmental Technology Co., Ltd. (Subsidiary of Weiming Group, a ***40B HKD*** Chinese A-Share Listed Company)

Contributed to industrial hardware R&D, resulting in co-authorship on multiple utility model patents. (**Research through Design with Industry background**)

First Inventor, China Utility Model Patent (CN209791046U) * Title: A Disc-Tube Reverse Osmosis Apparatus for Landfill Leachate. * Contribution: Solved a critical **human-centered usability problem** ("difficult to clean") by designing a detachable filter mesh structure , transforming a maintenance bottleneck into a serviceable system.

Co-Second Inventor, China Utility Model Patent (CN215209304U) * Title: An Extraction Device for Kitchen Waste Gutter Oil. *** Contribution:** Co-designed a complex mechanical apparatus for multi-stage pressing, filtering, and waste separation , proving capability in industrial hardware/ Engineer design.

SELECTED WORK

Senior Capstone Project: "Ctrl+Alt+Offline" (A Design Thinking Framework)
B.S. in Information Science Capstone Project (Team-Based) | In Progress (Expected Dec 2025)
• **My Role: System Architect & HCI/HCD Researcher.** In this team-based Design Thinking project, I co-led the system architecture design and **Product Design Rationale.**
• Conducted **user research** ("In our survey...") to analyze user motivations and existing "drastic" user strategies (e.g., letting the phone die).
• Designed a novel hardware-software intervention concept: a "**Smart Charger**" paired with a **social-gamification app** that uses a "progress-loss" mechanic to ensure accountability.
• This project demonstrates my strength in the **critical "front-end" of research:** defining a human-centered problem, analyzing user needs, and designing a robust **system architecture and User Flow** before fabrication.

*"Capstone project in **preparation for submission** to HCI conferences (e.g., CHI or UbiComp)."*

"Chill by U" Modular Customizable Laptop Stand with Adaptive Cooling and Phone Dock
Winner, 2nd Most Creative Prize – UNC MakerFest 2024
• Created a modular stand tailored to college students' multitasking habits: integrated phone dock, pen holder, and cup mount.
• Added Arduino-controlled fan system based on real-time thermal feedback for efficient laptop cooling.
• Constructed with laser-cut wood and 3D-printed modular joints, enabling reconfiguration for different workspace setups.
• Focused on daily user experience and ergonomic optimization, with attention to aesthetic detailing and portability.

SmartCan: Public Sorting Assistant for Trash Behavior Correction
User-Centered Design | Interaction Design Project
• Designed a UI-integrated trash bin system that visualizes behavioral feedback to encourage proper sorting.
• Applied social incentive models and behavioral economics principles to shape long-term user habits.
• Featured visual display, motion sensor activation, and responsive lighting to increase interaction and awareness in shared spaces.
• Emphasized urban micro-interaction with implications for city-scale behavior intervention systems.

Smart Feeder: Intelligent Bird Feeding System
Arduino-based Autonomous Device | UNC Maker Project
• Developed an intelligent bird feeder using photoresistor and pressure sensors to distinguish birds from intruding animals (e.g., squirrels).
• Integrated automatic gate control based on weight and light input; planned for future upgrade with YOLOv8 image recognition.

• Emphasized sustainability with over 90% recycled materials (e.g., acrylic panels, reused plastic bottles, biodegradable PLA).
• Addressed real-world need for remote feeding and species-specific delivery via behavior-informed control logic.

Lake Surface Cleaning Robot / VesselEnvironmental Robotics Concept
Environmental Robotics Concept Solution Design
• Developed a robot system to clean surface trash in lakes.
• Designed a double-layered collection net structure with floating sensors to control water-level adaptation.
• Used Arduino motor control and real-time feedback mechanism.
• Emphasized environmental sensing and hardware feasibility in open water environments.

Population Change and Spatial Autocorrelation in the U.S. (2020–2024)
Geospatial Analysis with R | R - Data & GIS Analysis Project
• Used ***R, sf, spdep, and tmap packages to analyze population growth patterns and spatial autocorrelation across U.S. states.***
• Built spatial weight matrices, calculated *Moran's I, and visualized hot spots.*
• ***Integrated socioeconomic data (unemployment rates) with Census and shapefiles for deeper interpretation.***
• Delivered technical and policy-relevant insights on demographic shifts and clustering.

ArcGIS Story Map Blog: Spatial Inequality in the Global Coffee Trade
Global Development & Inequality Analysis with Data Analysis
• Created an interactive ArcGIS Story Map comparing coffee trade systems in Vietnam and Ethiopia.
• Explored how spatial factors like infrastructure and land access shape economic outcomes.
• Incorporated visual data layers, institutional actor mapping, and Gini coefficient overlays.
• Synthesized development theory (colonial geographies, capability theory) with visual storytelling.

INDUSTRY EXPERIENCE

China Construction Bank, Institutional Business Department | *Intern*
Product & Information Management
Zhejiang, China | May 2024 – Aug 2024
• Participated in the development of consumer-oriented digital products for banking applications.
• Assisted in the design of a Human Resources Information Management System (HRIMS) for a major institutional client.
• Contributed to full-stack development: grid architecture, coding, bug fixing, and documentation.
• Engaged in team-based technical discussions and iterative testing.

Weiming Environmental Protection Co., Ltd. | *IT Operations Intern*
Zhejiang, China | Jun 2022 – Aug 2022
• Assisted in web-based development for industrial applications, including front-end functionality and backend API integration.
• Developed Python + Selenium automation scripts to monitor system status; reduced system failure response time and decreased maintenance ticket volume by 40%.
• Compared EU and Chinese environmental regulations to incorporate relevant compliance features into platform design.

Wenzhou Jiawei Environmental Tech. | *R&D Team Member (Hardware/Prototyping)*
Wenzhou, China | Mar 2019 – Present (Part-time)
• Contributed to industrial hardware R&D, focusing on solving human-centered usability and maintenance bottlenecks for environmental machinery.
• Led the design (as First Inventor) and co-designed (as Second Inventor) novel mechanical systems, resulting in multiple (5) nationally granted utility model patents .
• Translated engineering requirements into prototypes, demonstrating long-term experience in building real-world, physical systems .

*(Subsidiary of **Weiming Group,** a Chinese A-Share Listed Company)*

HONORS AND AWARDS

2024 UNC MakerFest — 2nd Most Creative Prize ("**Chill by U**" Laptop Stand)

2022 Let's Charrette & Sustainable Campus Design Competition, 3rd Campus topic Prize

2025 Selected Exhibitor — UNC Smart Design Showcase,

2024 UNC Academic Excellence Dean's List (3 Times)

TECHNICAL SKILLS

Programming: Python, Java, R, JavaScript, HTML5, Matlab
Tools: Adobe Illustrator, Figma, Arduino, ArcGIS, Rhino, Unity, SQL, After Effects
Prototyping: Laser cutting, 3D printing, soldering, 3DMax, TinkerCAD, Vinyl cutter
Others: Git, LaTeX, Blender, Photoshop, LightRoom, PR

LANGUAGES

Mandarin (Native), English (Professional Efficient), Japanese (Beginner)