

# Te-Yi “Dexter” Kan

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## Research Summary

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I am a Ph.D. student in ECE at USC under the supervision of Prof. Konstantinos Psounis. My research focuses on developing efficient, privacy-preserving, and reliable ML systems for resource-constrained devices in distributed environments. Specifically, I build a privacy-preserving, low-latency pipeline for vision tasks and develop low-latency, reliability-aware scheduling/offloading for ML workloads in vehicular networks. My recent work explores cloud-edge cooperative, hardware-aware NAS to produce lightweight personalized models that remain robust under dynamic resource and distribution shifts.

## Research Interests

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Privacy-Preserving ML Systems; Hardware-Aware Neural Architecture Search (NAS); Edge-Cloud ML Inference & Scheduling; Efficient & Lightweight ML; Computer Vision; Large Language Models (LLMs); Wireless Networking & Communications.

## Education

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**University of Southern California** - *Ph.D. in ECE* Aug. 2022 - May 2027 (expected)

- Dissertation Topic: Towards Efficient and Privacy-Preserving Machine Learning for Resource-Constrained Devices
- Coursework: Stochastic Network Optimization, Operating Systems, Computer Vision, Artificial Intelligence, Reinforcement Learning & Large Language Models

**University of California, Los Angeles** - *M.S. in ECE* Sep. 2019 - Dec. 2020

- Coursework: Convex Optimization, Neural Networks and Deep Learning, Reinforcement Learning

**National Taiwan University** - *B.S. in EE* Sep. 2014 - Jan. 2019

- Coursework: Wireless and Mobile Networking, Wireless Communications, Network Planning and Management

## Publications

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- [1] **Te-Yi Kan**, Konstantinos Psounis, “Efficient Hardware-aware Neural Architecture Search for Edge Devices via Cloud-Edge Collaboration”, *The International Conference on Machine Learning*, 2026, submitted. (ICML-26)
- [2] **Te-Yi Kan**, Konstantinos Psounis, “Low-Latency Private ML inference for Vision Tasks in Distributed Environments”, *IEEE Transactions on Dependable and Secure Computing*, 2026, submitted. (TDSC-26)
- [3] **Te-Yi Kan**, Konstantinos Psounis, “Online distributed offloading of time-sensitive vehicular tasks in edge-cloud systems”, *IEEE Transactions on Vehicular Technology*, 2025. (TVT-25) | 🔗
- [4] **Te-Yi Kan**, Ronald Y. Chang, Feng-Tsun Chien, “Hybrid Intelligent Reflecting Surface and Classical Relay Assisted Multiuser MISO Systems”, *IEEE Transactions on Vehicular Technology*, 2023. (TVT-23) | 🔗
- [5] Tz-Wei Mo, Ronald Y. Chang, **Te-Yi Kan**, “DeepMCTS: Deep Reinforcement Learning Assisted Monte Carlo Tree Search for MIMO Detection”, *2022 IEEE 95th Vehicular Technology Conference: (VTC2022-Spring)*, 2022. (VTC-22) | 🔗
- [6] **Te-Yi Kan**, Ronald Y. Chang, Feng-Tsun Chien, “Intelligent Reflecting Surfaces and Classical Relays: Coexistence and Co-Design”, *2021 IEEE GlobeCom Workshops (GC Wkshps)*, 2021.(GC-21). | 🔗
- [7] **Te-Yi Kan**, Yao Chiang, Hung-Yu Wei, “QoS-aware Mobile Edge Computing System: Multi-server Multi-user Scenario”, *2018 IEEE GlobeCom Workshops (GC Wkshps)*, 2018. (GC-18) | 🔗
- [8] **Te-Yi Kan**, Yao Chiang, Hung-Yu Wei, “QoS-aware Fog Computing System: Load Distribution and Task Offloading”, *The 15th IEEE Vehicular Technology Society Asia Pacific Wireless Communications Symposium (VTS APWCS)*, 2018. (APWCS-2018) | 🔗
- [9] **Te-Yi Kan**, Yao Chiang, Hung-Yu Wei, “Task Offloading and Resource Allocation in Mobile-Edge Computing System”, *2018 27th Wireless and Optical Communication Conference (WOCC)*, 2018. (WOCC-18) | 🔗

## Research Projects

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**Efficient Hardware-aware Neural Architecture Search for Mobile Devices [ICML-26]** Jun. 2025 - Present

- Designed a two-stage NAS framework combining cloud-based search with edge-based fine-tuning, enabling high-performance personalized models under strict latency and memory constraints.
- Conducted extensive experiments on CIFAR-100, ImageNet, and Freiburg datasets, with cross-dataset comparisons to evaluate effectiveness under varying edge-cloud distribution shifts.

#### **Privacy-Preserving ML Systems [TDSC-26]**

Jun. 2024 - Present

- Built a privacy-preserving inference pipeline with sensitive object detection, task scheduling, and obfuscation modules for vision tasks.
- Leveraged distributed remote servers to balance utility and privacy.
- Achieved ~30% higher task utility at 25 fps without compromising user privacy.

#### **Online Distributed Offloading Mechanism in Vehicular Networks [TVT-25]**

Feb. 2023 - May 2024

- Developed TODORA, a threshold-based online distributed offloading and resource allocation mechanism for real-time vehicular ML tasks.
- Reduced end-to-end task duration (execution delay + communication overhead) by optimizing offloading and allocation under dynamic edge-cloud environments.
- Demonstrated superior performance over state-of-the-art baselines via extensive simulations.

#### **Intelligent Reflecting Surface (IRS) [TVT-23, GC-21]**

Jan. 2021 - May 2022

- Proposed a multiuser downlink MISO system assisted by a full-duplex IRS and half-duplex DF relay.
- Designed an alternating-optimization algorithm to jointly optimize active BS/relay beamforming and IRS passive beamforming for maximum sum-rate.
- Demonstrated significant throughput gains and analyzed tradeoffs in joint beamforming design.

#### **Multiple-input multiple-output (MIMO) Detection [VTC-22]**

Oct. 2020 - Apr. 2021

- Devised a deep reinforcement learning enhanced Monte Carlo Tree Search (MCTS) framework for MIMO detection.
- Demonstrated notable performance and complexity improvements over conventional MCTS across diverse channel conditions.

#### **Multi-access Edge Computing (MEC) Systems [GC-18, APWCS-18, WOCC-18]**

Sep. 2017 - Aug. 2018

- Developed QoS-aware task offloading strategies for MEC systems in single- and multi-server settings.
- Proposed a two-stage algorithm optimizing task offloading, resource allocation, and load distribution.
- Validated superior latency reduction and QoS performance against multiple benchmarks.

## Teaching Experience

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#### **USC EE450: Introduction to Computer Networks**

Spring, Summer, and Fall 2023

Instructors: Dr. Ali Zahid, Dr. Sharin Nazarin, and Dr. Corey Baker

#### **USC EE503: Probability for Electrical and Computer Engineers**

Fall 2022

Instructors: Dr. Konstantinos Psounis

## Professional Activities

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#### **Reviewer, IEEE**

Sep. 2020 - Present

- Journals: *IEEE Access*, *IEEE Transactions on Vehicular Technology*, and *IEEE Transactions on Green Communications and Networking*
- Conferences: *IEEE Wireless Communications and Networking Conference*, *IEEE International Conference on Communications*, and *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*.

## Technical Skills

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#### **Programming Languages:**

Python, C/C++, Java, Bash, Matlab, R

#### **ML & AI:**

PyTorch, TensorFlow, Scikit-learn, Keras, Transformers

#### **Infrastructure & Deployment:**

OpenStack, Docker, Kubernetes, Pandas

## Work Experience

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#### **Researcher, Academia Sinica-MediaTek Collaborative Project**

Oct. 2021 - May 2022

- Proposed and collaborated with MediaTek research team on the project, “AI-Enabled Hybrid Reconfigurable Intelligent Surface (RIS) and Relay Systems for 6G Communications.”
- Designed an AI-enabled hybrid RIS/relay system to improve energy efficiency and system sum-rate.
- Analyzed system performance and tradeoffs in mmWave and THz frequency bands.

#### **Summer Intern, Foxconn Technology Group**

Jun. 2017 - Aug. 2017

- Implemented a commercial MEC infrastructure to enable lifecycle management of MEC services.
- Contributed to the development of an MEC-powered face recognition system for access control and attendance management, using OpenStack for deployment.

## **Presentations**

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### **Poster**

- “Low-Latency Private ML Inference for Vision Tasks in a Distributed Environment,” The ECE 14th Annual Research Festival, Los Angeles, CA, Nov. 8, 2024
- “Joint Task Assignment and Resource Allocation Mechanism for In-vehicle Augmented Reality,” The ECE 13th Annual Research Festival, Los Angeles, CA, Oct. 27, 2023
- “QoS-aware Mobile Edge Computing System: Multi-server Multi-user Scenario,” IEEE Globecom Workshops (GC Wkshps), Abu Dhabi, UAE, Dec. 09, 2018

### **Presentation**

- “Intelligent Reflecting Surfaces and Classical Relays: Coexistence and Co-Design,” IEEE Globecom Workshops (GC Wkshps), Madrid, Spain, Dec. 07, 2021
- “QoS-aware Fog Computing System: Load Distribution and Task Offloading,” IEEE Vehicular Technology Society Asia Pacific Wireless Communications Symposium (IEEE VTS APWCS), Taiwan, Aug. 23, 2018
- “Task Offloading and Resource Allocation in Mobile-Edge Computing System,” Wireless and Optical Communication Conference (WOCC), Taiwan, May 01, 2018

## **Selective Projects**

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### **Schematic-to-Netlist Translation using RL-Enhanced VLM Pipeline**

Fall 2025

- Developed an RL-enhanced VLM pipeline to translate circuit schematic diagrams into SPICE-compatible netlists.
- Trained Qwen with LoRA for schematic understanding, then used GRPO with syntax and functional correctness as reward signals to iteratively refine translation quality.

### **Generative Adversarial Imitation Learning (GAIL)**

Spring 2020

- Implemented a scalable imitation learning algorithm in Python for high-dimensional environments.
- Achieved superior performance over Behavior Cloning on OpenAI Gym tasks (Pendulum, Cartpole).

### **Image Generation Methods for Cataract Surgery**

Winter 2020

- Applied U-Net and U-Net+WGAN frameworks to segment cataract surgery images of eye structures.
- Benchmarked models using pixel accuracy, mean IoU, and F1 score, with comparisons against self-labeled data.

### **IEEE 802.15.4 Design Challenge**

Fall 2017

- Designed duty cycle-adaptive Machine-to-Machine (M2M) communication protocols for wireless networks.
- Implemented protocols on FCM2401 modules using AutoNet SDK.

### **Functionally Reduced And-Inverter Graph (FRAIG)**

Fall 2016

- Built a C-based FRAIG circuit representation with data structures for detecting functionally equivalent pairs.
- Integrated hashing, Boolean simulations, and SAT solvers to identify equivalences in digital circuits.

## **Honors and membership**

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- Viterbi Graduate Fellowship, Fall 2022.
- Undergraduate Overseas Research Presentation Grant, Fall 2018.
- Student member, IEEE and IEEE Communications Society, since 2018.