

Xiaofan Yu

Assistant Professor, University of California Merced
Science and Engineering Building 2 (SE2) Room 382

E-mail: xiaofanyu@ucmerced.edu

Webpage: <https://yuccalab.ucmerced.edu/>

Google Scholar: <https://scholar.google.com/citations?hl=en&user=HVMRUWoAAAAJ>

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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 (<i>selected as one of 41 awardees globally</i>)	2024
Best Poster Award of Theme 1, SRC CoCoSys Annual Review	2024
Rising Stars in CPS (<i>selected as one of 34 awardees globally</i>)	2023
Best PhD Forum Presentation Award, IPSN	2023
ACM SIGBED Student Research Competition Second Runners-Up	2023
Rising Stars in EECS (<i>selected as one of 85 awardees globally</i>)	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 Mentor & Manager: Ludmila Cherkasova & Gary Carpenter Project: Asynchronous Federated Learning in Hierarchical IoT Networks	Jun. 2021–Sep. 2021
Arm Research , San Jose, CA, USA Mentor & Manager: Ludmila Cherkasova & Gary Carpenter Project: Automating Robust and Fault-Tolerant LoRa-based IoT Networks Design	Jun. 2020–Sep. 2020
Kolmostar Inc. , Fremont, CA, USA Manager: Wensheng Hua Project: Firmware update for ultra-low power GNSS module and module tests automation	Jun. 2019–Sep. 2019

Teaching

Instructor at University of California Merced EE 060 Digital Systems Design	Spring 2026
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: *MDPI Sensors (Sensors)* 24.3 (2024), p. 1014.
- [5] **Xiaofan Yu**, Kazim Ergun, Xueyang Song[†], Ludmila Cherkasova, and Tajana 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 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] Jiajun Cheng, Xianwu Zhao, Sainan Liu, **Xiaofan Yu**, Ravi Prakash, Patrick J. Codd, Jonathan Elliott Katz, and Shan Lin. *SurgX Bench: Explainable Vision-Language Model Benchmark for Surgery*. In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. 2026.
- [9] 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 23rd IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS)*. 2025.
- [10] 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.
- [11] 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 (AAAI)*. Vol. 39. 21. 2025, pp. 22813–22821.
- [12] 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: *Proceedings of the Design, Automation & Test in Europe Conference (DATE)*. IEEE. 2025, pp. 1–7.
- [13] **Xiaofan Yu**, Anthony Thomas, Ivannia Gomez Moreno[†], Louis Gutierrez[†], and Tajana Rosing. *Lifelong Intelligence Beyond the Edge using Hyperdimensional Computing*. In: *Proceedings of the 23rd ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN)*. IEEE. 2024, pp. 1–13.
- [14] **Xiaofan Yu**, Tajana Rosing, and Yunhui Guo. *Evolvle: 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.
- [15] Quanling Zhao[†], **Xiaofan Yu**, Shengfan Hu[†], and Tajana Rosing. *MultimodalHD: Federated Learning over Heterogeneous Sensor Modalities using Hyperdimensional Computing*. In: *Proceedings of the Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE. 2024, pp. 1–6.
- [16] Ivannia Gomez Moreno[†], **Xiaofan Yu**, and Tajana Rosing. *KalmanHD: Robust On-Device Time Series Forecasting with Hyperdimensional Computing*. In: *Proceedings of the 29th Asia and South Pacific Design Automation Conference (ASP-DAC)*. IEEE. 2024, pp. 710–715.
- [17] **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.
- [18] Jinzhao Liu[†], **Xiaofan Yu**, and Tajana Rosing. *Self-Train: Self-Supervised On-Device Training for Post-Deployment Adaptation*. In: *Proceedings of the IEEE International Conference on Smart Internet of Things (SmartIoT)*. IEEE. 2022, pp. 161–168.
- [19] **Xiaofan Yu**, Weihong Xu, Ludmila Cherkasova, and Tajana Rosing. *Automating Reliable and Fault-Tolerant Design of LoRa-based IoT Networks*. In: *Proceedings of the 17th International Conference on Network and Service Management (CNSM)*. IEEE. 2021, pp. 455–463.
- [20] Yunhui Guo, **Xiaofan Yu**, Kamalika Chaudhuri, and Tajana Rosing. *Efficient Distributed Training in Heterogeneous Mobile Networks with Active Sampling*. In: *Proceedings of the 16th International Conference on Mobility, Sensing and Networking (MSN)*. IEEE. 2020, pp. 174–181.
- [21] **Xiaofan Yu**, Xueyang Song[†], Ludmila Cherkasova, and Tajana Rosing. *Reliability-Driven Deployment in Energy-Harvesting Sensor Networks*. In: *Proceedings of the 16th International Conference on Network and Service Management (CNSM)*. IEEE. 2020, pp. 1–9.

- [22] Kazim Ergun, **Xiaofan Yu**, Nitish Nagesh, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. *Simulating Reliability of IoT Networks with RelIoT*. In: *Proceedings of the 50th Annual IEEE-IFIP International Conference on Dependable Systems and Networks (DSN)*. IEEE. 2020, pp. 25–28.
- [23] Kazim Ergun, **Xiaofan Yu**, Nitish Nagesh, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. *RelIoT: Reliability Simulator for IoT Networks*. In: *Proceedings of the International Conference on Internet of Things (ICIOT)*. Springer. 2020, pp. 63–81.
- [24] **Xiaofan Yu**, Runze Yu, Jingsong Yang, and Xiaohui Duan. *A Robotic Auto-Focus System based on Deep Reinforcement Learning*. In: *Proceedings of the 15th International Conference on Control, Automation, Robotics and Vision (ICARCV)*. IEEE. 2018, pp. 204–209.

Referred Workshop Publications

(*Equal contribution, †Students I mentored)

- [25] Quanling Zhao[†], Anthony Thomas, Ari Brin, **Xiaofan Yu**, and Tajana Rosing. *Unleashing Hyperdimensional Computing with Nyström Method based Encoding*. In: *The NeurIPS Workshop on Machine Learning with new Compute Paradigms (MLNCP)*. 2023.
- [26] Alexander Redding[†], **Xiaofan Yu**, Shengfan Hu[†], Pat Pannuto, and Tajana Rosing. *EmbHD: A Library for Hyperdimensional Computing Research on MCU-Class Devices*. In: *The MobiCom Workshop on Networked Sensing Systems for a Sustainable Society (NET4us)*. 2023, pp. 187–192.
- [27] **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 (CVPRW)*. 2023, pp. 2484–2495.
- [28] 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 Workshop on ns-3 (WNS3)*. 2022, pp. 97–104.

Referred Posters, Demos and Other Publications

(*Equal contribution, †Students I mentored)

- [29] 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 (SenSys)*. 2025, pp. 608–609.
- [30] **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 (SenSys)*. 2024, pp. 836–837.
- [31] 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 (SenSys)*. 2024, pp. 899–900.
- [32] **Xiaofan Yu**, Minxuan Zhou, Fatemeh Asgarinejad, Onat Gungor, Baris Aksanli, and Tajana Rosing. *Lightning Talk: Private and Secure Edge AI with Hyperdimensional Computing*. In: *Proceedings of the 60th ACM/IEEE Design Automation Conference (DAC)*. IEEE. 2023, pp. 1–2.
- [33] **Xiaofan Yu**. *PhD Forum Abstract: Intelligence beyond the Edge in IoT*. In: *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks (IPSN)*. 2023, pp. 344–345.
- [34] 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 (IPSN)*. 2023, pp. 312–313.

- [35] 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 (MobiCom)*. 2022, pp. 791–793.

Theses

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

Invited Talks

- [37] **Xiaofan Yu**. *Intelligence Beyond the Edge in IoT*. WINLAB, Rutgers University. Oct. 2025.
- [38] **Xiaofan Yu**. *Interacting with Multimodal Sensors in Real Time using Natural Language*. SRC CoCoSys. Nov. 2024.
- [39] **Xiaofan Yu**. *Intelligence Beyond the Edge in IoT*. University of Pennsylvannia. Oct. 2024.
- [40] **Xiaofan Yu**. *Intelligence Beyond the Edge in IoT*. The Pennsylvania State University. Oct. 2024.
- [41] **Xiaofan Yu**. *Intelligence beyond the Edge in IoT*. University of Maryland, College Park. Oct. 2024.
- [42] **Xiaofan Yu**. *Lifelong Intelligence beyond the Edge using Hyperdimensional Computing*. SRC TECHCON. Sept. 2024.
- [43] **Xiaofan Yu**. *Hyperdimensional Computing for Real-World IoT Applications at the Edge*. SRC CoCoSys. Aug. 2024.
- [44] **Xiaofan Yu**. *Mitigating Network and Modality Heterogeneities in Federated Learning for IoT Applications*. Peking University. Mar. 2024.
- [45] **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 [9, 2, 29]
- Quanling Zhao, BS'24 at UCSD → PhD'29 at UCSD [11, 15, 34, 25, 35]
- Louis Gutierrez, PhD student at UCSD → E3R Inc. [13]
- Alexander Redding, PhD'27 at UCSD [26]

Master Student Mentee at UCSD

- Yi Yao, MS'26 at UCSD
- Shengfan Hu, MS'24 at UCSD → Supermicro [26, 15]
- 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 [31]
- Rushil Chandrupatla, BS'26 at UCSD [10, 1]
- Dylan Chu, BS'25 at UCSD [10, 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 [16, 13]
- 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 [18]
- Emily Ekaireb, BS'22 at UCSD → MS'24 at UCSD [28]
- Xueyang Song, BS'21 at UCSD → MS'23 at Stanford [21, 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 [35]
- Jeffrey Liu, BS, ERSP'22 [35]
- Muhammad Huzaifa, BS, ERSP'22 [35]

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

- IEEE Robotics and Automation Letters (RA-L)
- 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)

PhD Thesis Committee Member of

- Mohammad Partohaghghi, University of California, Merced, 2026 (tentative). Advisor: YangQuan Chen, Roummel Marcia.

Organizer of UCSD SEELab Reading Group, 2021–2025.