Xueyan Cai

Zhejiang University (ZJU)
Hangzhou, Zhejiang 310058, China

1025816190cxy@gmail.com
https://xueyancai.com

Education

Zhejiang University, Hangzhou, China — 09/2022 – 06/2025 (Expected)
M.E. in Industrial Design Engineering
GPA: 91.30/100.00 (3/40). Advisor: Cheng Yao.

Jiangnan University, Wuxi, China — 09/2018 – 06/2022
B.E. in Industrial Design
GPA: 91.25/100.00 (2/56)

Research Interests

Human-Computer Interaction, Game Design, Tangible Interaction, Healthcare, Creativity, Generative AI, Interactive Learning Technologies, Child-Computer Interaction

Publications

Conference Papers

1. **Xueyan Cai**, Kecheng Jin, Shang Shi, Shichao Huang, Ouying Huang, Xiaodong Wang, Jiahao Cheng, Weijia Lin, Jiayu Yao, Yuqi Hu, Chao Zhang, Cheng Yao. 2024. "See, Hear, Touch, Smell, and, ...Eat!": Helping Children Self-Improve Their Food Literacy and Eating Behavior through a Tangible Multi-Sensory Puzzle Game. In *Proceedings of the 23rd Annual ACM Interaction Design and Children Conference (IDC'24)*. [DOI] **(Best Short Paper Award)**

2. **Xueyan Cai***, Yingjing Xu*, Zihong Zhou, Mengru Xue, Zhengke Li, Chentian Weng, Wei Luo, Cheng Yao, Bo Lin, Jianwei Yin. 2025. "Break the Mask Barrier": An AU-based Rehabilitation Training System for Parkinson's Hypomimia. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '25)*. [DOI]

3. Weijia Lin*, **Xueyan Cai***, Shichao Huang, Haoye Dong, Jiayu Yao, Jiayi Ma, Fengyu Wang, Shuyue Feng, Kecheng Jin, Cheng Yao. 2025. Exploring a Tangible Interaction System for Behavior Management to Alleviate Children's Dental Anxiety in Waiting Rooms. In *Proceedings of the 23rd Annual ACM Interaction Design and Children Conference (IDC'25)*. [DOI]

4. Yijun Zhao, Zhengke Li, Yicheng Wang, **Xueyan Cai**, Xiaojing Zhou, Yifan Yan, Kecheng Jin, Shiying Ding, Yilin Shao, Chao Zhang, Pinhao Wang, Cheng Yao, Ye Tao, Guanyun Wang. 2024. DreamDirector: Designing a Generative AI System to Aid Therapists in Treating Clients' Nightmares. In *Proceedings of the 29th International Conference on Intelligent User Interfaces (IUI '24)*. [DOI]

5. Shichao Huang, Xiaolong Li, Shang Shi, Haoye Dong, **Xueyan Cai**, Kecheng Jin, Jiayi Wu, Weijia Lin, Jiayu Yao, Yuqi Hu, Fangtian Ying, Cheng Yao. 2023. Silent Delivery: Make Instant Delivery More Accessible for the DHH Delivery Workers Through Sensory Substitution. In *International Conference on Human-Computer Interaction (HCII 2023)*. [DOI]

6. Xiaolong Li, Cheng Yao, Shang Shi, Shuyue Feng, Yujie Zhou, Haoye Dong, Shichao Huang, **Xueyan Cai**, Kecheng Jin, Fangtian Ying, Guanyun Wang. 2024. E-Joint: Fabrication of Large-Scale Interactive Objects Assembled by 3D Printed Conductive Parts with Copper Plated Joints. In *Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology (UIST '24)*. [DOI]

Under Review Manuscripts

7. Anonymous Authors. 2025. Empowering Digital Humans with Large Language Models for New Teacher Classroom Training [title modified to ensure blind review].

Patent

- An artificial intelligence-generated content system that assists nightmare therapists based on large language models (LLMs) and AI drawing techniques. China National Invention Patent. CN202410612793.6

Research Experience

Research on Helping Children Self-Improve Their Food Literacy and Eating Behavior

Research Assistant, advised by Prof. Cheng Yao 11/2022 – 05/2023

- Proposed an approach to addressing picky eating and promoting food literacy among young children through a tangible multi-sensory puzzle game. Explored various strategies aimed at enhancing children's engagement with food education, integration of theoretical frameworks such as Self-Determination Theory (SDT), Five-color Diet Theory, and the incorporation of multi-sensory experiences to promote intrinsic motivation and engagement among children.
- A user study for 12 preschool-aged children with eating picky behavior demonstrated that it effectively increased their food knowledge, built positive attitudes towards disliked foods and had potential to improve eating behavior.

Research on a Generative AI System to Aid Therapists in Treating Clients' Nightmares

Research Assistant, advised by Prof. Cheng Yao 04/2023 – 10/2023

- Conducted a formative investigation of therapists and clients, suggesting that the system should reduce therapist pressure, increase client willingness, and improve multi-sensory interaction.
- Developed a visual-interactive and narrative generative AI system, DreamDirector, to assist therapists [2]. The system standardizes the treatment process based on psychotherapy methods and generates reprocessed nightmare story text with LLM (GPT-3). While AI painting is employed to craft healing dreams and picture books.
- Verified the efficacy of the system in the nightmare treatment process in terms of effect enhancement through a therapist-client-AI treatment experiment (therapists = 2, clients = 16) with quantitative and qualitative methods.

Research on a Digital Therapy System for Hypomimia Detection & Rehabilitation with Parkinson's Disease

Research Assistant, advised by Prof. Cheng Yao and Prof. Mengru Xue 09/2023 – 04/2024

- Established a formative study with neurologists and rehabilitation physicians and extended traditional detection and rehabilitation techniques by combining AI technology with traditional medical treatments.
- Proposed an AU-based digital therapy system, for detection and rehabilitation of Parkinson's disease patients [6]. Combined with Chinese opera music to help patients scientifically and systematically train their facial muscles.
- Conducted a user study (patients = 7, physicians = 10) at a hospital in China to evaluate the usability of the system, results demonstrated a positive feedback in terms of participants' engagement and self-efficacy.

Awards and Honors

1. Best Short Paper Award at the 2024 ACM Conference on Interaction Design and Children 2024
2. A Design Award, Iron Prize, Italy [link] 2023
3. K Design Award, Winner, Korea [link] 2024
4. James Dyson Award, Outstanding Winner (China Top 8), United Kingdom [link] 2024
5. China Collegiate Computing Contest Human-Computer Interaction Innovation Contest, Second prize 2023
6. National Scholarship (**Top 1%**), The Ministry of Education of China (**Four times**) 2019/2020/2021/2024

Skills

Language: Native Mandarin, Fluent English

Research: Interview, Survey, Participatory Design, Experimental Design, Thematic Analysis, LaTeX

Design: User Experience Design (Figma, Adobe XD), 3D Modelling and Rendering (Rhino, Keyshot, Solidworks), Generative Design (Processing, Grasshopper), Graphic Design (Photoshop, Illustrator, InDesign), Photography and editing (Premiere Pro, After Effects)

Prototyping: 3D Printing, Laser Cutting (AutoCAD), Hardware Design Tools (Arduino)