LIANGQI YUAN

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SUMMARY

Ph.D. student with 5 years of research experience, expected to graduate in May 2026.

- Extensive experience in the Multimodal Learning, Mobile Computing, Large Language Model (LLM), Reinforcement Learning (RL), and Federated Learning (FL).
- Advanced skills in implementing models, including LLM, RL, FL, and other ML models, across various platforms, with strong proficiency in Python, PyTorch, and TensorFlow. Also experienced in data science using R, signal processing with Matlab, and embedded systems with C++.
- Authored and co-authored 5 preprints, 9 journal articles, 1 book chapter, and 6 conference papers.
- Served as a peer reviewer for over 20 journals and more than 10 conferences.

EDUCATION

Ph.D. in Electrical and Computer Engineering Expected May 2026
Purdue University, West Lafayette, IN
Advisor: Prof. Christopher G. Brinton

M.S. in Electrical and Computer Engineering 2022
Oakland University, Rochester, MI
Advisor: Prof. Jia Li and Prof. Hongwei Qu

B.E. in Photo-electronic Information Science and Engineering 2020
Beijing Information Science & Technology University, Beijing, China

RESEARCH EXPERIENCE

Graduate Research Assistant Aug. 2022 – Present
Purdue University, West Lafayette, IN

▷ *Summary:* Specialized in the implementation of ML within diverse edge computing systems, particularly focusing on multimodal learning and mobile computing. Developed efficient optimization techniques to process and analyze multimodal data from various sensors and devices, enabling intelligent decision-making across application domains.

☆ *Contributions:* Multimodal LLM Inference [UR'24-1], Multimodal FL [ICC'24, arXiv'24-1], Diffusion Model for Continual FL [arXiv'24-4], FL for Driver Action Recognition [CVPR'23-2, CVPR'23-1, IoT-J'23-2], FL for Remote Sensing [arXiv'24-3], Digital Ethics in FL [IC-M'24], Decentralized FL [IoT-J'24], FL for Connected and Automated Vehicles [ITSC'23, T-IV'23].

Graduate Research Assistant Sep. 2020 – Apr. 2022
Oakland University, Rochester, MI

▷ *Summary:* Developed intelligent sensor applications with ML models, including pressure sensors, passive radio frequency (RF), and infrared, for various human-centered tasks such as occupancy detection, indoor positioning, posture classification, and activity recognition.

☆ *Contributions:* 3D Indoor Positioning via Passive RF [IoT-J'23-1, DDDAS'22], Human Sensing via Passive RF [OJ-IM'23], Human Signature Denoising [ICCE'23], Interpretable Multimodal Fusion for Activity Recognition [Sensors'22], Pressure Sensor Array for Object Detection [Sens-J'21], Posture Classification [Sens-C'21], and Activity Recognition [JSAS'24].

AWARDS & HONORS

- AIDA^3 Ph.D. Fellowship 2024
- OpenAI Researcher Access Program 2024

PREPRINTS

[UR'24-1] **L. Yuan**, D.-J. Han, S. Wang, and C. G. Brinton, "Local-Cloud Inference Offloading for LLMs in Multi-Modal, Multi-Task, Multi-Dialogue Settings," Under Review.

[arXiv'24-4] Y. Mei*, **L. Yuan***, D.-J. Han, K. S. Chan, C. Brinton, and T. Lan, "Using Diffusion Models as Generative Replay in Continual Federated Learning – What will Happen?," Nov. 2024. [pdf].

[arXiv'24-3] J. Tan, Y. Li, S. A. Bartalev, B. Dang, W. Chen, Y. Zhang, and **L. Yuan**, "Bridging Data Islands: Geographic Heterogeneity-Aware Federated Learning for Collaborative Remote Sensing Semantic Segmentation," *arXiv:2404.09292*, Apr. 2024. [pdf].

[arXiv'24-2] M. Mar, V. P. Chellapandi, **L. Yuan**, Z. Wang, and E. Dietz, "A Review of Full-Sized Autonomous Racing Vehicle Sensor Architecture," *arXiv:2402.02603*, Feb. 2024. [pdf].

[arXiv'24-1] **L. Yuan**, D.-J. Han, S. Wang, D. Upadhyay, and C. G. Brinton, "Communication-Efficient Multimodal Federated Learning: Joint Modality and Client Selection," *arXiv:2401.16685*, Jan. 2024. [pdf], [demo].

JOURNAL ARTICLES

[JSAS'24] **L. Yuan**, Y. Wei, and J. Li, "Smart Pressure e-Mat for Human Sleeping Posture and Dynamic Activity Recognition," *IEEE Journal of Selected Areas in Sensors*, Nov. 2024. [pdf].

[IoT-J'24] **L. Yuan**, Z. Wang, L. Sun, P. S. Yu, and C. G. Brinton, "Decentralized federated learning: A survey and perspective," *IEEE Internet of Things Journal*, vol. 11, no. 21, pp. 34 617–34 638, May 2024. [pdf].

[T-IV'23] V. P. Chellapandi, **L. Yuan**, C. G. Brinton, S. H. Zak, and Z. Wang, "Federated Learning for Connected and Automated Vehicles: A Survey of Existing Approaches and Challenges," *IEEE Transactions on Intelligent Vehicles*, vol. 9, no. 1, pp. 119–137, Nov. 2023. [pdf].

[IC-M'24] **L. Yuan**, Z. Wang, and C. G. Brinton, "Digital Ethics in Federated Learning," *IEEE Internet Computing*, Oct. 2023. [pdf].

[OJ-IM'23] H. Mu, **L. Yuan**, and J. Li, "Human Sensing via Passive Spectrum Monitoring," *IEEE Open Journal of Instrumentation and Measurement*, vol. 2, pp. 1–13, Sep. 2023. [pdf].

[IoT-J'23-2] **L. Yuan**, L. Su, and Z. Wang, "Federated Transfer-Ordered-Personalized Learning for Driver Monitoring Application," *IEEE Internet of Things Journal*, vol. 10, no. 20, pp. 18 292–18 301, May 2023. [pdf].

[IoT-J'23-1] **L. Yuan**, H. Chen, R. Ewing, E. Blasch, and J. Li, "Three Dimensional Indoor Positioning Based on Passive Radio Frequency Signal Strength Distribution," *IEEE Internet of Things Journal*, vol. 10, no. 15, pp. 13 933–13 944, Mar. 2023. [pdf].

[Sensors'22] **L. Yuan***, J. Andrews*, H. Mu, A. Vakil, R. Ewing, E. Blasch, and J. Li, "Interpretable Passive Multi-Modal Sensor Fusion for Human Identification and Activity Recognition," *Sensors*, vol. 22, no. 15, p. 5787, Aug. 2022. [pdf], (**Journal Cover**).

[Sens-J'21] **L. Yuan**, H. Qu, and J. Li, "Velostat Sensor Array for Object Recognition," *IEEE Sensors Journal*, vol. 22, no. 2, pp. 1692–1704, Dec. 2021. [pdf].

CONFERENCE PROCEEDINGS

[ICC'24] **L. Yuan**, D.-J. Han, V. P. Chellapandi, S. H. Żak, and C. G. Brinton, "FedMFS: Federated Multimodal Fusion Learning with Selective Modality Communication," in *ICC 2024-IEEE International Conference on Communications*, 2024, 287–292. [pdf].

[ITSC'23] V. P. Chellapandi, **L. Yuan**, S. H. Zak, and Z. Wang, "A Survey of Federated Learning for Connected and Automated Vehicles," in *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, 2023, 2485–2492. [pdf].

[CVPR'23-2] Y. Ma, **L. Yuan**, A. Abdelraouf, K. Han, R. Gupta, Z. Li, and Z. Wang, "M^{2}DAR: Multi-View Multi-Scale Driver Action Recognition with Vision Transformer," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, Jun. 2023, 5286–5293. [pdf].

[CVPR'23-1] **L. Yuan**, Y. Ma, L. Su, and Z. Wang, "Peer-to-Peer Federated Continual Learning for Naturalistic Driving Action Recognition," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, Jun. 2023, 5249–5258. [pdf].

[ICCE'23] S. Yang, **L. Yuan**, and J. Li, "Extraction and Denoising of Human Signature on Radio Frequency Spectrums," in *2023 IEEE International Conference on Consumer Electronics (ICCE)*, Jan. 2023, 1–6. [pdf].

[DDDAS'22] **L. Yuan**, H. Chen, R. Ewing, and J. Li, "Passive Radio Frequency-based 3D Indoor Positioning System via Ensemble Learning," in *International Conference on Dynamic Data Driven Applications Systems*, Springer, 2022, 173–184. [pdf].

[Sens-C'21] **L. Yuan** and J. Li, "Smart Cushion Based on Pressure Sensor Array for Human Sitting Posture Recognition," in *2021 IEEE Sensors*, 2021, 1–4. [pdf].

Professional Activities

Journal Reviewer

- IEEE Transactions on Wireless Communications (TWC) 2024 – Present
- IEEE Transactions on Network Science and Engineering (TNSE) 2024 – Present
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2024 – Present
- IEEE Transactions on Network and Service Management (TNSM) 2024 – Present
- IEEE Transactions on Knowledge and Data Engineering (TKDE) 2024 – Present
- IEEE Transactions on Communications (TCOM) 2024 – Present
- IEEE Transactions on Mobile Computing (TMC) 2024 – Present
- IEEE Internet of Things Journal (IoT-J) 2022 – Present
- ACM Transactions on Intelligent Systems and Technology (TIST) 2024
- IEEE Internet Computing 2024
- IEEE Sensors Letters 2024
- Elsevier Measurement 2024
- IEEE Transactions on Intelligent Vehicles (TIV) 2022 – 2024
- IEEE Transactions on Geoscience and Remote Sensing (TGRS) 2024
- IEEE Transactions on Machine Learning in Communications and Networking (TMLCN) 2024
- Elsevier Engineering Applications of Artificial Intelligence (EAAI) 2024
- SAE International Journal of Connected and Automated Vehicles 2024
- Springer Applied Composite Materials 2023
- ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 2023
- IEEE Transactions on Intelligent Transportation Systems (TITS) 2023
- IEEE Access 2023
- IEEE Sensors Journal 2023

Technical Program Committee (TPC) Member/Reviewer

- IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2025
- International Conference on Artificial Intelligence and Statistics (AISTATS) 2025
- International Conference on Learning Representations (ICLR) 2025
- ACM International Conference on Information and Knowledge Management (CIKM) 2024
- IEEE International Symposium on Embedded Multicore/Manycore SoCs (MCSoC) 2024
- IEEE Sensors Conference 2023, 2024
- Advances in Neural Information Processing Systems (NeurIPS) 2024
- IEEE International Conference on Distributed Computing Systems (ICDCS) 2024
- IEEE International Conference on Communications (ICC) 2024
- IEEE International Conference on Computer Communications (INFOCOM) 2024
- IEEE International Conference on Intelligent Transportation Systems (ITSC) 2023
- IEEE International Conference on Mobility: Operations, Services, and Technologies (MOST) 2023

Proposal Reviewer

- Advances in Neural Information Processing Systems (NeurIPS) Workshop Proposals 2024

Talks

Naval Applications of Machine Learning (NAML 2024) Mar. 11, 2024

San Diego, California

- Communication-Efficient Federated Learning for Multimodal Automatic Target Recognition

IEEE Intelligent Vehicles Symposium (IV 2023) Workshop Jun. 4, 2023

Anchorage, Alaska

- Advancing Personalized Driver Action Recognition in Federated Learning: User-Centric Approaches

TEACHING

Grading Assistant

Purdue University

- ECE 60146 -Deep Learning — Spring 2023
- ECE 66100 -Computer Vision — Fall 2022

SKILLS

- **Programming:** Python (PyTorch, TensorFlow, Scikit-learn, Transformers), R, Matlab, C++, SQL, Git
- **Machine Learning:** Multimodal (Vision, Language, Wearable, Pressure, RF, Healthcare, Remote Sensing), LLM (GPT-4, Llama 3, Phi-3), RL (PPO, A2C, DQN), Generative AI (Diffusion, GAN)
- **Languages:** English (Professional), Chinese (Native)