Wenyi (Morty) ZHANG

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EDUCATION

University of California, San Diego Sep 2023 - June 2025 (Expected)
M.S. in Electronic and Computer Engineering (Data Science and Machine Learning track), **cGPA:** 3.88/4.0

University of California, Irvine, *3+2 Engineering Program* Sep 2022 - June 2023
Visiting student in Computer Engineering (Senior year), **cGPA:** 4.0/4.0

The Chinese University of Hong Kong, Shenzhen (CUHK-SZ) Sep 2019 - June 2023
B.Eng. in Electronic Information Engineering (Computer Engineering Stream), **cGPA:** 3.55/4.0
Awards: Bowen Scholarship 2019-2022; Inspirational Scholarship 2019-2022; Undergraduate Research Award 2021, 2022; Dean's List 2019-20, 2021-22; Shaw College Spirits Award 2021, 2022

PUBLICATION

Conferences

1. [**PAM' 25**] *A Deep Dive into LEO Satellite Topology Design Parameters.* **Wenyi Zhang***, Zihan Xu*, Sangeetha Abdu Jyothi. *the 26th Annual Passive and Active Measurement Conference. (PAM).* (* = Co-primary Authors).

2. **[LEO-NET' 24]** *A First Look of LEO Satellite Network Resilience.* Zhuoyuan Li*, **Wenyi Zhang***, Wenhao Chen, Yiyan Hu, Weyl Lu. *2024 ACM Workshop on LEO Networking and Communication (LEO-NET), Co-located with ACM MobiCom 2024.* (* = Co-primary Authors).

3. **[LEO-NET' 24]** *An In-Depth Investigation of LEO Satellite Topology Design Parameters.* **Wenyi Zhang*,** Zihan Xu*, Sangeetha Abdu Jyothi. *2024 ACM Workshop on LEO Networking and Communication (LEO-NET), Co-located with ACM MobiCom 2024.* (* = Co-primary Authors).

4. **[IEEE VR' 23]** *CaV3: Cache-assisted Viewport Adaptive Volumetric Video Streaming*. Junhua Liu, Boxiang Zhu, Fangxin Wang, Yili Jin, **Wenyi Zhang**, Zihan Xu, Shuguang Cui. *2023 IEEE Conference Virtual Reality and 3D User Interfaces (VR).*

Journals

1. **[TMC' 24]** *Privacy-Preserving Gaze-Assisted Immersive Video Streaming.* Yilin Jin, **Wenyi Zhang**, Zihan Xu, Junhua Liu, Fangxin Wang, Shuguang Cui. *IEEE Transactions on Mobile Computing.*

2. **[IoTJ' 24]** *Proffler: Toward Collaborative and Scalable Edge-Assisted Crowdsourced Livecast.* **Wenyi Zhang***, Zihan Xu*, Fangxin Wang, Jiangchuan Liu. *IEEE Internet of Things Journal (Volume: 11, Issue: 2, 15 January 2024).* (* = Co-primary Authors).

Preprints

1. *Unimodal Training-Multimodal Prediction: Cross-modal Federated Learning with Hierarchical Aggregation.* Rongyu Zhang, Xiaowei Chi, **Wenyi Zhang**, Guiliang Liu, Yuan Du, Fangxin Wang. *arXiv preprint arXiv:2303.15486.*

RESEARCH

Networking and Systems Group & WCSNG Lab, UC San Diego | *Supervisor: Prof. Aaron Schulman & Prof. Dinesh Bharadia*

- Distributed Spectrum Sensing. Apr 2024 - Now
  - Designed a distributed spectrum sensing platform utilizing Pluto SDR and an Android phone, leveraging the Maia-SDR for implementation.
  - Enabled real-world spectrum measurements across a broad frequency range, incorporating GPASDO and reference signals to calibrate and synchronize multiple SDRs for Carrier Frequency Offset (CFO) correction.
    Achieved accurate signal localization and detection based on synchronized recordings.
- Measurement and Security of Satellite Networks. Oct 2023 - Now
  - Captured raw binary user traffic from multiple GEO satellites using EBSPro and satellite dishes, adhering to DVB-S/DVB-S2 standards to develop parsers for reassembling Data Link Layer traffic.
  - Investigating potential security vulnerabilities in GEO satellite-based communication, including RSA private key leakage and exposure of unencrypted user privacy data.

Networking, Systems, and AI Lab (NetSAIL), UC Irvine | *Supervisor: Prof. Sangeetha Abdu Jyothi*

- Topology Design and Routing of LEO Satellite Networks Aug 2022 - Aug 2023
  - Surveyed and summarized the literature on routing and topology design of satellite network system, and built the environment and satellite network simulators, Hypatia and Starperf.
  - Measured the performance of the shortest path based on the Dijkstra's algorithm using static routing tables for the topological structure of satellite networks with the +Grid strategy (a mesh-like connectivity mechanism), as well as the round-trip time (RTT) and throughput of dynamic satellite networks on the simulators.
  - **Publication:**
    1) **Wenyi Zhang***, Zihan Xu*, Sangeetha Abdu Jyothi. *An In-Depth Investigation of LEO Satellite Topology Design Parameters*, *2024 ACM Workshop on LEO Networking and Communication (LEO-NET).*
    2) **Wenyi Zhang***, Zihan Xu*, Sangeetha Abdu Jyothi. *A Deep Dive into LEO Satellite Topology Design Parameters. the 26th Annual Passive and Active Measurement Conference. (PAM 2025).*

Intelligent Networking and Multimedia Lab, CUHK-SZ | *Paid RA, Supervisor: Prof. Fangxin Wang*

- Multi-modal Federated Learning — Jun 2022 - Oct 2022
  - Designed HA-Fedformer, a novel transformer-based model that empowers unimodal training with only an unimodal dataset at the client and multimodal testing by aggregating multiple clients' knowledge for better accuracy
  - Experiments on popular sentiment analysis benchmarks, CMU-MOSI and CMU-MOSEI, demonstrated that HA-Fedformer significantly outperforms SOTA multimodal models under the UTMP federated learning frameworks, with 15%-20% improvement on most attributes
  - **Result:** Rongyu Zhang, Xiaowei Chi, **Wenyi Zhang**, Guiliang Liu, and Fangxin Wang. *Unimodal Training-Multimodal Prediction: Cross-modal Federated Learning with Hierarchical Aggregation*, submitted to IEEE Transactions on Mobile Computing.
- Volumetric Video (VV) Streaming – client-side cache-assisted content transmission — May 2022 - Sep 2022
  - Proposed CaV3, an integrated cache-assisted viewport adaptive VV streaming framework, which employs a Long-short term Sequential prediction model (LSTSP) to achieve accurate short-, mid-, and long-term viewing pattern prediction with a multi-modal fusion model by capturing the viewer's behavior inertia, current attention, and subjective intention.
  - Collected a comprehensive dataset with sufficient practical unbounded 360° scenes, conducted extensive evaluation of CaV3 on the dataset, results confirming the superiority of CaV3, which outperformed SOTA algorithm by 15.6%-43% in viewport prediction and 13%-40% in system utility.
  - **Publication:** Junhua Liu, Boxiang Zhu, Fangxin Wang, Yili Jin, **Wenyi Zhang**, Zihan Xu, Shuguang Cui. *CaV3: Cache-assisted Viewport Adaptive Volumetric Video Streaming*, accepted the 30th IEEE Conference on Virtual Reality and 3D User Interfaces. (VR 2023).
- User-aware Viewpoint Prediction of 360° Video Streaming — Aug 2021 - May 2022
  - Considering the lack of eye gazing in existing datasets, collected a dataset of the head and gaze behaviors of users watching a 360° video, which outperforms existing datasets with rich dimensions, large scale, strong diversity, and high sampling frequency.
  - Designed a new FoV prediction approach using a cross-modal attention mechanism, which effectively extracts historical FoV trajectory, video content, and gaze information for joint analysis; conducted extensive experiments, which showed 26.24% improved performance on average compared to SOTA algorithms.
  - **Publication:** Yilin Jin, **Wenyi Zhang**, Zihan Xu, Junhua Liu, Fangxin Wang, and Shuguang Cui. *Exploring Gaze Behavior in 360-Degree Videos: Dataset and Multimodal Attentive FoV Prediction*, accepted by IEEE Transactions on Mobile Computing. (2024).
- Video Streaming Distribution Optimization in Edge Computing — Dec 2020 - Aug 2021
  - Proposed Proffler, an integrated framework that enables effective stream caching at the network edge server
  - Examined the underlying correlations in viewing patterns across different regions and proposed a novel transformer-based algorithm, Chili-TF, that achieves accurate viewer request prediction, even for regions with insufficient data
  - Designed a scalable algorithm, U2VR, that achieves near-optimal video stream allocation as well as viewer scheduling, and conducted extensive experiments based on real data for validation
  - **Publication: Wenyi Zhang***, Zihan Xu*, and Fangxin Wang. *Proffler: Towards Collaborative and Scalable Edge-Assisted Crowdsourced Livecast*, accepted by IEEE Internet of Things Journal. (2023).

EXTRACURRICULAR TECHNICAL ACTIVITIES

China College Students' IC Innovation and Entrepreneurship Competition | *Team Leader* — Jan 2021 - Oct 2021

- Built a handwritten digit (from 0 to 9) recognition device on a Nexys Video Artix-7 FPGA board (required by the competition), implemented the RISC-V instruction set architecture, and constructed the Linux environment
- Trained and tested a LeNet-5 model with Python and C++, and deployed the model with Vivado HLS to construct the handwritten digit recognition IP core, achieving recognition accuracy of 79.55%
- **Award:** 3rd Prize in the Southern China Finals

Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS) | *Teaching Assistant* — Jun 2021 - Sep 2021

- Assisted with the institute's summer camp about unmanned boat
- Calibrated the inertia measurement unit (IMU), designed an adaptive PID controller of the steering gear with Arduino Nano and Uno boards

LEADERSHIP

Billiards Club & Shaw College Billiard Club, CUHK-SZ | *Founder, President* — Nov 2019 - June 2022

- Recruited 70+ members in the first year within the school and another 100+ across schools in 2020 and 2021
- Hosted monthly training sessions for billiard sports aficionados, prepared teaching materials like technical documents and recorded matches, and organized team outings
- Collaborated with administrative offices and other student organizations to host on-campus activities like the 2020 and 2021 Freshman Cup, 2021 CUHK-SZ Sports Festival (billiard games)

SKILLS AND PROFICIENCIES

Languages	English (*Proficient*), Mandarin (*Native-speaker).*
Software	Python, C++, R, SQL; GNURadio, MATLAB, Vivado, Arduino, Photoshop, MS Office.
Interests	Billiards, Basketball, Violin**.**