

# Jiazhi Li

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## PROFILE

I am a fourth-year Ph.D. student at the University of Southern California. My research interests primarily focus on **machine learning fairness, unbiased representation learning, and generative models**. Furthermore, I possess hands-on experience in face recognition and biomedical engineering. Beyond my technical expertise, I excel in interpersonal communication, allowing me to engage effectively with diverse individuals. I am eager to learn, grow, and apply my knowledge in the real-world application. I am currently seeking an internship in Summer 2024.

## EDUCATION

<b>University of Southern California</b> <i>Ph.D. in Electrical Engineering (Machine Learning Fairness)</i>	Los Angeles, CA, US <i>Expected 2025.5</i>
<b>University of Southern California</b> <i>Master of Science in Electrical Engineering (Image Processing, GPA:3.82/4.00)</i>	Los Angeles, CA, US <i>2018.8 – 2020.5</i>
<b>Beijing Institute of Technology</b> <i>Bachelor of Science in Electronic Science and Technology (GPA: 3.80/4.00)</i>	Beijing, P.R.China <i>2014.8 – 2018.7</i>

## PUBLICATIONS

- [1] **Jiazhi Li**, Mahyar Khayatkhoei, Jiageng Zhu, Hanchen Xie, Mohamed E Hussein, Wael AbdAlmageed, “SABAF: Removing Strong Attribute Bias from Neural Networks with Adversarial Filtering”, submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2023.
- [2] Hanchen Xie, Jiageng Zhu, Mahyar Khayatkhoei, **Jiazhi Li**, Mohamed E. Hussein, Wael Abd-Almageed, “A Critical View of Vision-Based Long-Term Dynamics Prediction Under Environment Misalignment”, accepted by *International Conference on Machine Learning (ICML)*, 2023.
- [3] **Jiazhi Li**, Mahyar Khayatkhoei, Jiageng Zhu, Hanchen Xie, Mohamed E Hussein, Wael AbdAlmageed, “A Critical Review of Predominant Bias in Machine Intelligence”, planning to be submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2023.
- [4] **Jiazhi Li**, Wael Abd-Almageed, “Ethics and Fairness for Diabetes Artificial Intelligence”, accepted as the book chapter in “*Diabetes Digital Health, Telehealth, and Artificial Intelligence, Elsevier*”, 2024.
- [5] **Jiazhi Li**, Mahyar Khayatkhoei, Jiageng Zhu, Hanchen Xie, Mohamed E Hussein, Wael AbdAlmageed, “Information-Theoretic Bounds on The Removal of Attribute-Specific Bias from Neural Networks”, accepted by *Conference on Neural Information Processing Systems (NeurIPS) Workshops on Algorithmic Fairness through the Lens of Time*, 2023.
- [6] **Jiazhi Li**, Wael Abd-Almageed, “CAT: Controllable Attribute Translation for Fair Attribute Classification”, accepted by *European Conference on Computer Vision (ECCV) Workshops on VISION WITH BIASED OR SCARCE DATA*, 2022.
- [7] **Jiazhi Li**, Wael Abd-Almageed, “Information-Theoretic Bias Assessment Of Learned Representations Of Pretrained Face Recognition”, accepted by *IEEE International Conference on Automatic Face and Gesture Recognition (FG)*, 2021.
- [8] Shumeng Wang, Huiqi Li, **Jiazhi Li**, Yanjun Zhang, Bingshuang Zou, “Automatic Analysis of Lateral Cephalograms Based on Multiresolution Decision Tree Regression Voting”, accepted by *Journal of Healthcare Engineering*, 2018.
- [9] Jiageng Zhu, Hanchen Xie, **Jiazhi Li**, Mahyar Khayatkhoei, Wael AbdAlmageed, “An Investigation on the Position Encoding in Vision-Based Dynamics Prediction”, *In-Submission*, 2023.
- [10] Jiageng Zhu, Hanchen Xie, **Jiazhi Li**, Mahyar Khayatkhoei, Wael AbdAlmageed, “Toward Generalized Causal Representation Learning with Hidden Confounders via ADMG”, *In-Submission*, 2023.

- [11] Jiageng Zhu, Hanchen Xie, Jianhua Wu, **Jiazhi Li**, Mahyar Khayatkhoei, Mohamed E Hussein, Wael AbdAlmageed, “Shadow Datasets, New challenging datasets for Causal Representation Learning”, *Pre-Print*, 2023.

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## AWARDS

- Google Best Poster Award at IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021 (Jiazhi Li, Wael AbdAlmageed, “Information-Theoretic Bias Assessment Of Learned Representations Of Pretrained Face Recognition”).

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## PROFESSIONAL ACTIVITIES

- Reviewer at European Conference on Computer Vision (ECCV) 2022.
- Reviewer at Genetic and Evolutionary Computation Conference (GECCO) 2023.

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## RESEARCH EXPERIENCES

**Visual Intelligence and Multimedia Analytics Laboratory (VIMAL), USC**      Los Angeles, CA, US  
*Graduate Research Assistant (Advisor: Prof. Wael AbdAlmageed)*      2020.5 – Present

- Proposed a self-supervised learning method applied to models pre-trained on public large-scale web-scraped datasets to tackle strong attribute bias across various downstream tasks.
- Applied Adversarial Filtering to address strong attribute bias in diverse downstream tasks.
- Developed a framework based on Controllable Attribute Translation for generating synthetic face datasets to address minority group bias in facial attribute recognition and sex classification.
- Conducted an in-depth investigation to elucidate the distinction between two predominant biases, namely attribute bias and minority group bias, in machine intelligence.
- Presented an independent bias assessment metric at the representation level to evaluate the effectiveness of bias mitigation strategies regarding both attribute bias and minority group bias.
- Conducted a comprehensive fairness evaluation for a wide range of debiasing techniques.

**Media Communications Lab (MCL), USC**      Los Angeles, CA, US  
*Graduate Research Assistant (Advisor: Prof. C.-C. Jay Kuo)*      2019.5 – 2020.4

- Implemented interpretable convolutional neural networks and explainable machine learning models tailored for image forensics.
- Designed a data-driven model using Subspace Learning for fully automatic detection and classification of artifacts on wafer and device surfaces with 90% accuracy (United Microelectronics Corporation project).
- Established a pipeline incorporating Subspace Approximation with Adjusted Bias (Saab) transform for ProGAN generated images detection with 98% accuracy (DARPA project).
- Developed a PixelHop-based model to enlarge the receptive field for splicing edge localization with 97% accuracy.

**Research Group of Medical Information Processing, BIT**      Beijing, P.R.China  
*Undergraduate Research Assistant (Advisor: Prof. Huiqi Li)*      2017.9 – 2018.7

- Developed a program for the automatic identification of cephalometric landmarks using a shape model and enhanced the automatic detection through the mechanism of tag and distribution rules.
- Trained a Random Forest Classifier for landmark detection by extracting features based on anatomical structure.
- Acquired a dataset of 330 clinical X-ray cephalograms and evaluated landmark detection in the testing set, achieving 0.86 precision at 0.5 mm.
- Computed 17 angular measurements and 10 linear measurements using 45 detected landmarks for 330 cephalograms.

**Advanced Integrated Cyber-Physical Systems Lab (AICPS), UCI**      Irvine, CA, US  
*Undergraduate Research Assistant (Advisor: Prof. Mohammad Al Faruque)*      2017.6 – 2017.9

- Implemented a data-driven approach to establish the relationship between sensor-collected data (acoustic, magnetic, and vibration) and the movement of a 3-D printer extruder.
- Conducted data preprocessing and visualization to identify the initiation time of 3D printers’ printing process and optimized the placement of sensors.

## WORK EXPERIENCES

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### Beijing Institute of Heart Lung and Blood Vessel Diseases

Beijing, P.R.China

*Undergraduate Research Assistant (Advisor: Prof. Huiqi Li)*

2017.9 – 2018.7

- Collected a dataset comprising 5000 medical images of retinal vascular, discerning patterns in arteriovenous distribution.
- Collaborated with medical professionals to design a medical-aided application in C++, incorporating arteriovenous classification functionality.
- Developed retinal vascular auto-analysis software in C++, utilizing extracted parameters (Curvature, width, Bifurcation angle) from 5000 fundus images.

## PROJECTS

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### Machine Learning/Deep Learning | *Python, TensorFlow, Google Cloud Platform*

2019.6 – 2019.8

- Applied Support Vector Machine, Random Forest Classifier, Bag of Words Clustering, K-means clustering, Gaussian Mixture Models (GMM), Expectation-Maximization (EM) Clustering, and KNN for analysis on the Old Faithful dataset.
- Implemented Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), Long Short-Term Memory (LSTM), Generative Adversarial Network (GAN), Policy Gradient method REINFORCE.
- Developed a caption generation model tailored for Instagram, employing personalized image captioning techniques.

### Computer Vision/Image Processing | *C++*

2019.1 – 2019.5

- Constructed a bag of words model for object classification, utilizing extracted SIFT features.
- Implemented a texture classification and segmentation algorithm on the SIPI Texture dataset, achieving an accuracy of 87%.
- Applied boundary smoothing, hole filling, adaptive thresholding, and connected component labeling algorithms for preprocessing rice grain images and employed the K-means cluster algorithm to categorize rice grain types with an accuracy of 93%.
- Implemented a range of image processing algorithms, including Image De-mosaicing, enhancement, denoising, histogram manipulation, digital halftoning, geometric image modification, image warping, and morphological processing.

## TECHNICAL SKILLS

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**Languages:** Python (Pytorch, NumPy, pandas, Matplotlib), C/C++, JAVA, MATLAB

**Developer Tools:** Git, Google Cloud Platform, VS Code, Visual Studio, PyCharm, Eclipse