# Cheng-Wei Ching

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## Education

**University of California, Santa Cruz (UCSC)** May 2022 - Jul. 2026 (Expected)
Ph.D. student in Computer Science and Engineering
- Advisor: Dr. Liting Hu.
- Research Interests: Distributed Systems for Machine Learning, Federated Learning.

**National Chung Cheng University (CCU)** Sep. 2019 - Jul. 2021
M.S. in Computer Science and Information Technology
- Advisor: Dr. Jian-Jhih Kuo.
- Research Interests: Approximation Algorithms, Federated Learning, Decentralized Learning.

**Tamkang University (TKU)** Sep. 2011 - Jan. 2016
B.A. in Spanish

## Experience

**Graduate Student Researcher** May 2022 - Present
*University of California, Santa Cruz (UCSC)* California, the U.S.
- Contributed to a federated learning engine in edge computing settings that accelerates total training time by up to 14.0× compared to OpenFL and FedScale. This work is to appear in *ACM EuroSys 2024* [2].

**Research Assistant** Jul. 2021 - Feb. 2022
*Academia Sinica* Taipei, Taiwan
- Worked on a federated learning framework to solve the issue of partially-labeled and non-IID data, which increases classification accuracy by up to 20% compared to FedFomo and Federated Bayesian Ensemble. This work was published in *IEEE TSC* [3].

**Research Assistant** Sep. 2019 - Jul. 2021
*National Chung Cheng University (CCU)* Chiayi, Taiwan
- Designed an approximation algorithm to build up a communication topology in decentralized learning with minimum power consumption over wireless networks, which saves more than 20% power compared to the baselines. This work was accepted by *IEEE GLOBECOM 2020* [8], and extended to *IEEE TGCN* [7].
- Devised a decentralized learning framework with differential privacy to build up an efficient and secure communication topology based on social networks in decentralized learning, which increases the convergence rate by up to 2.8× compared to the state of the art. This work was accepted by *IEEE ICCCN 2021* [5].
- Presented a federated learning framework to defend the attack of generative adversarial networks. This work was accepted by *IEEE GLOBECOM 2020* [9].

## Publications

[1] **Cheng-Wei Ching** *et al.*, "Decaffe: DHT Tree-Based Online Federated Fake News Detection," in *International Conference on Control Engineering and Artificial Intelligence (CCEAI)*, 2024.

[2] **Cheng-Wei Ching** *et al.*, "Totoro: A Scalable Federated Learning Engine for the Edge," in *the 19th ACM SIGOPS European Conference on Computer Systems (EuroSys)*, 2024.

[3] **Cheng-Wei Ching** *et al.*, "Dual-Objective Personalized Federated Service System With Partially-Labeled Data Over Wireless Networks," *IEEE Transactions on Services Computing (TSC)*, vol. 16, no. 5, pp. 3265–3279, 2023.

[4] **Cheng-Wei Ching** *et al.*, "OrcoDCS: An IoT-Edge Orchestrated Online Deep Compressed Sensing Framework," in *IEEE the 43rd International Conference on Distributed Computing Systems Workshops (ICDCSW)*, 2023.

[5] **Cheng-Wei Ching** *et al.*, "Efficient Communication Topology via Partially Differential Privacy for Decentralized Learning," in *International Conference on Computer Communications and Networks (ICCCN)*, 2021.

[6] **Cheng-Wei Ching** *et al.*, "Efficient Online Decentralized Learning Framework for Social Internet of Things," in *IEEE Global Communications Conference (GLOBECOM)*, 2021.

[7] Jian-Jhih Kuo, **Cheng-Wei, Ching**, *et al.*, "Energy-Efficient Topology Construction via Power Allocation for Decentralized Learning via Smart Devices with Edge Computing," *IEEE Transactions on Green Communications and Networking (TGCN)*, vol. 5, no. 4, pp. 1806–1819, 2021.

[8] **Cheng-Wei Ching** *et al.*, "Energy-Efficient Link Selection for Decentralized Learning via Smart Devices with Edge Computing," in *IEEE Global Communications Conference (GLOBECOM)*, 2020.

[9] **Cheng-Wei Ching** *et al.*, "Model Partition Defense against GAN Attacks on Collaborative Learning via Mobile Edge Computing," in *IEEE Global Communications Conference (GLOBECOM)*, 2020.

[10] **Cheng-Wei Ching** *et al.*, "Optimal Device Selection for Federated Learning Over Mobile Edge Networks," in *IEEE 40th International Conference on Distributed Computing Systems Workshop (ICDCSW)*, 2020.

## Professional Services

- Journal Reviewer, *Elsevier Computer Communications*, 2024.
- Journal Reviewer, *Elsevier Engineering Applications of Artificial Intelligence (EAAI)*, 2023-2024.
- Journal Reviewer, *Elsevier Future Generation Computer Systems (FGCS)*, 2023-2024.
- Journal Reviewer, *Elsevier Journal of Network and Computer Applications (JNCA)*, 2023-2024.
- Journal Reviewer, *IEEE Transactions on Machine Learning in Communications and Networking (TMLCN)*, 2023-2024.
- Journal Reviewer, *IEEE Transactions on Services Computing (TSC)*, 2024.
- Journal Reviewer, *IEEE Network*, 2023-2024.

## Technical Skills

**Languages:** Python, Java, Latex, MATLAB, C and C++.

**Developer Tools:** Pytorch, TensorFlow, Keras, Linux, Gurobi, Docker, Git, and VS Code.