

Chang Xiao

RESEARCH SCIENTIST · ADOBE RESEARCH

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Research Interests

My research lie at the intersection of Human-Computer Interaction, applied AI/ML, LLMs and AR/VR. I am particularly interested in leveraging computational method and AI to create intuitive, accessible and human-centered interaction techniques, while also explore novel ways in which AI can reshape creativity, productivity, and everyday experiences.

Education

- Columbia University** New York, USA
PH.D. IN COMPUTER SCIENCE 2016 - 2021
- Thesis: Bridging the Gap Between People, Mobile Devices, and the Physical World
 - Committee: Changxi Zheng (Advisor), Steven K. Feiner (Chair), Brian A. Smith, Carl Vondrick, Andrés Monroy-Hernández
- Zhejiang University** China
B.S. IN COMPUTER SCIENCE 2012 - 2016
- Chu Kochen Honors College

Employment

- Adobe Research** San Jose, USA
RESEARCH SCIENTIST 2021 - present
- Presented my research twice at Adobe's annual Summit Sneaks, the company's largest public-facing showcase (**2022, 2024**).
 - Published 10+ papers and filed 6 patents while at Adobe.
 - Mentored 10+ Ph.D. student interns on various research projects.
 - Developing novel AI solutions for Adobe's products.
- Snap Research** New York, USA
RESEARCH INTERN Summer 2018, 2019
- Mentored by Prof. Shree K. Nayar.
 - Published at SIGGRAPH 2019 and CHI 2021.

Peer-Reviewed Journal & Conference Publications

In computer science, conferences are often the primary publication venues. The top conferences in Human-Computer Interaction (e.g., CHI, UIST), Computer Graphics and XR (e.g., SIGGRAPH, SIGGRAPH Asia), and AI/ML (e.g., CVPR, ICCV, NeurIPS, ICLR) are highly selective and widely regarded, with acceptance rates typically ranging from 20% to 25%.

Bold: Represents myself. Underline: Represents students or interns I have mentored.

- TEI '25** ***ReactFold: Towards Camera-based Tangible Interaction on Passive Paper Artifacts***
Chang Xiao
ACM Conference on Tangible Embedded and Embodied Interaction, TEI, 2025
- SIGGRAPH Asia '24** ***Evaluating Visual Perception of Object Motion in Dynamic Environments***
Budmonde Duinkharjav, Jenna Kang, Gavin S. P. Miller, **Chang Xiao**, Qi Sun
ACM Transactions on Graphics (TOG), SIGGRAPH Asia, 2024
- UIST '24** ***SonifyAR: Context-Aware Sound Effect Generation in Augmented Reality***
Xia Su, Jon E. Froehlich, Eunyee Koh, **Chang Xiao**
ACM Symposium on User Interface Software and Technology, UIST, 2024

- CHI '24** ***MoiréWidgets: High-Precision, Passive Tangible Interfaces via Moiré Effect***
Daniel Campos Zamora, M. Doga Dogan, Alexa F. Siu, Eunyee Koh, **Chang Xiao**
ACM Conference on Human Factors in Computing Systems, CHI, 2024
- CHI '23** ***Improving Learning-based Camera Pose Estimation for Image-based Augmented Reality Applications***
Enyu Cai, Ryan A. Rossi, **Chang Xiao**
ACM Conference on Human Factors in Computing Systems, CHI, 2023
- BigData '23** ***Tabular Data to Image Generation: Benchmark Data, Approaches, and Evaluation***
Alex Tang, Gromit Chan, Ryan A Rossi, **Chang Xiao**, Eunyee Koh
IEEE International Conference on Big Data, 2023
- WWW '22** ***VisGNN: Personalized Visualization Recommendation via Graph Neural Networks***
Fayokemi Ojo, Ryan A. Rossi, Jane Hoffswell, Shunan Guo, Fan Du, Sungchul Kim, **Chang Xiao**, Eunyee Koh
ACM Web Conference, WWW, 2022
- USENIX '22** ***Can One Hear the Shape of a Neural Network?: Snooping the GPU via Magnetic Side Channel***
Henrique Teles Maia, **Chang Xiao**, Dingzeyu Li, Eitan Grinspun, Changxi Zheng
USENIX Security, 2022
- UIST '21** ***MoiréBoard: A Stable, Accurate and Low-cost Camera Tracking Method***
Chang Xiao, Changxi Zheng
ACM Symposium on User Interface Software and Technology, UIST, 2021
- ICCV '21** ***DeepCAD: A Deep Generative Network for Computer-Aided Design Models***
Rundi Wu, **Chang Xiao**, Changxi Zheng
ACM Symposium on User Interface Software and Technology, UIST, 2021
- CHI '21** ***BackTrack: 2D Back-of-device Interaction through Front Touchscreen***
Chang Xiao, Karl Bayer, Changxi Zheng, Shree K. Nayar
ACM Symposium on User Interface Software and Technology, UIST, 2021
- CVPR '20** ***One Man's Trash is Another Man's Treasure: Resisting Adversarial Examples by Adversarial Examples***
Chang Xiao, Changxi Zheng
IEEE / CVF Computer Vision and Pattern Recognition, CVPR, 2020
- ICLR '20** 🐧 ***Enhancing Adversarial Defense by k-Winners-Take-All***
Chang Xiao, Peilin Zhong, Changxi Zheng
International Conference on Learning Representations, ICLR (Spotlight, top 3%), 2020
- NeurIPS '19** ***Rethinking Generative Mode Coverage: A Pointwise Guaranteed Approach***
Peilin Zhong*, Yuchen Mo*, **Chang Xiao***, Pengyu Cheng, Changxi Zheng
(*equal contribution) Neural Information Processing Systems, NeurIPS, 2019
- SIGGRAPH '19** ***Vidgents: Modular Mechanical Widgets for Mobile Devices***
Chang Xiao, Karl Bayer, Changxi Zheng, Shree K. Nayar
ACM Transactions on Graphics, SIGGRAPH, 2019
- TVCG '19** ***Mechanics-Aware Modeling of Cloth Appearance***
Montazerim Zahra, **Chang Xiao**, Raymond Yun Fei, Changxi Zheng, Shuang Zhao
IEEE Transactions on Visualization and Computer Graphics, TVCG, 2019

NeurIPS '18 

BourGAN: Generative Networks with Metric Embeddings

Chang Xiao, Peilin Zhong, Changxi Zheng

Neural Information Processing Systems, NeurIPS (Spotlight, top 3%), 2018

SIGGRAPH '18

Fontcode: Embedding Information in Text Documents Using Glyph Perturbation

Chang Xiao, Cheng Zhang, Changxi Zheng

ACM Transactions on Graphics, SIGGRAPH, 2018

CLEO '18

Two-color and 3d Phase-amplitude Modulation Holograms

Adam Overvig, Sajan Shrestha, **Chang Xiao**, Changxi Zheng, Nanfang Yu

Conference on Lasers and Electro-Optics, CLEO, 2018

Peer-Reviewed Workshop & Poster Publications

UIST '24

Data Pictorial: Deconstructing Raster Images for Data-Aware Animated Vector Posters

Tongyu Zhou, Gromit Yeuk-Yin Chan, Shunan Guo, Jane Hoffswell, **Chang Xiao**, Victor Soares Bursztyn, Eunyee Koh

ACM Symposium on User Interface Software and Technology, UIST Poster, 2024

UIST '23

AutoSurveyGPT: GPT-Enhanced Automated Literature Discovery

Chang Xiao

ACM Symposium on User Interface Software and Technology, UIST Poster, 2023

CHI '23

StandARone: Infrared-Watermarked Documents as Portable Containers of AR Interaction and Personalization

M. Doga Dogan, Alexa F. Siu, Jennifer Healey, Curtis Wigington, **Chang Xiao**, Tong Sun

ACM CHI Conference on Human Factors in Computing Systems (CHI LBW), 2023

UIST '22

iMarker: Instant and True-to-scale AR with Invisible Markers

Chang Xiao, Ryan Rossi, Eunyee Koh

ACM Symposium on User Interface Software and Technology, UIST Poster, 2022

Preprints & Work-in-progress

CHI '25

LLMs May Not Be Human-Level Players, But They Can Be Testers: Measuring Game Difficulty with LLM Agents

Chang Xiao, Brenda Yang

arXiv:2410.02829, In Submission to CHI 2025

CHI '25

Imprinto: Enhancing Infrared Inkjet Watermarking for Human and Machine Perception

Martin Feick, Xuxin Tang, Raul Garcia-Martin, Alexandru Luchianov, Roderick Huang, **Chang Xiao**, Alexa Siu, Mustafa Doga Dogan

In Submission to CHI 2025

arXiv '20

RP2K: A Large-Scale Retail Product Dataset for Fine-Grained Image Classification

Jingtian Peng, **Chang Xiao**, Yifan Li

arXiv:2006.12634, 2020

Honors & Awards

- 2024 **Adobe Summit Sneaks Presentation** Project Perfect Plays
2022 **Adobe Summit Sneaks Presentation** Project Right Sized

Adobe Summit Sneaks is a high-profile public event at the annual Adobe Summit, showcasing innovative, experimental technologies that Adobe is exploring. Each year, only 6-7 presentations are selected from hundreds of new inventions at Adobe.

- 2019-2021 **Cheung-Kong Innovation Doctoral Fellowship** 2 awardees among Columbia Engineering School.
2022 **Snap Research Fellowship** 11 awardees worldwide.
4x **Special Recognitions for Outstanding Reviews** UIST
2020 **ICLR Spotlight Paper** Top 3% papers.
2018 **NeurIPS Spotlight Paper** Top 3% papers.
2019, 2018 **NeurIPS Travel Award**
2015 **China Computer Federation Elite Collegiate Award** 20 awardees among all undergrads in China
2014-2016 **Zhejiang University First-Class Scholarship** 20 awardees among all undergrads in China

Selected Press

- Forget touchscreens: This case controls a smartphone with buttons and dials [CNN]**
Let's Get Personal: The Future of Personalized Digital Experiences in the Era of AI [VLM]
Adobe Unveils New Augmented Reality Shopping Tool [Adweek]
A new AR-based eCommerce tool by Adobe to help consumers try products virtually [Digital Information World]
Magnetic Snoops Plunder Deep Learning's Secrets [Communication of the ACM]
Add Scroll Wheels And Buttons To Smartphones With 3D-Printed Widgets [Hackaday]
Researchers build a smart case to control your phone with no wires or Bluetooth required [New Atlas]
Without Wires Or Bluetooth, This Case Lets You Add Buttons And Scroll Wheels To Your Smartphone [Gizmodo]
You Can Send Invisible Messages With Subtle Font Tweaks [WIRED]
Hiding Information in Plain Text [IEEE Spectrum]
Researchers Hide Information in Plain Text [Columbia Engineering]
Helvetica Is Now An Encryption Device [CoDesign]
This algorithm can hide secret messages in regular-looking text [Digital Trend]
Researchers hide information in plain text [Science Daily]

Patents

Hypergraph Representation Learning

Ryan Rossi, Ryan Aponte, Shunan Guo, Jane Hoffswell, Nedim Lipka, **Chang Xiao**, Yeuk-Yin Chan, Eunyee Koh

US Patent App. 18/119,305

Performing Machine Learning Techniques for Hypertext Markup Language-based Style Recommendations

Ryan Rossi, Ryan Aponte, Shunan Guo, Nedim Lipka, Jane Hoffswell, **Chang Xiao**, Eunyee Koh, Yeuk-yin Chan

US Patent App. 17/470,665

Feature Detection for Image-based Augmented Reality

Enyu Cai, Ryan Rossi, **Chang Xiao**

US Patent App. 18/084,606

System and Methods for Providing Invisible Augmented Reality Markers

Chang Xiao, Ryan Rossi, Eunye Koh

US Patent App. 17/882,821

Utilizing a Graph Neural Network to Generate Visualization and Attribute Recommendations

Fayokemi Ojo, Ryan Rossi, Jane Hoffswell, Shunan Guo, Fan Du, Sungchul Kim, **Chang Xiao**, Eunye Koh

US Patent App. 17/654,933

Systems and Methods for Steganography Based on Text Fonts

Changxi Zheng, **Chang Xiao**, Cheng Zhang

US Patent 10,755,375

Trackpad on Back Portion of a Device

Shree K. Nayar, **Chang Xiao**, Changxi Zheng

US Patent 11,550,435

Vibrational Input Elements

Chang Xiao, Karl Bayer, Shree K. Nayar, Changxi Zheng

US Patent 11,126,266

Professional Services

Program Committee / Associate Chair

2025

CHI

2023, 2024

UIST

Reviewer

2022-

UIST

2021-

CHI

2020, 2021, 2022

ICLR

2020, 2021, 2022, 2023

CVPR

2019, 2020, 2021

NeurIPS

2019, 2020, 2021

ICML

2019, 2020, 2023, 2024

SIGGRAPH

2018, 2020

SIGGRAPH Asia

2018

TVCG

Invited Talks

Mar 2024

Augmented Interaction Between Physical and Digital World

University of Southern California, Los Angeles, CA

CS Colloquium, Hosted by Prof. Heather Culbertson

Feb 2024

Augmented Interaction Between Physical and Digital World

Stevens Institute of Technology, Hoboken, NJ

CS Seminar, Hosted by Prof. Jonggi Hong

Jan 2024

Augmented Interaction Between Physical and Digital World

Arizona State University, Tempe, AZ

CS Seminar, Hosted by Prof. Yezhou Yang and Prof. Hasti Seifi

Nov 2023

Recent Advances in Input Technologies for Extended Reality (XR)

Peking University, Beijing, China

CS Seminar, Hosted by Prof. Baoquan Chen

Nov 2022 ***Immersive Online Shopping with AR***
Adobe Tech Summit, San Jose, CA

Nov 2019 ***Interaction through Hidden Channel***
Zhejiang University, Hangzhou, China
Seminar, Hosted by Prof. Kun Zhou

Mentoring

ADOBE INTERNS

At Adobe Research, I mentor PhD interns conducting cutting-edge research and publishing in top venues. Listed below are students whom I served as the primary mentor.

2024 **Yimeng Liu** CSCW '25 submission, PhD at UCSB
2023 **Daniel Campos Zamora** GEM Fellow. CHI '24 publication, TAPIA '24 first-place, PhD at UW
2023 **Monde Duinkharjav** SIGGRAPH ASIA '24 publication, PhD at NYU
2023 **Xia Su** UIST '24 publication, PhD at UW
2022 **Mustafa Doga Dogan** CHI '23 publication, PhD at MIT, now Research Scientist at Adobe
2022 **Enyu Cai** CHI '23 publication, PhD at Purdue
2022 **Ime Essien** GEM Fellow, PhD at JHU
2022 **Alex Tang** BigData '23 publication, PhD at Northwestern
2022 **Tongyu Zhou** UIST '24 publication, PhD at Brown
2021 **Fayokemi Ojo** WWW '22 publication, GEM Fellow, undergrad at UMD

STUDENTS AT COLUMBIA

2020 - 2021 **Rundi Wu** PhD student
2020 - 2021 **Yingsi Qin** Undergrad, next: PhD at CMU
2019 **Yihang Yin** Visiting student, next: MS at NUS
2019 **Nanyong Lin** MS student, next: PhD at Yale
2018 - 2019 **Yuchen Mo** MS student, next: ByteDance AI Lab
2018 - 2019 **Pengyu Chen** MS student, next: Software engineer at Google
2018 **Lahav Lipson** Undergrad, next: PhD at Princeton
2018 **Yuxuan Mei** Undergrad, next: PhD at UW
2018 **Cheng Zhang** MS student, next: PhD at UCI