# Chao Zhang

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## RESEARCH INTERESTS

Human-Computer Interaction (HCI), Human-AI Collaboration, Co-Creative AI, Digital Youth, Child-AI Interaction, AI Literacy, Storytelling, Sketching, Learning Technologies, Learning at Scale, Ethics in User Experience, Dark Patterns, Usable Privacy & Security

## EDUCATION

**Zhejiang University**, Hangzhou, China                                   *09/2020 - 03/2023 (expc.)*

   *M.E. in Design Engineering, GPA 3.93/4.00 (Top 1%), advised by Prof. Cheng Yao*

**Jiangnan University**, Wuxi, China                                             *09/2016 - 06/2020*

   *B.E. in Electrical Engineering, minor in Digital Media Technology, GPA 3.83/4.00 (Top 3%)*

## PUBLICATIONS

### Conference Papers and Posters

c.6. **Chao Zhang**, Cheng Yao, Jiayi Wu, Weijia Lin, Lijuan Liu, Ge Yan, and Fangtian Ying. 2022. StoryDrawer: A Child–AI Collaborative Drawing System to Support Children's Creative Visual Storytelling. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22)*. [pdf]

c.5. Ge Yan, **Chao Zhang**, Jiadi Wang, Zheng Xu, Jianhui Liu, Jintao Nie, Fangtian Ying, and Cheng Yao. 2022. CamFi: An AI-driven and Camera-based System for Assisting Users in Finding Lost Objects in Multi-Person Scenarios. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA' 22)*. [pdf]

c.4. Ge Yan, Cheng Yao, **Chao Zhang**, Jiadi Wang, Yuqi Hu, and Fangtian Ying. 2022. MusicCollage: A Music Composition Tool for Children Based on Synesthesia and a Genetic Algorithm. In *Proceedings of the 2022 International Conference on Human-Computer Interaction (HCII' 22)*. [pdf]

c.3. **Chao Zhang**, Zili Zhou, Jiayi Wu, Yajing Hu, Yaping Shao, Jianhui Liu, Yuqi Hu, Fangtian Ying, and Cheng Yao. 2021. Bio Sketchbook: An AI-assisted Sketching Partner for Children's Biodiversity Observational Learning. In *Interaction Design and Children (IDC '21)*. [pdf]

c.2. **Chao Zhang**, Cheng Yao, Jianhui Liu, Zili Zhou, Weilin Zhang, Lijuan Liu, Fangtian Ying, Yijun Zhao, and Guanyun Wang. 2021. StoryDrawer: A Co-Creative Agent Supporting Children's Storytelling through Collaborative Drawing. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA' 21)*. [pdf]

c.1. Muling Huang, Lingyan Zhang, Lijuan Liu, Pinqi Zhu, **Chao Zhang**, Pitchayapat Sonchaeng, Weiqiang Ying, Pinhao Wang, Yuqi Hu, Fangtian Ying, and Cheng Yao. 2021. ColorGuardian: Customize Skin Tattoos for Children with Vitiligo. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA' 21)*. [pdf]

### Journal Articles

j.2. Yang Chen, Katherine Fennedy, Anna Fogel, Shengdong Zhao, **Chao Zhang**, Lijuan Liu, and Chingchiuan Yen. 2022. SSpoon: A Shape-changing Spoon That Optimizes Bite Size for Eating Rate Regulation. *ACM Journal on Interactive, Mobile, Wearable and Ubiquitous Technologies.* 6, 3, 105:1-105:32. [pdf]

j.1. Lijuan Liu, Jiahao Guo, **Chao Zhang**, Zhangzhi Wang, Pinqi Zhu, Tuo Fang, Junwu Wang, Cheng Yao, and Fangtian Ying. 2021. ElectroPaper: Design and Fabrication of Paper-Based Electronic Interfaces for the Water Environment. *Electronics.* 10, 5, 604. [pdf]

### Under Review Manuscripts

m.5. Anonymous Authors (**as the First Author**). 2023. Designing an AI-Driven Observational Drawing Tool that Connects Children with Nature [Title modified to ensure blind review]. In *CHI '23. Under Review.*

m.4. Anonymous Authors (**as the Co-First Author**). 2023. Exploring an End-User-Empowerment Intervention Approach for Dark Patterns in UX [Title modified to ensure blind review]. In *CHI '23. Under Review.*

m.3. Anonymous Authors (**as the Second Author**). 2023. Understanding Creators' Engagement with Received Critiques in Online Communities [Title modified to ensure blind review]. In *CHI '23. Under Review.*

m.2. Anonymous Authors (**as the Co-Author**). 2023. Teaching Children Mathematical Language using a Voice-Guided Embodied Game [Title modified to ensure blind review]. In *CHI '23. Under Review.*

m.1. Anonymous Authors (**as the Co-Author**). 2023. Integrating Electronics, Mechanical Structures, and Magnets to Augment Laser-Cut Objects [Title modified to ensure blind review]. In *CHI '23. Under Review.*

## Patents & Software Copyrights

### Patents

p.3. A Drawing System to Support Children's Observation of Plants and Learning about Biodiversity. 2021. *China National Invention Patent.* Application No. 202110645869.1

p.2. A Sketch Recognition and Generation Method based on Raspberry Pi and Recurrent Neural Network. 2020. *China National Invention Patent.* Application No. 202011322789.4

p.1. A Sentiment Analysis and Visualization Method Combining Video and Pop-Ups. 2019. *China National Invention Patent.* Application No. 201910287517.6

### Software Copyrights

sc.1. Enterprise Network Opinion Analysis and Visualization Software. 2019. *China Software Copyright.* Registration No. 2019SR0428088

## Selected Design Awards & Exhibitions

### Design Awards

a.7. **Iron Award**, A' Design Award, Italy. [Link] *2022*

a.6. **iF Talent Award**, iF Design Award, Germany. [Link] *2021*

a.5. **Honorable Mention**, Design Intelligence Award (DIA), China. [Link] *2021*

a.4. **Outstanding Winner** (Top 1), C4-AI Innovation Contest, China. *2021*

a.3. **Outstanding Winner** (Top 10), China Graduate AI Innovation Competition, China. *2021*

a.2. **Finalist** (Top 20) x 4, User Experience Design Award (UXDA), China. 2021

a.1. **Nominations Award**, International Designer Club Award, Malaysia. *2021*

### Design Exhibitions

e.3. **China Design Exhibition**, China. *2022*

e.2. **Global Grad Show** x 2, Dubai Design Week, The United Arab Emirates. [Link.1] [Link.2] *2021*

e.1. **"Ecological Bridge" Innovative Design Exhibition** x 3, China. *2021*

## Selected Honors & Scholarships

### Honors

h.2. **Valedictorian**, School of IOT, Jiangnan University, China. *2020*

h.1. **Jiangnan Talent** (Only 10 awardees in Jiangnan University), Jiangnan University, China. *2019*

### Scholarships

s.3. **National Scholarship** (Top 1% in Zhejiang University), Ministry of Education, China. *2022*

s.2. **National Scholarship** (Top 1% in Zhejiang University), Ministry of Education, China. *2021*

s.1. **National Scholarship** (Top 1% in Jiangnan University), Ministry of Education, China. *2018*

## Research Experience

### Explore End-User-Empowerment Approach against Dark Patterns in User Experience

*SaNDwich Lab, University of Notre Dame (ND), USA* *06/2022 - Present*

*Lead Researcher, team of 5, advised by Prof. Toby Jia-jun Li and Prof. Yaxing Yao*

- Materialized an end-user empowerment intervention approach as a technology probe that supports users in changing dark patterns on website interfaces and designed the UIs of the probe with Figma;
- Implemented the probe in the form of a browser extension using Vue.js, Tailwind CSS, and Google Firebase;
- Conducted a 2-week probe deployment study with 15 participants to understand end users' real-life, in-situ reactions to our approach and their underlying needs and preferences;
- Analyzed the collected interview transcripts using thematic analysis and affinity diagramming;
- Submitted a co-first paper to CHI 2023 [m.4.].

### Investigate Feedback Seekers' Engagement with Received Comments in Online Communities

*HCI Lab, Hong Kong University of Science and Technology (HKUST), China* *06/2022 - 09/2022*

*Research Intern, team of 4, advised by Prof. Xiaojuan Ma*

- Used pattern.en and NLTK to characterize 287k discussion messages collected from Reddit with content-based features (i.e., actionability, justification, specificity, and valence);
- Developed a coding scheme through thematic analysis to categorize seekers' cognitive engagement;
- Implemented machine learning models (e.g., SVC, MLP, RF, etc.) to classify seekers' cognitive engagement and the creation stages of their artifacts (work-in-progress or complete);

- Submitted a second author paper to CHI 2023 [m.3.].

**Design an AI Drawing Partner to Support Children's Creativity in Visual Storytelling**

> *INNO Lab, Zhejiang University (ZJU), China*                                   *10/2020 - 09/2021*
>
> *Lead Researcher, team of 5, advised by Prof. Cheng Yao and Prof. Fangtian Ying*

- Conducted a formative investigation with 12 pairs of parents and children to identify the challenges children face in visual storytelling through observations and semi-structured interviews;
- Designed and developed a child-AI collaborative drawing system that supports children's creativity in visual storytelling using Figma, Vue.js, Paper.js, and Tailwind CSS;
- Implemented a voice agent and a voice-driven sketching algorithm using Baidu Text-to-Speech API, Google Speech-to-Text API, Google Translation API, NLTK, and Sketch-RNN;
- Conducted a between-subject user study with 64 children to evaluate the system using mixed methods;
- Published and presented a Late-Breaking Work at CHI 2021 and a first author paper at CHI 2022 [c.2.] [c.6.].

## Work Experience

**Research Intern**, HCI Lab, OPPO Research Institute, China                     *01/2022 - 04/2022*

> *Mentored by Dr. Yilei Shi and Dr. Haimo Zhang*

## Teaching Experience

**CST 5141081 Interaction Technology and Design Practice**, Teaching Assistant, ZJU     *Spring 2021*

**CST 5143104 Design Engineering**, Teaching Assistant, ZJU                     *Autumn 2020*

**CST 2521018 Frontier of Engineering Technology**, Teaching Assistant, ZJU     *Autumn 2020*

## Oral Presentations

**Invited Talk**, Design Innovation Center, China Academy of Art               *04/2022*

> *Topic: Entanglement of Design and Technology*

**Invited Talk**, Industrial Design Institution, Chinese Mechanical Engineering Society     *04/2022*

> *Topic: Entanglement of Design and Technology*

**Presenting Author**, CHI 2022, Virtual Event                                 *03/2022*

**Presenting Author**, IDC 2021, Virtual Event                                 *06/2021*

**Presenting Author**, CHI 2021, Virtual Event                                 *03/2021*

## Academic Services

**Paper Reviewing**: Chinese CHI 2021, IDC 2022, CHI 2022, ChinaVis 2022, Chinese CHI 2022

## Skills

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

**Design**: User Experience Design (Figma, Sketch), 3D Modelling and Rendering (Cinema 4D, Corona Render, Rhino 3D), Generative Design (P5, Processing, Grasshopper), Graphic Design (Adobe Products)

**Computing**: Front-End Development (Javascript, HTML, CSS, Vue.js), Statistics Analysis (Matplotlib, Numpy, Pandas, SPSS, JASP), and Machine Learning (Sklearn, PyTorch, Tensorflow)

**Prototyping**: 3D Printing, Laser Cutting, Fabrication and Hardware Assembly, Basic Circuit Design