

# Qian Jiang

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## Education

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<b>Ph.D. Candidate in Electrical and Computer Engineering</b> <i>University of Illinois at Urbana-Champaign (UIUC)</i> GPA:4.0/4.0 Advisor: Professor Minh N. Do	<b>2019- Present</b> <i>Illinois, USA</i>
<b>B.Sc. in Electrical Engineering</b> <i>University of Electronic Science and Technology of China (UESTC)</i> GPA:3.9/4.0	<b>2015 - 2019</b> <i>Chengdu, China</i>

## Research Interests

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- Machine learning and computer vision, especially transfer learning and AutoML.

## Programming Skills

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- Pytorch, Python, MATLAB, Bash, Vim, Git.

## Research Experience

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<b>University of Illinois at Urbana-Champaign (UIUC)</b> <i>Hardware-aware Neural Architecture Search</i>	<b>Aug 2019 - Present</b> <i>Illinois, USA</i>
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- Developed differentiable models predicting end-to-end hardware performance of neural network architectures.
- Incorporated hardware feedback into end-to-end Differentiable Neural Architecture Search (DNAS).
- Conducted experiments on CIFAR and ImageNet datasets on multiple hardware platforms (Edge GPUs, Edge TPUs, Mobile CPUs, and customized accelerators).
- Demonstrated hardware performance improvement of  $1.4\times$  on customized accelerators and  $1.6\times$  on existing hardware processors.

### *Multi-source transfer learning*

- Formulated multi-source transfer learning as a bi-level optimization problem.
- Learned task weights for each source task during training using implicit differentiation.
- Conducted experiments on multiple tasks including classification and scene understanding.
- Demonstrated improved performance on FashionMNIST, CelebA and Cityscapes datasets.

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<b>University of California, Los Angeles (UCLA)</b> <i>Semantic segmentation for medical images</i>	<b>08/2018 - 11/2018</b> <i>Los Angeles, USA</i>
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- Developed tools to efficiently pre-process raw skull MRI images.
- Developed models to segment brain parts, especially hippocampus from raw skull images.

## Work Experience

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<b>Amazon</b> <i>Applied Scientist Intern, Large-scale multi-modal learning for vision and language</i>	<b>05/2022 - 11/2022</b> <i>Seattle, USA</i>
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- Conducted empirical and theoretical analysis on understanding the impact of the modality alignment between image and text on downstream tasks.
- Propose three instrumental regularizations to improve latent modality structures.
- Conduct extensive and comprehensive experiments on various vision-language models to show that the proposed methods consistently improve over the baselines for different model families (e.g., CLIP and ALBEF) and for different downstream applications (e.g., cross-modality retrieval, VQA, VR and etc).
- Submitted work to CVPR 2023 and got accepted.

#### **International Business Machine Inc. (IBM)**

**05/2020 - 08/2020**

*Research Intern, Optimization of communication libraries for IBM clouds*

*Yorktown Heights, USA*

- Developed tools to efficiently benchmark and visualize communication performance.
- Optimized parameters for message passing interface on IBM clouds.

## **Teaching Experience**

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#### **University of Illinois at Urbana-Champaign**

**2021-2022**

*Teaching Assistant, Electrical and Computer Engineering Department*

*Illinois, USA*

- ECE310: Digital Signal Processing
- ECE311: Digital Signal Processing Lab

## **Other Experience**

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#### **University of California, Los Angeles (UCLA)**

**2018 Summer**

*Full scholarship, Cross-disciplinary Scholar in Science and Technology (CSST)*

*Los Angeles, UCLA*

#### **Israel Institute of Technology (Technion)**

**2017 Summer**

*Full scholarship, Summer School of Engineering*

*Haifa, Israel*

## **Publications**

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#### **Journal papers**

1. **Qian Jiang**, Raymond A. Yeh, and Minh N. Do. Multi-source transfer learning by learning to weight source tasks. Under Review for IEEE Transactions on Neural Networks and Learning Systems and Learning systems (TNNLS).
2. **Qian Jiang\***, Xiaofan Zhang\*, Deming Chen, Minh N. Do, and Raymond A. Yeh. EH-DNAS: End-to-end hardware-aware differentiable neural architecture search. Under Review for IEEE Transactions on Neural Networks and Learning Systems (TNNLS). [\[Paper\]](#) [\[Code\]](#)

#### **Conference papers**

1. **Qian Jiang**, Changyou Chen, Han Zhao, Liqun Chen, Qing Ping, Son Dinh Tran, Yi Xu, Belinda Zeng, Trishul Chilimbi. Understanding and Constructing Latent Modality Structures in Multi-modal Representation Learning. CVPR 2023. [\[Paper\]](#)
2. Huimin Zeng, Zhenrui Yue, **Qian Jiang**, Yang Zhang, Lanyu Shang, Ruohan Zong, Dong Wang. Mitigating Demographic Bias of Federated Learning Models via Robust-Fair Domain Smoothing. Under Review for ICML 2023.

## **Review**

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- ICASSP, 2022-2023

## Scholarships and Awards

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- Nadine Barrie Smith Memorial Fellowship, 2022.
- C3SR (Illinois- IBM Center of Cognitive Computing Systems Research) Fellowship, 2019-2021.
- Outstanding Award, National College Student Research Innovation, China, 2018.
- National Scholarship, China, 2018.
- Tanglixin Scholarship, China, 2017.

## Relevant Coursework

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- CS 543: Computer Vision
- ECE 544: Pattern Recognition
- ECE 543: Statistical learning theory
- ECE 534: Random Processes
- ECE 490: Introduction to optimization