

Yaqing Shen

Postdoctoral Research Associate · Carnegie Mellon University

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Research profile

I'm a Postdoctoral Research Associate at Carnegie Mellon University, working with Professor [Xu Zhang](#). My research connects two-dimensional materials, device physics, and nanoelectronic integration.

I earned my Ph.D. in Materials Science and Engineering at KAUST, where I worked with Professor [Mario Lanza](#). My work spans hBN gate dielectrics, transistor engineering, memristor reliability, and the integration of 2D materials into microchips.

Academic background

Current	Carnegie Mellon University Postdoctoral Research Associate
2022–2025	KAUST Ph.D. · Materials Science & Engineering
2019–2022	Soochow University M.S. · Materials Science & Engineering
2013–2017	Yangzhou University B.S. · Polymer Science & Engineering

Honours & awards

2025	Dean's Award KAUST
2023	Ph.D. Student Fellowship IEEE Electron Devices Society
2022	Excellence in Academic Achievement Award for Graduate Studies Soochow University
2021	National Scholarship Ministry of Education, China
2020	First Class Award Scholarship of the Graduate School Soochow University
2019	Supreme Scholarship of the Graduate School (top 5%) Soochow University
2017	Excellent Bachelor Dissertation Award Yangzhou University
2016	Second Award Scholarship for Excellent Students Yangzhou University

Technical experience

Materials synthesis: Chemical vapor deposition, atomic layer deposition, sputtering, electron-beam evaporation.

Device fabrication: Electron-beam lithography, photolithography, mechanical exfoliation, wet transfer, laser-patterned shadow masks.

Characterization: SEM, TEM, FIB, conductive AFM, Raman spectroscopy, XPS, semiconductor parameter analysis.

Analysis & design: Origin, NanoScope Analysis, XPS Peak, layout design, Beamer simulation.

Peer-review service

Science · Materials Science & Engineering: R: Reports · Advanced Functional Materials · Applied Physics Letters · Communications Engineering · Microelectronic Engineering

Editorial experience

Guest Editor · Materials (MDPI)

Special issue: [Advances in 2D Material-Based Electronic Devices](#)

Selected publications

Nature · 2026

1. Reconfigurable mmWave microchips co-integrating hBN switches on GaN

S. Pazos, A. Fontana, **Y. Shen** et al.

doi: [10.1038/s41586-026-10761-8](#)

ACS Nano · 2025 · First author

2. MoS₂ Transistors with 4 nm hBN Gate Dielectric and 0.46 V Threshold Voltage

Y. Shen, S. Pazos, W. Zheng et al.

doi: [10.1021/acsnano.5c02341](#)

Nature · 2025

3. Synaptic and neural behaviours in a standard silicon transistor

S. Pazos, K. Zhu, M. A. Villena, O. Alharbi, W. Zheng, **Y. Shen**, Y. Yuan, Y. Ping and M. Lanza

doi: [10.1038/s41586-025-08742-4](#)

Nature Electronics · 2024 · First author

4. Two-dimensional-materials-based transistors using hexagonal boron nitride dielectrics and metal gate electrodes with high cohesive energy

Y. Shen, K. Zhu, Y. Xiao et al.

doi: [10.1038/s41928-024-01233-w](#)

Nature Electronics · 2024

5. Memristive circuits based on multilayer hexagonal boron nitride for millimetre-wave radiofrequency applications

S. Pazos, **Y. Shen**, H. Zhang et al.

doi: [10.1038/s41928-024-01192-2](#)

Nature · 2023

6. Hybrid 2D–CMOS microchips for memristive applications

K. Zhu, S. Pazos, F. Aguirre, **Y. Shen** et al.

doi: [10.1038/s41586-023-05973-1](#)

Advanced Materials · 2021 · First author

7. Variability and Yield in h-BN-Based Memristive Circuits: The Role of Each Type of Defect

Y. Shen, W. Zheng, K. Zhu et al.

doi: [10.1002/adma.202103656](#)

Full publication list: [Google Scholar](#)