Xiaofan Yu

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Research Interests

- Edge AI for real-world cyber-physical system deployments
- Embedded system design for next-generation applications
- Cognitive-inspired and neuromorphic computing paradigms

Appointments

Assistant Professor, University of California Merced, Merced, CA, USA 2025–

Education

University of California San Diego, La Jolla, CA, USA 2018–2025
Ph.D. in Computer Science and Engineering (Master's degree awarded Jun. 2020)
Thesis: Intelligence Beyond the Edge in IoT
Advisor: Tajana Rosing
Thesis Committee: Tajana Rosing, Sicun Gao, Ryan Kastner, Geoffrey Voelker and Farinaz Koushanfar

Peking University, Beijing, China 2014–2018
B.S. in Electronics Engineering
Advisor: Xiaohui Duan

Non-Degree Academic Experience:

Global Research Experience in Advanced Technologies (GREAT) Program 2017
University of California Davis, Davis, CA, USA
Advisor: Soheil Ghiasi

Selected Honors and Awards

Rising Stars in ML and Systems (*selcted as one of 41 awardees globally*) 2024
Best Poster Award of Theme 1, SRC CoCoSys Annual Review 2024
Rising Stars in CPS (*selected as one of 34 awardees globally*) 2023
Best PhD Forum Presentation Award, IPSN 2023
ACM SIGBED Student Research Competition Second Runners-Up 2023
Rising Stars in EECS (*selected as one of 85 awardees globally*) 2022
Nomination for Young Women in VLSI, TCVLSI, IEEE Computer Society 2022
Best Paper Award, CNSM 2021
Graduate Student Fellowship, CSE, UCSD 2018
Excellent Graduate Student, EECS, PKU 2018
First Prize in Oral Presentation of Undergraduate Research, EECS, PKU 2017
Award for Outstanding Research Performance in GREAT Program, UC Davis 2017
Merit Student, PKU 2017, 2016

Research Internships

Arm Research, San Jose, CA, USA — Jun. 2021–Sep. 2021
Mentor & Manager: Ludmila Cherkasova & Gary Carpenter
Project: Asynchronous Federated Learning in Hierarchical IoT Networks

Arm Research, San Jose, CA, USA — Jun. 2020–Sep. 2020
Mentor & Manager: Ludmila Cherkasova & Gary Carpenter
Project: Automating Robust and Fault-Tolerant LoRa-based IoT Networks Design

Kolmostar Inc., Fremont, CA, USA — Jun. 2019–Sep. 2019
Manager: Wensheng Hua
Project: Firmware update for ultra-low power GNSS module and module tests automation

Teaching

Guest Lecturer at University of California San Diego
CSE 237A Introduction to Embedded Computing — Instructor: Tajana Rosing — Winter 2025, Winter 2023

Teaching Assistant at University of California San Diego
CSE 237A Introduction to Embedded Computing — Instructor: Tajana Rosing — Winter 2023, Winter 2022

Teaching Assistant at School of EECS, Peking University
Emerging Techniques for Modern Wireless Communications — Instructor: Lingyang Song — Spring 2018

Referred Journal Publications

(**Equal contribution,* †*Students I mentored*)

[1] **Xiaofan Yu**, Lanxiang Hu, Benjamin Reichman, Dylan Chu†, Rushil Chandrupatla†, Xiyuan Zhang, Larry Heck, and Tajana Rosing. *SensorChat: Answering Qualitative and Quantitative Questions during Long-Term Multimodal Sensor Interactions*. In: *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (*IMWUT*) (2025).

[2] Ye Tian†, Rishikanth Chandrasekaran, Kazim Ergun, **Xiaofan Yu**, and Tajana Rosing. *Federated Hyperdimensional Computing: Comprehensive Analysis and Robust Communication*. In: *ACM Transactions on Internet of Things* (*TIOT*) 6.3 (2025), pp. 1–30.

[3] Behnam Khaleghi*, **Xiaofan Yu***, Jaeyoung Kang, Xuan Wang, and Tajana Rosing. *Private and Efficient Learning with Hyperdimensional Computing*. In: *IEEE Transactions on Circuits and Systems for Artificial Intelligence* (*TCASAI*) (2024).

[4] Fatemeh Asgarinejad, **Xiaofan Yu**, Danlin Jiang†, Justin Morris, Tajana Rosing, and Baris Aksanli. *Enhanced Noise-Resilient Pressure Mat System based on Hyperdimensional Computing*. In: *Sensors* 24.3 (2024), p. 1014.

[5] **Xiaofan Yu**, Kazim Ergun, Xueyang Song†, Ludmila Cherkasova, and Tajana Šimunić Rosing. *Automating and Optimizing Reliability-Driven Deployment in Energy-Harvesting IoT Networks*. In: *IEEE Transactions on Network and Service Management* (*TNSM*) 20.1 (2022), pp. 787–799.

[6] **Xiaofan Yu**, Kazim Ergun, Ludmila Cherkasova, and Tajana Šimunić Rosing. *Optimizing Sensor Deployment and Maintenance Costs for Large-Scale Environmental Monitoring*. In: *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems* (*TCAD*) 39.11 (2020), pp. 3918–3930.

[7] Daniel D Fong, **Xiaofan Yu**, Jiageng Mao, Mahya Saffarpour, Prashant Gupta, Rami Abueshsheikh, Alejandro Velazquez Alcantar, Eric A Kurzrock, and Soheil Ghiasi. *Restoring the Sense of Bladder Fullness for Spinal Cord Injury Patient*. In: *Smart Health* 9 (2018), pp. 12–22.

Referred Conference Publications

(**Equal contribution,* †*Students I mentored*)

[8] Ye Tian†, Xiaoyuan Ren, Zihao Wang, Onat Gungor, **Xiaofan Yu**, and Tajana Rosing. *DailyLLM: Context-Aware Activity Log Generation Using Multi-Modal Sensors and LLMs*. In: *Proceedings of the 23nd IEEE International Conference on Mobile Ad-Hoc and Smart Systems* (*MASS*). 2025.

[9] Benjamin Reichman*, **Xiaofan Yu***, Lanxiang Hu, Jack Truxal, Atishay Jain, Rushil Chandrupatla†, Tajana Rosing, and Larry Heck. *SensorQA: A Question Answering Benchmark for Daily Life Monitoring*. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems* (*SenSys*). 2025, pp. 282–289.

[10] Quanling Zhao†, Anthony Hitchcock Thomas, Ari Brin, **Xiaofan Yu**, and Tajana Rosing. *Bridging the Gap Between Hyperdimensional Computing and Kernel Methods via the Nyström Method*. In: *Proceedings of the AAAI Conference on Artificial Intelligence*. Vol. 39. 21. 2025, pp. 22813–22821.

[11] Yujin Nam, Abhishek Moitra*, Yeshwanth Venkatesha*, **Xiaofan Yu***, Gabrielle De Micheli, Xuan Wang, Minxuan Zhou, Augusto Vega, Priyadarshini Panda, and Tajana Rosing. *Rhychee-FL: Robust and Efficient Hyperdimensional Federated Learning with Homomorphic Encryption*. In: *2025 Design, Automation & Test in Europe Conference* (*DATE*). IEEE. 2025, pp. 1–7.

[12] **Xiaofan Yu**, Anthony Thomas, Ivannia Gomez Moreno†, Louis Gutierrez†, and Tajana Rosing. *Lifelong Intelligence Beyond the Edge using Hyperdimensional Computing*. In: *2024 23rd ACM/IEEE International Conference on Information Processing in Sensor Networks* (*IPSN*). IEEE. 2024, pp. 1–13.

[13] **Xiaofan Yu**, Tajana Rosing, and Yunhui Guo. *Evolve: Enhancing Unsupervised Continual Learning with Multiple Experts*. In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision* (*WACV*). 2024, pp. 2366–2377.

[14] Quanling Zhao†, **Xiaofan Yu**, Shengfan Hu†, and Tajana Rosing. *MultimodalHD: Federated Learning over Heterogeneous Sensor Modalities using Hyperdimensional Computing*. In: *2024 Design, Automation & Test in Europe Conference & Exhibition* (*DATE*). IEEE. 2024, pp. 1–6.

[15] Ivannia Gomez Moreno†, **Xiaofan Yu**, and Tajana Rosing. *KalmanHD: Robust On-Device Time Series Forecasting with Hyperdimensional Computing*. In: *2024 29th Asia and South Pacific Design Automation Conference* (*ASP-DAC*). IEEE. 2024, pp. 710–715.

[16] **Xiaofan Yu**, Ludmila Cherkasova, Harsh Vardhan, Quanling Zhao†, Emily Ekaireb†, Xiyuan Zhang, Arya Mazumdar, and Tajana Rosing. *Async-HFL: Efficient and Robust Asynchronous Federated Learning in Hierarchical IoT Networks*. In: *Proceedings of the 8th ACM/IEEE Conference on Internet of Things Design and Implementation* (*IoTDI*). 2023, pp. 236–248.

[17] Jinhao Liu†, **Xiaofan Yu**, and Tajana Rosing. *Self-Train: Self-Supervised On-Device Training for Post-Deployment Adaptation*. In: *2022 IEEE International Conference on Smart Internet of Things* (*SmartIoT*). IEEE. 2022, pp. 161–168.

[18] **Xiaofan Yu**, Weihong Xu, Ludmila Cherkasova, and Tajana Rosing. *Automating Reliable and Fault-Tolerant Design of LoRa-based IoT Networks*. In: *2021 17th International Conference on Network and Service Management* (*CNSM*). IEEE. 2021, pp. 455–463.

[19] Yunhui Guo, **Xiaofan Yu**, Kamalika Chaudhuri, and Tajana Rosing. *Efficient Distributed Training in Heterogeneous Mobile Networks with Active Sampling*. In: *2020 16th International Conference on Mobility, Sensing and Networking* (*MSN*). IEEE. 2020, pp. 174–181.

[20] **Xiaofan Yu**, Xueyang Song†, Ludmila Cherkasova, and Tajana Rosing. *Reliability-Driven Deployment in Energy-Harvesting Sensor Networks*. In: *2020 16th International Conference on Network and Service Management* (*CNSM*). IEEE. 2020, pp. 1–9.

[21] Kazim Ergun, **Xiaofan Yu**, Nitish Nagesh, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. *Simulating Reliability of IoT Networks with RelIoT*. In: *2020 50th Annual IEEE-IFIP International Conference on Dependable Systems and Networks-Supplemental Volume* (*DSN-S*). IEEE. 2020, pp. 25–28.

[22] Kazim Ergun, **Xiaofan Yu**, Nitish Nagesh, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. *RelIoT: Reliability Simulator for IoT Networks*. In: *International Conference on Internet of Things* (*ICIOT*). Springer. 2020, pp. 63–81.

[23] **Xiaofan Yu**, Runze Yu, Jingsong Yang, and Xiaohui Duan. *A Robotic Auto-Focus System based on Deep Reinforcement Learning*. In: *2018 15th International Conference on Control, Automation, Robotics and Vision (ICARCV)*. IEEE. 2018, pp. 204–209.

Referred Workshop Publications

(**Equal contribution, †Students I mentored*)

[24] Quanling Zhao†, Anthony Thomas, Ari Brin, **Xiaofan Yu**, and Tajana Rosing. *Unleashing Hyperdimensional Computing with Nyström Method based Encoding*. In: (2023).

[25] Alexander Redding†, **Xiaofan Yu**, Shengfan Hu†, Pat Pannuto, and Tajana Rosing. *EmbHD: A Library for Hyperdimensional Computing Research on MCU-Class Devices*. In: *Proceedings of the 2nd Workshop on Networked Sensing Systems for a Sustainable Society*. 2023, pp. 187–192.

[26] **Xiaofan Yu**, Yunhui Guo, Sicun Gao, and Tajana Rosing. *SCALE: Online Self-Supervised Lifelong Learning without Prior Knowledge*. In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2023, pp. 2484–2495.

[27] Emily Ekaireb†, **Xiaofan Yu**, Kazim Ergun, Quanling Zhao†, Kai Lee†, Muhammad Huzaifa†, and Tajana Rosing. *ns3-fl: Simulating Federated Learning with ns-3*. In: *Proceedings of the 2022 Workshop on ns-3*. 2022, pp. 97–104.

Referred Posters, Demos and Other Publications

(**Equal contribution, †Students I mentored*)

[28] Ye Tian†, Onat Gungor, **Xiaofan Yu**, and Tajana Rosing. *Fine-grained Contextualized Activity Logs Generation based on Multi-Modal Sensor Data and LLM*. In: *Proceedings of the 23rd ACM Conference on Embedded Networked Sensor Systems*. 2025, pp. 608–609.

[29] **Xiaofan Yu**, Lanxiang Hu, Benjamin Reichman, Rushil Chandrupatla†, Dylan Chu†, Xiyuan Zhang, Larry Heck, and Tajana S Rosing. *Demo: A Real Time Question Answering System for Multimodal Sensors using LLMs*. In: *Proceedings of the 22nd ACM Conference on Embedded Networked Sensor Systems*. 2024, pp. 836–837.

[30] Run Wang*†, Shirley Bian*, **Xiaofan Yu**, Quanling Zhao†, Le Zhang, and Tajana Rosing. *Poster: Resource-Efficient Environmental Sound Classification Using Hyperdimensional Computing*. In: *Proceedings of the 22nd ACM Conference on Embedded Networked Sensor Systems*. 2024, pp. 899–900.

[31] **Xiaofan Yu**, Minxuan Zhou, Fatemeh Asgarinejad, Onat Gungor, Baris Aksanli, and Tajana Rosing. *Lightning Talk: Private and Secure Edge AI with Hyperdimensional Computing*. In: *2023 60th ACM/IEEE Design Automation Conference (DAC)*. IEEE. 2023, pp. 1–2.

[32] **Xiaofan Yu**. *PhD Forum Abstract: Intelligence beyond the Edge in IoT*. In: *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks*. 2023, pp. 344–345.

[33] Quanling Zhao†, **Xiaofan Yu**, and Tajana Rosing. *Attentive Multimodal Learning on Sensor Data using Hyperdimensional Computing*. In: *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks*. 2023, pp. 312–313.

[34] Quanling Zhao†, Kai Lee†, Jeffrey Liu†, Muhammad Huzaifa†, **Xiaofan Yu**, and Tajana Rosing. *FedHD: Federated Learning with Hyperdimensional Computing*. In: *Proceedings of the 28th annual international conference on mobile computing and networking*. 2022, pp. 791–793.

Theses

[35] **Xiaofan Yu**. *Intelligence Beyond the Edge in IoT*. PhD thesis. University of California San Diego, 2025.

Invited Talks

[36] **Xiaofan Yu**. *Hyperdimensional Computing for Real-World IoT Applications at the Edge*. UC Berkeley. Nov. 2024.

[37] **Xiaofan Yu**. *Interacting with Multimodal Sensors in Real Time using Natural Language*. SRC CoCoSys. Nov. 2024.

[38] **Xiaofan Yu**. *Intelligence beyond the Edge in IoT*. University of Pennsylvannia. Oct. 2024.

[39] **Xiaofan Yu**. *Intelligence beyond the Edge in IoT*. The Pennsylvania State University. Oct. 2024.

[40] **Xiaofan Yu**. *Intelligence beyond the Edge in IoT*. University of Maryland, College Park. Oct. 2024.

[41] **Xiaofan Yu**. *Lifelong Intelligence beyond the Edge using Hyperdimensional Computing*. SRC TECHCON. Sept. 2024.

[42] **Xiaofan Yu**. *Hyperdimensional Computing for Real-World IoT Applications at the Edge*. SRC CoCoSys. May 2024.

[43] **Xiaofan Yu**. *Mitigating Network and Modality Heterogeneities in Federated Learning for IoT Applications*. Peking University. Mar. 2024.

[44] **Xiaofan Yu**. *A Brief Introduction to Internet of Things*. UCSD-TILOS Data Science Discovery Bootcamp. July 2023.

Advising and Mentoring

PhD Student Mentee at UCSD

- Ye Tian, PhD'29 at UCSD [8, 2, 28]
- Quanling Zhao, BS'24 at UCSD → PhD'29 at UCSD [10, 14, 33, 24, 34]
- Louis Gutierrez, PhD student at UCSD → E3R Inc. [12]
- Alexander Redding, PhD'27 at UCSD [25]

Master Student Mentee at UCSD

- Yi Yao, MS'26 at UCSD
- Shengfan Hu, MS'24 at UCSD → Supermicro [25, 14]
- Lucy Hu, MS'24 at UCSD
- Danlin Jiang, MS'24 at UCSD [4]

Bachelor Student Mentee at UCSD

- Shiv Mehta, BS'27 at UCSD
- Michael Sullivan, BS'27 at UCSD
- Run Wang, BS'26 at UCSD [30]
- Rushil Chandrupatla, BS'26 at UCSD [9, 1]
- Dylan Chu, BS'25 at UCSD [9, 1]
- Lele Zhao, BS'25 at UCSD
- Saransh Malik, BS'24 at UCSD
- Ivannia Gomez Moreno, BS'24 at CETYS University → MS'26 at TUM [15, 12]
- Chiadika Vincent, BS'23 at UCSD → MS at JHU
- Chenyang Zhou, BS'22 at UCSD
- Shuhang Xu, BS'22 at UCSD
- Jinhao Liu, BS'22 at UCSD → MS'24 at UCSD [17]
- Emily Ekaireb, BS'22 at UCSD → MS'24 at UCSD [27]

- Xueyang Song, BS'21 at UCSD → MS'23 at Stanford [20, 5]

Mentee in Other Programs at UCSD

- Audrick Bolaños Linares, BS, ENLACE'24
- Cesar Daniel Ortiz Aguilera, BS, ENLACE'24
- Diego Muñiz De las Casas, HS, ENLACE'24
- Marena Schiess, HS, ENLACE'24
- Jennifer Tanurdjaja, BS, ERSP'23
- Aammya Sapra, BS, ERSP'23
- Duanhui Li, BS, ERSP'23
- Jezebel Yangari, BS, ERSP'23
- Paul Verdugo, BS, ENLACE'22
- Enya Solis, BS, ENLACE'22
- Valeria Leal, HS, ENLACE'22
- Mariana Flores, HS, ENLACE'22
- Kai Lee, BS, ERSP'22 [34]
- Jeffrey Liu, BS, ERSP'22 [34]
- Muhammad Huzaifa, BS, ERSP'22 [34]

Service

Technical Program Committee for Conferences

- SenSys (2026), ASP-DAC (2026), ICCPS Posters & Demos (2025)

Reviewer for Conferences

- Machine Learning: NeurIPS (2025)
- Computer Vision: CVPR (2025–2026), ICCV (2025), ECCV (2024), WACV (2024–2026)

Reviewer for Journals

- ACM Transactions on Internet of Things (TIOT)
- IEEE Transactions on Emerging Topics in Computing (TETC)
- IEEE Internet of Things Journal (IoT-J)
- IEEE Transactions on Mobile Computing (TMC)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Signal and Information Processing over Networks (TSIPN)
- IEEE Transactions on Computational Imaging (TCI)