YI HUANG

Incoming Assistant Professor
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Research Interests

- Hardware-software co-design for energy-efficient artificial intelligence
- Neuromorphic computing based on emerging memory devices
- Intelligent sensing and communication systems for edge applications

Professional Experience

University of Tennessee, Knoxville — Starting August 2026
Incoming Assistant Professor

University of Massachusetts Amherst — September 2025 – present
Postdoctoral Research Associate

Education

University of Massachusetts Amherst — September 2025
Ph.D. in Electrical and Computer Engineering — Advisor: Prof. Qiangfei Xia

Huazhong University of Science and Technology — June 2019 / June 2016
M.S. in Control Science and Engineering / B.E. in System Engineering — Advisor: Prof. Zhigang Zeng

Honors and Awards

ECE David H. Navon Scholarship of University of Massachusetts Amherst (2022)

ECE Graduate Fellowship of University of Massachusetts Amherst (2020)

Publications

Journal Articles (* indicate equal contribution)

1. Memristive cellular neural networks for ultrafast in-pixel computing
   V. Ravichandran, **Y. Huang**, B. Flannery, T. Molom-Ochir, T. Maurer, S. Asapu, A. Abdel-Maksoud, N. Heermance, R. Yoo, J. Tackie, W. Zhao, Y. Ling, A. Guo, J.J. Yang, Q. Xia
   Nature Electronics 9, 189–199 (2026).

2. Event-based neuromorphic sensing system with flexible haptic sensors and a memristive system on a chip
   W. Zhao, **Y. Huang**, A. Tewari, A. J. Rad, A. Zhang, N. Ge, J.J. Yang, M. Hu, S. Majumdar, Q. Xia
   Nature Sensors 1, 163–171 (2026).

3. Radiofrequency signal processing with a memristive system-on-a-chip
   Y. Huang*, C. He*, Y. Ling, N. Ge, J.J. Yang, M. Hu, L. Katehi, Q. Xia
   Nature Electronics 8, 587–596 (2025). **(Cover article, July 2025)**

4. A parallel read-write circuit with fast amplitude-adaptive matching scheme to memristor crossbar array

N. Jiang, M. Jiang, H. Huang, L. Yang, **Y. Huang**, Z. Zeng
IEEE Transactions on Circuits and Systems I: Regular Papers **72**, 5898–5911 (2025).

5. Memristor-based hardware accelerators for artificial intelligence
Y. Huang, T. Ando, A. Sebastian, M.F. Chang, J.J. Yang, Q. Xia
Nature Reviews Electrical Engineering 1, 286–299 (2024).

6. From memristive devices to neuromorphic systems
Y. Huang, F. Kiani, F. Ye, Q. Xia
Applied Physics Letters 122, 110501 (2023). **(Editor's Pick)**

7. Towards energy-efficient computing hardware based on memristive nanodevices
Y. Huang, V. Ravichandran, W. Zhao, Q. Xia
IEEE Nanotechnology Magazine 17, 30–38 (2023).

8. MERRC: A memristor-enabled reconfigurable low-power reservoir computing architecture at the edge
F. Nowshin, **Y. Huang**, M.R. Sarkar, Q. Xia, Y. Yi
IEEE Transactions on Circuits and Systems I: Regular Papers 71, 174–186 (2023).

9. Diffusive memristors with uniform and tunable relaxation time for spike generation in event-based pattern recognition
F. Ye, F. Kiani, **Y. Huang**, Q. Xia
Advanced Materials 35, 2204778, (2022).

10. Memristor-based HTM spatial pooler with on-device learning for pattern recognition
X. Liu, **Y. Huang**, Z. Zeng, D.C. Wunsch
IEEE Transactions on Systems, Man, and Cybernetics: Systems 52, 1901–1915 (2020).

11. An associative-memory-based reconfigurable memristive neuromorphic system with synchronous weight training
L. Yang, Z. Zeng, **Y. Huang**
IEEE Transactions on Cognitive and Developmental Systems 12, 529–540 (2020).

12. Memristor-based circuit design for neuron with homeostatic plasticity
X. Shi, Z. Zeng, L. Yang, **Y. Huang**
IEEE Transactions on Emerging Topics in Computational Intelligence 2, 359–370 (2018).

13. Memristor-based circuit implementations of recognition network and recall network with forgetting stages
L. Yang, Z. Zeng, **Y. Huang**, S. Wen
IEEE Transactions on Cognitive and Developmental Systems 10, 1133–1142 (2018).

Conference Publications

1. Hardware-algorithm co-design for hyperdimensional computing based on memristive system-on-chip
Y. Huang, A.J. Rad, Q. Xia
NeurIPS 2024 Workshop Machine Learning with New Compute Paradigms, 1–8 (2024).

2. Hierarchy of event-based time-surfaces (HOTS) based on diffusive memristors with uniform and tunable relaxation time
F. Ye, F. Kiani, **Y. Huang**, Q. Xia
5th International Conference on Memristive Materials, Devices & Systems, (2022).

3. Three-dimensional memristor-based crossbar architecture for capsule network implementation.
   Y. Huang, R. Hu, Z. Zeng
   2018 Eighth International Conference on Information Science and Technology, 170–175 (IEEE, 2018).

Invited Talks

1. Hardware-software co-design of memristive systems for edge intelligence
   Computer Science Colloquium, City university of Hong Kong, China, 2025
2. Multi-channel testing systems for efficient prototyping of emerging memory devices and arrays
   EIPBN 2024 Workshop on Emerging Memory Infrastructure, La Jolla, CA, USA, 2024.

Teaching and Advising

Mentor for REU students — Summer 2022/2023
University of Massachusetts Amherst — Project: FPGA programming

Mentor for Senior Design Project — Fall 2018
Missouri University of Science and Technology (Remote) — Project: ML with non-volatile memory

Professional Services

Journal Reviewer for:

- *Science Advances*
- *Nature Communications*
- *Advanced Functional Materials*
- *IEEE Transactions on Cybernetics*
- *IEEE Transactions on Systems, Man and Cybernetics: Systems*
- *IEEE Transactions on Emerging Topics in Computational Intelligence*
- *IEEE Transactions on Circuits and Systems II: Express Briefs*
- *Knowledge-Based Systems*
- *Information Sciences*
- *Neural Networks*
- *Cognitive Computation*
- *Scientific Reports*

Review Committee Member:

- *2026 IEEE International Symposium on Circuits and Systems*