

# Huancheng Chen

*PhD Candidate*

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## Education

- 2020–present **Ph.D. in Electrical and Computer Engineering**, *University of Texas at Austin*  
GPA: 3.97/4.0     Advisor: Haris Vikalo
- 2014–2019 **B.Eng. in Electrical Engineering**, *South China University of Technology*  
GPA: 3.90/4.0

## Research Overview

My research concentrates on developing **scalable, trustworthy and efficient** learning systems and their applications in foundation models including:

- model compression (pruning, quantization) in federated learning;
- differential privacy and adversarial robustness in collaborative learning;
- fine-tuning strategies to continuously adapt large foundation models to downstream tasks using forgetting-resilient low-rank adaptation (LoRA);
- enhancing spatial accuracy and fidelity of content control for generative models.

## Industry Experience

- May – Aug. **Research Intern**, *Sony AI*, Tokyo, Japan  
2024 **Project: Enhancing Layout Guidance in Text-To-Image Generation**
  - Proposed a novel sampling scheme that optimizes backward noises aided by cross-attention maps of input text and enables controlling spatial semantics of images.
  - Generation with layout guidance enables to synthesize an arbitrary number of images with bounding boxes for improving object detection capability of the foundation model.
- Feb – May. **Research Intern**, *Sony AI*, Austin, Texas  
2024 **Project: Forgetting-Resilient Low-Rank Adaptation on Large Pretrained Models**
  - Proposed a novel continual learning scheme based on low-rank adaptation (LoRA) that enables the foundation model fine-tuning on a sequence of downstream tasks.
  - The proposed fine-tuning strategy prevents cataphoric forgetting problem and preserves performance of old tasks when adapting the foundation model to the new task.
- May – Aug. **Research Intern**, *Toyota InfoTech Lab*, Mountain View, California  
2022 **Project: Data-Free Knowledge Distillation in Non-IID Federated Learning (FL)**
  - Applying knowledge distillation technique to securely extract class-wise representations from clients' private datasets which are not allowed to be shared to the server.
  - The server utilizes the extracted representations for regularization to mitigate performance degradation caused by data-heterogeneity cross clients in the server-clients FL system.

Jan. – May. **Research Intern, Nokia Bell Lab**, Murray Hill, New Jersey

2022 **Project: Robust Flaw Detection on Low-Quality Images**

- Developed an end-to-end framework for background removal of equipment's images based on **U-2-Net** that enables removing irrelevant contents might mislead flaw detection.
- Constructed a highly accurate (90%+) and robust deep network based on **Inception-ResNet** for detecting flaws on images of devices in low quality (such as blur, shadow).

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## Publications

- [1] **Huancheng Chen**, Jingtao Li, Weiming Zhuang, Haris Vikalo, Lingjuan Lyu. [Boundary Attention Constrained Zero-Shot Layout-To-Image Generation](#). Under Review
- [2] **Huancheng Chen**, Jingtao Li, Nidham Gazagnadou, Weiming Zhuang, Chen Chen, Lingjuan Lyu. [Dual Low-Rank Adaptation for Continual Learning with Pre-Trained Models](#). Under Review
- [3] **Huancheng Chen**, Haris Vikalo. [Heterogeneity-Guided Client Sampling: Towards Fast and Efficient Non-IID Federated Learning](#). NeurIPS, 2024
- [4] **Huancheng Chen**, Haris Vikalo. [Recovering Labels from Local Updates in Federated Learning](#). ICML, 2024
- [5] **Huancheng Chen**, Haris Vikalo. [Mixed-Precision Quantization for Federated Learning on Resource-Constrained Heterogeneous Devices](#). CVPR, 2024
- [6] **Huancheng Chen**, Haris Vikalo. [Federated Learning in Non-IID Settings Aided by Differentially Private Synthetic Data](#). CVPR Workshops **Oral**, 2023
- [7] **Huancheng Chen**, Johnny Wang, Haris Vikalo. [The Best of Both Worlds Accurate Global and Personalized Models through Federated Learning with Data-Free Hyper-Knowledge Distillation](#). ICLR, 2023
- [8] Abdullah Mohamed\*, **Huancheng Chen\***, Zhangyang Wang, Christian Claudel. [Skeleton-Graph: Long-Term 3D Motion Prediction From 2D Observations Using Deep Spatio-Temporal Graph CNNs](#). ICCV Workshops, 2021

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## Honors

Sept. 2015 **National Encouragement scholarship**, South China University of Technology

Sept. 2016 **The First Prize scholarship**, South China University of Technology

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## Skills

Languages English (fluent), Mandarin (native), Cantonese (native)  
Programming Python, Java, C/C++, Bash, SQL, Matlab,  $\text{\LaTeX}$   
Tools Tensorflow, Pytorch, Hugging Face, Git, Pandas