

# Yaojie Liu

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## RESEARCH INTERESTS

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Face, Biometrics, Out-of-distribution (OOD), Domain Adaptation/Generalization, XAI, Vision and Language, Mobile Vision

## EXPERIENCE

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- Senior Research Scientist**, Google 04/2023 - present
- Tech Lead
  - Launch Face Unlock on Pixel 7a & Pixel Fold & Pixel 8/8 Pro as Class 3 (Strong)
- Research Scientist**, Google Research 06/2021 - 04/2023
- Launch Face Unlock on Pixel 7 & Pixel 7 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

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- 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

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I have >2300 citations according to [Google Scholar](#), and my **h-index** is 14. (\* denotes equal contribution)

### Conference Papers:

1. Yiyou 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](#)]
2. **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](#)]
3. 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](#)]
4. 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](#)]
5. **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](#)]
6. 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](#)]

7. **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](#)]
8. **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](#)]
9. **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](#)]
10. **Yaojie Liu**, Amin Jourabloo, William Ren, Xiaoming Liu, “Dense Face Alignment,” *International Conference on Computer Vision (ICCV) Workshop on Analysis and Modeling of Faces and Gestures (AMFG)*, 2017. [[PDF](#), [Code](#), [Poster](#)]
11. **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](#)]
12. 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](#)]
13. **Yaojie Liu**, Chang Shu, “A Comparison of Image Inpainting Techniques.” *International Conference on Graphic and Image Processing (ICGIP)*, 2015. [[Link](#)]

#### Journal Papers:

14. 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](#)]
15. **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](#)]
16. 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](#)]
17. **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:

18. **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, 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, “Large-Model Copilot: A System to Boost Generalization of Smaller Models,” Serial No. PCT/US2023/0760926, filed on Oct 05, 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

- 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

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- **Area Chair:** BMVC’22
- **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’19-24, ICCV’19-23, ECCV’20-24, NeurIPS’20-22, 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
- **Mentoring:**
  - Ziqian Lin (Google, Summer 2024 - Fall 2024)
  - Manli Shu (Google, Summer 2023 - Fall 2023)
  - Yiyu Sun (Google, Summer 2022 - Fall 2022)
  - Steven Grosz (Google, Summer 2021 - Fall 2021)
  - Hsin-Ping Huang (Google, Summer 2021 - Fall 2021)
  - Xiao Guo (MSU, Summer 2021 - Fall 2021)
  - Xiaohong Liu (MSU, Summer 2020 - Fall 2020)
  - Xiaohan Zhang (MSU, Fall 2016 - Spring 2017)
  - William Ren (MSU, Summer 2016, Summer 2017)

## INVITED TALKS

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- 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

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- **Languages:** Python, C/C++, Java, Shell Script, Matlab, HTML, R
- **Tools:** Tensorflow, PyTorch, Caffe, Apache Beam, Git, OpenCV, L<sup>A</sup>T<sub>E</sub>X
- **Systems:** Linux, MacOS, Windows