

Yaojie Liu

(614)-886-6885 ◇ yjliu0414@gmail.com ◇ <https://yaojieliu.github.io>

RESEARCH INTERESTS

Vision-Language Models, Multi-Modal LLM, Knowledge Distillation, Face/Biometrics, Domain Adaptation/Generalization, Explainability, Out-of-distribution (OOD)

EXPERIENCE

Senior Research Scientist, Tech Lead, Google

04/2023 - present

- **ML Product Impact:** Led the authentication models launch of Class 3 Face Unlock for the Pixel 7-11 ecosystem, and broader Google ecosystem such as Youtube User Verification and Andriod, overcoming complex deployment challenges including cross-sensor generalization, out-of-distribution (OOD) scenarios, and emerging face spoofing vulnerabilities.
- **VLM/MLLM Research:** Led research initiatives on multiple topics such as model capacity gap discovery and auditing, on-policy distillation, vision skills development, and R&D agent development. (Co-)Established the roadmap for VLM-based face foundation models.
- **Biometric AI Research:** Led applied biometric research to solve domain generalization and out-of-distribution (OOD) challenges in production, focusing on delivering diversified knowledge to on-device small models. Developed and patented a "Large-Model Copilot" system.

Research Scientist, Google Research

06/2021 - 04/2023

- Launch Face Unlock on Pixel 6 & Pixel 6 Pro

Research Intern, HMI, Robert Bosch LLC

06/2020 - 08/2020

- Mentors: Xinyu Huang, Liu Ren
- Project: Face Shadow Removal/Relighting

Research Intern, AI Research, Apple

05/2019 - 08/2019

- Mentors: Barry Theobald, Nicholas Apostoloff
- Project: Audio-Visual Modeling

EDUCATION

Ph.D., Computer Science, Michigan State University, USA

05/2016 - 05/2021

- Advisor: Xiaoming Liu
- Committee: Xiaoming Liu (chair), Anil Jain, Arun Ross, Daniel Morris
- Dissertation: Face Anti-Spoofing: Detection, Generalization, and Visualization

M.S., Computer Science, Ohio State University, USA

08/2014 - 05/2016

- Advisor: Aleix Martinez
- Project: Global and Local Fitting of Facial Landmarks and Action Units

B.E., Communication Engineering, UESTC, China

08/2010 - 05/2014

- Advisor: Chang Shu
- Thesis: Image Inpainting

PUBLICATIONS

I have >3900 citations according to [Google Scholar](#), and my **h-index** is 15. (* denotes equal contribution)

Ongoing Project:

1. Feng Wang, **Yaojie Liu**, Zeeshan Hayder, Hieu Phan, Wen-Sheng Chu, "Exploring the Format of **Vision Skills**," 2026.
2. Zirui Zhang, Ahmed Abdelkader, **Yaojie Liu**, Chengzhi Mao, Wen-Sheng Chu, "Explaining Image Classifiers by **Custom MLLMs**," 2026.
3. Yixiong Chen, Tian Tan, Blake JianHang Chen, Ziqian Lin, **Yaojie Liu**, Liqian Peng, Alec Go, "**AI R&D Agent**," 2026.

Conference Papers:

1. Baiyu Su, **Yaojie Liu**, Chengzhi Mao, Wen-Sheng Chu, "NudgeRL: Resolving **Reward Signal Deficiency** in **RLVR** via Perturbing and Restarting Model Rollouts," *submitted to conference*, 2025.

2. Qihao Liu, Chengzhi Mao, **Yaojie Liu**, Alan Yuille, Wen-Sheng Chu, “Differences That Matter: Auditing Models for **Capability Gap Discovery** and Rectification,” *IEEE Computer Vision and Pattern Recognition (CVPR)*, 2026 (**Highlight, Top 3%**). [[PDF](#), [Project](#)]
3. Ziqian Lin, **Yaojie Liu**, Runze Li, Yujia Chen, Yixuan Li, Wen-Sheng Chu, “**OOD Learner via In-Context Learning**,” *submitted to conference*, 2025.
4. Yiyu Sun, **Yaojie Liu**, Xiaoming Liu, Yixuan Li, Wen-Sheng Chu, “Rethinking Domain Generalization for Face Anti-spoofing: Separability and Alignment,” *IEEE Computer Vision and Pattern Recognition (CVPR)*, 2023. (25% Acceptance Rate) [[PDF](#), [Code](#)]
5. **Yaojie Liu***, Andrew Hou*, Xinyu Huang, Liu Ren, Xiaoming Liu, “Blind Removal of Facial Foreign Shadows,” *Proc. British Machine Vision Conference (BMVC)*, 2022. [[PDF](#), [Code](#), [Demo](#)]
6. Xiao Guo, **Yaojie Liu**, Anil Jain, Xiaoming Liu, “Multi-domain Learning for Updating Face Anti-spoofing Models,” *Proc. European Conference of Computer Vision (ECCV)*, 2022. (**Oral, 2.7% Acceptance Rate**). [[PDF](#), [Code](#)]
7. Hsin-Ping Huang, Deqing Sun, **Yaojie Liu**, Wen-Sheng Chu, Taihong Xiao, Jinwei Yuan, Hartwig Adam, Ming-Hsuan Yang, “Adaptive Transformers for Robust Few-shot Cross-domain Face Anti-spoofing,” *Proc. European Conference of Computer Vision (ECCV)*, 2022. (20% Acceptance Rate). [[PDF](#), [Code](#)]
8. **Yaojie Liu**, Jeol Stehouwer, Xiaoming Liu, “On Disentangling Spoof Traces for Generic Face Anti-Spoofing,” *Proc. European Conference of Computer Vision (ECCV)*, 2020. (26% Acceptance Rate) [[PDF](#), [Code](#), [Short Video](#), [Long Video](#)]
9. Jeol Stehouwer, Amin Jourabloo, **Yaojie Liu**, Xiaoming Liu, “Noise Modeling, Synthesis and Classification for Generic Object Anti-Spoofing,” *IEEE Computer Vision and Pattern Recognition (CVPR)*, 2020. (25% Acceptance Rate) [[PDF](#), [Code](#), [Data](#), [Short Video](#)]
10. **Yaojie Liu**, Jeol Stehouwer, Amin Jourabloo, Xiaoming Liu, “Deep Tree Learning for Zero-shot Face Anti-spoofing,” *IEEE Computer Vision and Pattern Recognition (CVPR)*, 2019. (**Oral, Best Paper Finalist, 5.6% Acceptance Rate**). [[PDF](#), [Code](#), [Data](#), [Video](#), [Poster](#)]
11. **Yaojie Liu***, Amin Jourabloo*, Xiaoming Liu, “Face De-Spoofing: Anti-Spoofing via Noise Modeling,” *Proc. European Conference of Computer Vision (ECCV)*, 2018. (31.8% Acceptance Rate) [[PDF](#), [Code](#), [Poster](#)]
12. **Yaojie Liu***, Amin Jourabloo*, Xiaoming Liu, “Learning Deep Models for Face Anti-Spoofing: Binary or Auxiliary Supervision,” *IEEE Computer Vision and Pattern Recognition (CVPR)*, 2018. (30% Acceptance Rate) [[PDF](#), [Data](#), [Poster](#)]
13. **Yaojie Liu**, Amin Jourabloo, William Ren, Xiaoming Liu, “Dense Face Alignment,” *International Conference on Computer Vision (ICCVW) Workshop on Analysis and Modeling of Faces and Gestures (AMFG)*, 2017. [[PDF](#), [Code](#), [Poster](#)]
14. **Yaojie Liu***, Yousef Atoum*, Amin Jourabloo*, Xiaoming Liu, “Face Anti-Spoofing Using Patch and Depth-Based CNNs,” *IEEE International Joint Conference on Biometrics (IJCB)*, 2017. [[PDF](#), [Poster](#)]
15. Ruiqi Zhao, Yan Wang, C.F. Benitez-Quiroz, **Yaojie Liu**, A.M. Martinez, “Fast and Precise Face Alignment and 3D Shape Reconstruction from a Single 2D Image.” *European Conference on Computer Vision Workshop (ECCVW)*, 2016. [[PDF](#)]
16. **Yaojie Liu**, Chang Shu, “A Comparison of Image Inpainting Techniques.” *International Conference on Graphic and Image Processing (ICGIP)*, 2015. [[Link](#)]

Journal Papers:

17. Xiaohong Liu, **Yaojie Liu**, Jun Chen, Xiaoming Liu, “PSCC-Net: Progressive Spatio-Channel Correlation Network for Image Manipulation Detection and Localization,” in *IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*, doi:10.1109/TCSVT.2022.3189545, 2022. [[PDF](#)]
18. **Yaojie Liu**, Xiaoming Liu, “Spoof Trace Disentanglement for Generic Face Anti-Spoofing” in *IEEE Transaction on Pattern Analysis and Machine Intelligence (PAMI)*, doi:10.1109/TPAMI.2022.3176387, 2022. [[PDF](#)]
19. Chang Shu, **Yaojie Liu**, “Inpainting: Survey and Experiments” *International Journal of Signal Processing, Image Processing and Pattern Recognition*, Vol. 9, Issue. 10, pp. 21-36, 2016. [[Link](#)]
20. **Yaojie Liu**, Chang Shu, Zhizhong Fu “Dynamic Gesture Localization and Recognition Algorithm Based on Skeletonization” *Electronic Science and Technology*, Vol. 3, pp. 005, 2014. (in Chinese) [[Link](#)]

Book Chapters:

21. **Yaojie Liu**, Jeol Stehouwer, Amin Jourabloo, Xiaoming Liu, “Presentation Attack Detection for Face in Mobile Phones” *Selfie Biometrics*, Ajita Rattani, Reza Derakhahani, and Arun Ross, Springer, 2019. [[PDF](#)]

PATENT

- **Yaojie Liu**, Wen-Sheng Chu, “**Large-Model Copilot: A System to Boost Generalization of Smaller Models**,” Serial No. PCT/US2023/0760926, filed on Oct 05, 2023.
- Ahmed Abdelkader, **Yaojie Liu**, Wen-Sheng Chu “Explainability For Image Classifiers,” U.S. Serial No. 64/032,375, filed on Apr 07, 2026.
- **Yaojie Liu**, Wen-Sheng Chu, Manli Shu “Material Classification with Conditional Diffusion Models,” U.S. Serial No. 63/549,265, filed on Feb 02, 2024.
- Soyoung Péraud, Wen-Sheng Chu, **Yaojie Liu**, “Detecting Out-of-Distribution Use Cases in an Object Classification System,” Serial No. PCT/US2023/034282, filed on Oct 02, 2023.
- **Yaojie Liu**, Wen-Sheng Chu, “Multi-Scale Model Ensemble for Classification of Objects,” U.S. Serial No. 18/150,426, filed on Jan 05, 2023.
- **Yaojie Liu**, Amin Jourabloo, Xiaoming Liu, “Improved Spoof Detection for Facial Recognition,” U.S. Serial No. 62/626,486, filed on Feb 05, 2018.

HONORS & AWARDS

- | | |
|---|-----------|
| • CVPR 2026 Outstanding Reviewer Award | 2026 |
| • ECCV 2022 Outstanding Reviewer Award (205 selected from 4,719 reviewers) | 2022 |
| • CVPR 2021 Outstanding Reviewer Award (1063 selected from 5,246 reviewers) | 2021 |
| • Fitch Beach Award nominee (one winner in entire CSE department), MSU | 2021 |
| • Outstanding Graduate Student Award, CSE Department at MSU | 2021 |
| • ECCV 2020 Outstanding Reviewer Award (215 selected from 2,830 reviewers) | 2020 |
| • College of Engineering Dissertation Completion Fellowship, MSU | 2020 |
| • CVPR 2019 Best Paper Finalist (45 selected from 1,294 accepted papers) | 2019 |
| • Honorable Mention, Engineering Graduate Research Symposium, MSU | 2018 |
| • College of Engineering Distinguished Fellowship, MSU | 2016 |
| • Best Bachelor Thesis Award, UESTC | 2014 |
| • People’s Scholarship for Excellent University Student, UESTC | 2011-2013 |

PROFESSIONAL SERVICES

- **Area Chair:** BMVC’22
- **Mentoring/Intern Host:**
 - Google
 - [Feng Wang](#) (Summer 2026 - Fall 2026) – *Exploring Vision Skills*
 - [Zirui Zhang](#) (Summer 2026 - Fall 2026) – *Explaining Image Classifiers by Custom MLLMs*
 - [Yixiong Chen](#) (Summer 2026 - Fall 2026, Co-host) – *AI R&D Agent architecture*
 - [Baiyu Su](#) (Summer 2025 - Fall 2025) – *Mentored research on RLVR and reward signal optimization*
 - [Qihao Liu](#) (Summer 2025 - Fall 2025) – *Mentored research auditing models for capability gap discovery*
 - [Ziqian Lin](#) (Summer 2024 - Fall 2024) – *Mentored research on OOD Learning via In-Context Learning*
 - [Manli Shu](#) (Summer 2023 - Fall 2023)
 - [Yiyu Sun](#) (Summer 2022 - Fall 2022)
 - [Steven Grosz](#) (Co-host, Summer 2021 - Fall 2021)
 - [Hsin-Ping Huang](#) (Co-host, Summer 2021 - Fall 2021)
 - MSU
 - [Xiao Guo](#) (Summer 2021 - Fall 2021)
 - [Xiaohong Liu](#) (Summer 2020 - Fall 2020)
 - [Xiaohan Zhang](#) (Fall 2016 - Spring 2017)
 - William Ren (Summer 2016, Summer 2017)
- **Co-Organizer/Lecturer:**

- IJCB 2020 Tutorial, “Recent Advances on Detecting Face Spoofing and Face Manipulation”, half-day. [\[1, 2, 3\]](#)
- BTAS 2019 Tutorial, “Face Anti-Spoofing: Past, Present and Future”, half-day. [\[1, 2, 3\]](#)
- CVPR 2018 Demo, “Real-time Face Anti-spoofing System”, full-day. [\[Link\]](#)
- **Conference Reviewer:** CVPR ’19-25, ICCV ’19-25, ECCV ’20-24, NeurIPS ’20-24, AAAI ’20-22, ICML ’21-23, ICLR ’22, WACV ’18-22, ACCV ’20-22, BTAS ’18, ICB ’19, ICME ’20-21, PRCV ’19-20
- **Journal Reviewer:** TPAMI, IJCV, TIP, TIFS, CVIU, Neurocomputing, Pattern Recognition, JEI, Image and Vision Computing, TBIOM, TOMM, IET Computer Vision, IEEE Access, JCST

INVITED TALKS

- Interview @ IEEE Biometrics Council Newsletter. [\[Link\]](#) *6/2021*
- “Face Anti-Spoofing: Detect, Visualize, and Generalize”, Sichuan University. *1/2020*
- “Face Anti-Spoofing: Detect, Visualize, and Generalize”, UESTC. *1/2020*
- “Deep Tree Learning for Zero-shot Face Anti-spoofing”, MSU/ND Vision Workshop. *9/2019*
- “Deep Tree Learning for Zero-shot Face Anti-spoofing”, Oral Presentation, CVPR. *6/2019*
- “Dense Face Alignment”, Midwest Vision Workshop. *4/2017*

TECHNICAL SKILLS

- **Languages:** Python, C/C++, Java, Shell Script, Matlab, HTML, R
- **Tools:** Tensorflow, PyTorch, Caffe, Apache Beam, Git, OpenCV, L^AT_EX
- **Systems:** Linux, MacOS, Windows