Curriculum Vitae

Feng Miao
Professor
School of Physics
Nanjing University
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Professional Preparation

B.A., Physics	(2004)	Nanjing University
Ph.D., Physics	(2009)	University of California, Riverside

Appointments

Director, Institute of Brain-Inspired Intelligence, Nanjing University	Jan. 2021 – present
Professor, School of Physics, Nanjing University	July 2012 – present
Research Associate, Hewlett-Packard Laboratory (Palo Alto)	July 2009 – July 2012

Research Interest

Electronic transport and property engineering of 2D layered materials, and their applications for nanoelectronics, including emerging neuromorphic and optoelectronic devices.

Honors and Awards

Xplorer Prize (New Cornerstone Science Foundation, one of the most recognized Prizes for young scientists in China) (2024)
Chinese Physical Society “Huang Kun” Award (the most prestigious award in the field of solid state physics and semiconductor physics in China) (2021)
IAAM Medal (International Association of Advanced Materials, Sweden) (2021)
China "Leading Scientists, Engineers and Innovators" (2019)
Clarivate Analytics "Highly Cited Researchers" (2018)
China "Young and Middle-aged Leading Scientists, Engineers and Innovators" (awarded by ministry of science and technology, China) (2018)
"Jiangsu Youth Stars of Science and Technology" (Jiangsu province government) (2018)
Nanjing Natural Science Academic Paper Award (2018)
NSFC (National Science Fund of China) Distinguished Young Scholar (2016)
Chief Scientist of National Key Basic Research Program (2015)
Jiangsu Young Investigator Award (2014)
Poe Memorial Scholarship Award (University of California, Riverside) (2009)
Chinese Government Award for Outstanding Student Abroad (2009)
Dean's Dissertation Fellowship Award (University of California, Riverside) (2008)
Dean’s Fellowship Award (University of California, Riverside) (2004)

Professional Activities

Editorial Board & Associate Editor: Scientifc Reports (Springer Nature); npj 2D Materials and Applications (Nature Partner Journal); Newton (Cell family); Neuromorphic Computing and Engineering (IOP Publishing)

***Journal Review*:** Physical Review Letters; Nature; Science; Nature Nanotechnology; Nature Physics; Nature Materials; Nature Electronics; Nature Photonics; Nature Synthesis; Nature Computational Science; Science Advances; Nature Communications; Advanced Materials; Nano Letters; Applied Physics Letters; Europhysics Letters; Journal of Applied Physics; Nanoscale; Nano Research; Journal of Physics D; Applied Physics A; IEEE Transactions on Electron Devices; Semiconductor Science and Technology; *et al*.

Grant Review: SNSF (Swiss National Science Foundation), NOW (Netherlands Organisation for Scientific Research), EU FLAG-ERA, ISF (the Israel Science Foundation), Austrian Science Fund, Research Grants Council (RGC) of Hong Kong, National Science Foundation of China (NSF of China), MOEC (The Ministry of Education of China), *et al*.

Committee Member: Neuromorphics Technical Committee of IEEE Electron Devices Society; Brain-inspired Intelligence Committee of Chinese Neuroscience Society.

Conference Chair: Organized and co-organized international conference sessions including MRS, OPTICA NOMA (Novel Optical Materials and Applications) and IEEE Workshop on Future Computing.

Researcher Associate Supervised

Shijun Liang, 2017.10-2020.12 (currently Professor at Nanjing University)
Bin Cheng, 2019.4-2021.12 (currently Professor at Nanjing University of Science and Technology)
Xuan Pan, 2020.10-2023.9 (currently Associate Professor at Xi'an Jiaotong University)
Junjie Shan, 2021.1-2023.12 (currently Associate Professor at Nanjing Normal University)

Postdoctoral Scholar Supervised

Hongguang Zhang, 2013.5-2015.4 (currently Associate Professor at Nanjing University of Posts and Telecommunications)
Xiaojuan Lian, 2014.10-2017.4 (currently Associate Professor at Nanjing University of Posts and Telecommunications)
Song Hao, 2015.7-2017.6 (currently Associate Professor at Nanjing University of Science and Technology)
Yuekun Yang, 2020.10-2024.8 (currently Associate Professor at Nanjing University)
Yixiang Li, 2022.7-2025.6 (currently Assistant Professor at Sun Yat-Sen University)

Graduate Students Supervised

Erfu Liu, 2012.9-2015.6 (currently Associate Professor at Nanjing University)
Yajun Fu, 2013.9-2017.9 (currently Associate Professor at Southwest University of Science and Technology)
Mingsheng Long, 2014.9-2017.6 (currently Professor at Anhui University)
Yaojia Wang, 2015.9-2019.6 (currently Assistant Professor at Katholieke Universiteit Leuven, Belgium)
Anyuan Gao, 2014.9-2019.12 (currently Associate Professor at Shanghai Jiaotong University)
Chen Pan, 2014.9-2020.6 (currently Associate Professor at Nanjing University of Science and Technology)
Chenyu Wang, 2014.9-2019.12 (currently Assistant Professor at Nanjing University)
Cong Wang, 2017.9-2022.9 (currently Assistant Professor at Nanjing University)
Lili Zhang, 2015.9-2020.9 (currently Assistant Professor at Lanzhou University)
Kang Xu, 2014.9-2017.6 (currently Postdoc at New York University)
Miao Wang, 2013.9-2018.9 (currently System Engineer at KLA-Tencor Corporation)

Junwen Zeng, 2013.9-2018.9 (currently Engineer at Huawei Technologies)
Yu Wang, 2015.9-2020.9 (currently Engineer at Xiaomi Corporation)
Qiao Li, 2016.9-2022.3 (currently Postdoc at University of California, Riverside)
Xiaowei Liu, 2016.9-2022.6 (currently Engineer at Huawei Technologies)
Zecheng Ma, 2016.9-2024.6 (currently Postdoc at Huatian Technology)
Tianjun Cao, 2017.9-2024.6 (currently Engineer at Shanghai Bangxin Semiconductor)
Shengnan Yan, 2017.9-2023.12 (currently Engineer at Sicarrier)
Shuang Wang, 2018.9-2023.6 (currently Postdoc at Hong Kong Polytechnic University)
Pengfei Wang, 2018.12-2023.12 (currently Assistant Professor at Nanjing University)
Lizheng Wang, 2018.9-2024.12 (currently Postdoc at Ningbo Institute of Materials Technology and Engineering)
Zhiyi Zhang, 2018.9-2024.12 (currently Engineer at BYD Co. Ltd)
Moyu Chen, 2018.9-2024.9 (currently Postdoc at University of Munich)
Junlin Xiong, 2020.9-2025.9 (currently Postdoc at Nanjing University)
Yudi Dai, 2019.9-2025.9 (currently Postdoc at Shanghai Jiaotong University)
Zenglin Liu,2019.9-2025.9 (currently Engineer at Semiconductor Manufacturing International Corporation)
Zhu'an Li, 2019.9-2025.12 (currently Lecturer at Qingdao University of Science and Technology)
Zaizheng Yang, 2019.9-2025.9 (currently Engineer at Witmem)
Xingjian Yangdong, 2022.9-2025.9 (currently Postdoc at Nanjing University)
Xinyu Cui, 2022.9-2025.6 (currently Teacher at Kunshan High School)
Hang Zhao, 2022.9-2025.6 (currently Engineer at Byte Dance)

Selected Publications

1. Q. Li, B. Cheng*, M. Chen, B. Xie, Y. Xie, P. Wang, F. Chen, Z. Liu, K. Watanabe, T. Taniguchi, S.-J. Liang, D. Wang, C. Wang, Q. -H Wang, J. Liu, **F. Miao***, "Tunable quantum criticalities in an isospin extended Hubbard model simulator", ***Nature*** 609, 479-484 (2022).
2. **F. Miao**, S. Wijeratne, Y. Zhang, U. C. Coskun, W. Bao, and C. N. Lau, "Phase-coherent transport in graphene quantum billiards," ***Science*** 317, 1530 (2007).
3. J. Xiong, J. Jiang, Y. Cui*, H. Gao, J. Zhou, Z. Liu, K. Zhang, S. Cheng, K. Wu, S.-W. Cheong, K. Chang, Z. Liu*, H. Yang*, S.-J. Liang, B. Cheng*, **F. Miao***, "All-Electrical Self-Switching of van der Waals Chiral Antiferromagnet", ***Physical Review Letters*** 135, 206701(2025).
4. Y. Cui, Z. Liu, Q. Liu, J. Xiong, Y. Xie, Y. Dai, J. Zhou, L. Wang, H. Fang, H. Liu, S.-J. Liang, B. Cheng*, **F. Miao***, "Dimensionality-Driven Anomalous Metallic State with Zero-Field Nonreciprocal Transport in Layered Ising Superconductors", ***Physical Review Letters*** 135, 076501(2025).
5. **F. Miao**, D. Ohlberg, D. R. Stewart, R. S. Williams, C. N. Lau, "Quantum conductance oscillations in metal/molecule/metal switches at room temperature," ***Physical Review Letters*** 101, 016802 (2008).
6. Y. Wang, Y. Yang*, N. Yang, T. Jiao, W. Yu, Z. Li, W. Li, Q. Liu, C. Li, Z. Zeng, X.-J. Yangdong, G. Ruan, P. Wang, C. Pan, Yi Wan, L. Li, S.-J. Liang*, **F. Miao***, "In-sensor wireless computing for intelligent remote sensing", ***Nature Sensors*** (2026) doi:10.1038/s44460-026-00043-1.
7. Z. Yang, C. Wang*, Y. Zhao, G. Ruan, X.-J. Yangdong, Y. Yang, C. Pan, B. Cheng, S.-J. Liang*, **F. Miao***, "Communication-aware in-memory wireless neural networks ", ***Nature Electronics*** (2026) doi:10.1038/s41928-026-01577-5.
8. X. Liu, J. Shan, T. Cao, L. Zhu, J. Ma, G. Wang, Z. Shi, Q. Yang, M. Ma, Z. Liu, S. Yan, L. Wang, Y. Dai, J. Xiong, F. Chen, B. Wang, C. Pan, Z. Wang, B. Cheng, Y. He, X. Luo, J. Lin, S.-J. Liang, **F. Miao***, "On-device phase engineering", ***Nature Materials*** 23, 1363 (2024).
   Featured by Cover Story and News and Views of Nature Materials
9. M. Chen, Y. Xie, B. Cheng, Z. Yang, X. Li, F. Chen, Q. Li, J. Xie, K. Watanabe, T. Taniguchi,

W. He, M. Wu, S.-J. Liang, **F. Miao***, “Selective and quasi-continuous switching of ferroelectric Chern insulator devices for neuromorphic computing”, ***Nature Nanotechnology*** 19, 962 (2024).

Featured by Cover Story and Research Briefing of Nature Nanotechnology

10. Y. Yang, S.-J. Liang, **F. Miao**, “Pixel-correlated computing for detecting and tracking targets in dim lighting”, ***Nature Electronics*** 7, 191-192 (2024).

Featured by Nature Electronics News and Views

11. Y. Yang, C. Pan, Y. Li, X.-J. Yangdong, P. Wang, Z. Li, S. Wang, W. Yu, G. Liu, B. Cheng, Z. Di, S.-J. Liang*, **F. Miao***, "In-sensor Dynamic Computing for Intelligent Machine Vision", ***Nature Electronics*** 7, 225-233(2024).

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12. C. Wang, G. Ruan, Z. Yang, X.-J. Yangdong, Y. Li*, L. Wu, Y. Ge, Y. Zhao, C. Pan, W. Wei, L. Wang, B. Cheng, Z. Zhang, C. Zhang, S.-J. Liang*, **F. Miao***, "Parallel in-memory wireless computing", ***Nature Electronics*** 6, 381-389 (2023).
13. L. Pi, P. Wang, S.-J. liang, P. Luo, H. Wang, D. Li, Z. Li, P. Chen, X. Zhou*, **F. Miao***, T. Zhai*, "Broadband convolutional processing using band-alignment-tunable heterostructures", ***Nature Electronics*** 5, 248-254 (2022).
14. C. Wang, S.-J. Liang, C. Wang, Z. Yang, Y. Ge, C. Pan, X. Shen, W. Wei, Y. Zhao, Z. Zhang, B. Cheng, C. Zhang, **F. Miao***, “Scalable massively parallel computing using continuous-time data representation in nanoscale crossbar array”, ***Nature Nanotechnology*** 16, 1079-1085 (2021).
15. C. Pan, C. Wang, S.-J. Liang*, Y. Wang, T. Cao, P. Wang, C. Wang, S. Wang, B. Cheng, A. Gao, E. Liu, K. Watanabe, T. Taniguchi, **F. Miao***, "Reconfigurable logic and neuromorphic circuits based on electrically tunable two-dimensional homojunctions", ***Nature Electronics*** 3, 383 (2020).

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16. A. Gao, J. Lai, Y. Wang, Z. Zhu, J. Zeng, G. Yu, N. Wang, W. Chen, T. Cao, W. Hu, D. Sun, X. Chen, **F. Miao***, Y. Shi*, X. M. Wang*, “Observation of ballistic avalanche phenomena in nanoscale vertical InSe/BP heterostructures”, ***Nature Nanotechnology*** 14, 217 (2019).
17. M. Wang, S.H. Cai, C. Pan, C.Y. Wang, X.J. Lian, Y. Zhuo, K. Xu, T.J. Cao, X.Q. Pan, B.G. Wang, S.-J. Liang, J. Yang*, P. Wang*, **F. Miao***, “Robust memristors based on layered two-dimensional materials”, ***Nature Electronics*** 1, 130-136 (2018).

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18. X.-J. Yangdong, C. Wang*, Y. Zhao, Z.-C. Wang, Z. Yang, Z. Liu, W. Yu, Z. Zeng, S. Wang, W. Wei, Y. Shen, D. Kong, S. Ding, X. Wang, C. Pan, S.-J. Liang*, **F. Miao***, "Ultrahigh-precision analog computing using memory-switching geometric ratio of transistors", ***Science Advances*** 11, eady4798(2025).
19. D. Li, P. Xie, Y. Yang*, Y. Wang, C. Lan, Y. Wei, J. Liao, B. Li, Z. Wu, Q. Quan, Y. Zhang, Y. Meng, M. Ding, Y. Yan, Y. Shen, W. Wang, S.-W. Tsang, S.-J. Liang, **F. Miao***, J. C. Ho*, "In-material physical computing based on reconfigurable microwire arrays via halide-ion segregation", ***Nature Communications*** 16, 5472 (2025).
20. W. Dang, Y. Shen, W. Wei, C. Pan*, F. Chen, G.-J. Ruan, Y. Luo, Y. Guo, Q. Tan, J. Shi, X.-J. Yangdong, S. Chen, C. Wang, Y. Xie, Z.-Z. Yang, P. Wang, S. Wang, L. Zhong, S. Cheng, C. Zhu, B. Cheng, S.-J. Liang*, **F. Miao***, "Mortise-tenon–shaped memristors for scientific computing", ***Science Advances*** 11,eadu3309 (2025).
21. J. Xiong, J. Xie, B. Cheng*, Y. Dai, X. Cui, L. Wang, Z. Liu, J. Zhou, N. Wang, X. Xu, X. Chen, S. Cheong, S.-J. liang*, **F. Miao***, "Electrical switching of Ising-superconducting nonreciprocity for quantum neuronal transistor", ***Nature Communications*** 15, 4953 (2024).
22. Y. Dai, J. Xiong, Y. Ge, B. Cheng*, L. Wang, P. Wang, Z. Liu, S. Yan, C. Zhang, X. Xu, Y. Shi, S. Cheong, C. Xiao*, S. A. Yang, S.-J. liang*, **F. Miao***, "Interfacial magnetic spin Hall effect in van der Waals Fe_3GeTe_2/$MoTe_2$ heterostructure", ***Nature Communications*** 15,

1129 (2024).
23. X. Pan, J. Shi, P. Wang, S. Wang, C. Pan, W. Yu, B. Cheng, S.-J. liang*, **F. Miao***, "Parallel perception of visual motion using light-tunable memory matrix", ***Science Advances*** 9, eadi4083 (2023).
24. L. Wang, J. Xiong, B. Cheng*, Y. Dai, F. Wang, C. Pan, T. Cao, X. Liu, P. Wang, M. Chen, S. Yan, Z. Liu, J. Xiao, X. Xu, Z. Wang, Y. Shi, S. Cheong, H. Zhang, S.-J. liang*, **F. Miao***, "Cascadable in-memory computing based on symmetric writing and readout", ***Science Advances*** 8, eabq6833 (2022).
25. C. Wang, S.-J. liang, S. Wang, P. Wang, Z. Li, Z. Wang, A. Gao, C. Pan, C. Liu, J. Liu, H. Yang, X. Liu, W. Song, C. Wang, B. Cheng, X. Wang, K. Chen, Z. Wang, K. Watanabe, T. Taniguchi, J. Yang*, **F. Miao***, "Gate-tunable van der Waals heterostructure for reconfigurable neural network vision sensor", ***Science Advances*** 6 , eaba6173 (2020).
26. M. Long, A. Gao, P. Wang, H. Xia, Claudia Ott, C. Pan, Y. Fu, E. Liu, X. Chen, W. Lu, Tom Nilges, J. Xu, X. Wang*, W. Hu*, **F. Miao***, "Room-temperature high detectivity mid-infrared photodetectors based on black arsenic phosphorus", ***Science Advances*** 3, e1700589 (2017).
27. Y. Wang, E. Liu, H. Liu, Y. Pan, L. Zhang, J. Zeng, Y. Fu, M. Wang, K. Xu, Z. Huang, Z. Wang, H. Lu, D. Xing, B. Wang*, X. Wan*, **F. Miao***, "Gate-Tunable Negative Longitudinal Magnetoresistance in the Predicted Type-II Weyl Semimetal WTe_2", ***Nature Communications*** 7, 13142 (2016).
28. K. Xu, K. Wang, W. Zhao, W. Bao, E. Liu, Y. Ren, M. Wang, Y. Fu, J. Zeng, Z. Li, W. Zhou, F. Song, X. Wang, Y. Shi, X. Wan, M. S. Fuhrer, B. Wang*, Z. Qiao*, **F. Miao***, D. Xing, "The positive piezoconductive effect in graphene," ***Nature Communications*** 6, 8119 (2015).
29. E. Liu, Y. Fu, Y. Wang, Y. Feng, H. Liu, X. Wan, W. Zhou, B. Wang*, L. Shao, C. Ho, Y. Huang, Z. Cao, L. Wang, A. Li, J. Zeng, F. Song, X. Wang, Y. Shi, H. Yuan*, H. Y. Hwang, Y. Cui, **F. Miao***, D. Xing, "Integrated digital inverters based on two-dimensional anisotropic ReS_2 field-effect transistors," ***Nature Communications*** 6, 6991 (2015).

Full Publications

(*Total citations:* **33263** *by Feb. 2026; also see https://publons.com/researcher/1397881/feng-miao/)*

1. Y. Wang, Y. Yang*, N. Yang, T. Jiao, W. Yu, Z. Li, W. Li, Q. Liu, C. Li, Z. Zeng, X.-J. Yangdong, G. Ruan, P. Wang, C. Pan, Yi Wan, L. Li, S.-J. Liang*, **F. Miao***, "In-sensor wireless computing for intelligent remote sensing", ***Nature Sensors*** (2026) doi:10.1038/s44460-026-00043-1.
2. Z. Yang, C. Wang*, Y. Zhao, G. Ruan, X.-J. Yangdong, Y. Yang, C. Pan, B. Cheng, S.-J. Liang*, **F. Miao***, "Communication-aware in-memory wireless neural networks ", ***Nature Electronics*** (2026) doi:10.1038/s41928-026-01577-5.
3. S. Yan, Q. Wu, X. Yan, D. Lin, F. Chen, Q. Zhang, C. Li, M. Liu, S. Zhou, Y. Dai, L. Wang, B. Cheng, T. Xu, X. Xi, L. Gu, P. Wu, X. Tu*, S.-J. Liang, B. Cheng*, **F. Miao***, "Sensitive THz Detection by Using Thermoresistive Effect in 2D Vanadium Dioxide", ***ACS Nano*** (2026) doi:10.1021/acsnano.5c14705.
4. C. Wang#, X. Feng#, Y. Shen#, Z. Liao, S. Ding, Z. Li, X-J. Yangdong, Y. Zhao, D. Kong, D-C. Zhang, Y. Lv, M-H. Xuan, X-C. Chen*, S.-J. Liang*, **F. Miao***, "Precision-Sustained Analog In-Memory Computing using IGZO DRAM Array with Quasi-Nonvolatile and Continuously Tunable Weights", ***IEEE International Electron Devices Meeting*** (2025) doi:10.1109/IEDM50572. 11353772.
5. J. Xiong, J. Jiang, Y. Cui*, H. Gao, J. Zhou, Z. Liu, K. Zhang, S. Cheng, K. Wu, S.-W.

Cheong, K. Chang, Z. Liu*, H. Yang*, S.-J. Liang, B. Cheng*, **F. Miao***, "All-Electrical Self-Switching of van der Waals Chiral Antiferromagnet", ***Physical Review Letters*** 135, 206701(2025).

6. X.-J. Yangdong, C. Wang*, Y. Zhao, Z.-C. Wang, Z. Yang, Z. Liu, W. Yu, Z. Zeng, S. Wang, W. Wei, Y. Shen, D. Kong, S. Ding, X. Wang, C. Pan, S.-J. Liang*, **F. Miao***, "Ultrahigh-precision analog computing using memory-switching geometric ratio of transistors", ***Science Advances*** 11, eady4798(2025).
7. Y. Cui, Z. Liu, Q. Liu, J. Xiong, Y. Xie, Y. Dai, J. Zhou, L. Wang, H. Fang, H. Liu, S.-J. Liang, B. Cheng*, **F. Miao***, "Dimensionality-Driven Anomalous Metallic State with Zero-Field Nonreciprocal Transport in Layered Ising Superconductors", ***Physical Review Letters*** 135, 076501(2025).
8. D. Li, P. Xie, Y. Yang*, Y. Wang, C. Lan, Y. Wei, J. Liao, B. Li, Z. Wu, Q. Quan, Y. Zhang, Y. Meng, M. Ding, Y. Yan, Y. Shen, W. Wang, S.-W. Tsang, S.-J. Liang, **F. Miao***, J. C. Ho*, "In-material physical computing based on reconfigurable microwire arrays via halide-ion segregation", ***Nature Communications*** 16, 5472 (2025).
9. Y. Ding, Y. Yang, H. Hao*, Z.-A Li, C. Pan, P. Wang, C. Wang, H. Tan, R. Jin, J. Zhang, S. Du, S.-J. liang*, **F. Miao***, W. Yang*, "Bioinspired Target Detection Pipeline Based on Two-Dimensional Optoelectronic van der Waals Heterostructures", ***ACS Nano*** 19, 24, 22376-22386 (2025).
10. W. Dang, Y. Shen, W. Wei, C. Pan*, F. Chen, G.-J. Ruan, Y. Luo, Y. Guo, Q. Tan, J. Shi, X.-J. Yangdong, S. Chen, C. Wang, Y. Xie, Z.-Z. Yang, P. Wang, S. Wang, L. Zhong, S. Cheng, C. Zhu, B. Cheng, S.-J. Liang*, **F. Miao***, "Mortise-tenon-shaped memristors for scientific computing", ***Science Advances*** 11,eadu3309 (2025).
11. J. Xie, J.-L. Xiong, B. Cheng*, S.-J. Liang*, **F. Miao***, "In-Memory Probabilistic Computing Using Gate-Tunable Layer Pseudospins in van der Waals Heterostructures", ***Chinese Physics Letters*** 42,040202 (2025).
12. Z.-A Li, C. Pan, P. Wang, Y. Yang*, W. Yu, Y. Zhao, G. Ruan, C. Wang, J. Mei, P. Zeng, X. Wang, Z. Ni, B. Cheng, S.-J. liang*, **F. Miao***, "In-Pixel Dual-Band Intercorrelated Compressive Sensing Based on MoS_2/h-BN/$PdSe_2$ Vertical Heterostructure", ***ACS Nano*** 19,6263 (2025).
13. Z. Ma, S. Yan, F. Chen, Y. Dai, Z. Liu, K. Xu, T. Xu, Z. Tong, M. Chen, L. Wang, P. Wang, L. Sun, B. Cheng, S.-J. Liang*, **F. Miao***, "Ultrasensitive Mechanical Sensor Using Tunable Ordered Array of Metallic and Insulating States in Vanadium Dioxide", ***Chinese Physics Letters*** 41, 077101 (2024).
14. Z. Liu, J. Shi, J. Cao, Z. Ma, Z. Yang, Y. Cui, L. Wang, Y. Dai, M. Chen, P. Wang, Y. Xie, F. Chen, Y. Shi, C. Xiao, S. A. Yang, B. Cheng*, S.-J. liang*, **F. Miao***, "Skin-inspired in-sensor encoding of strain vector using tunable quantum geometry", ***Advanced Functional Materials*** 35, 2416204 (2025).
15. Q. Wu, X. Pan, W.W. Zhao, Y. Gao, D.W. Zhao, S.C. Yan, T.T. Li, **F. Miao**, Z.Y. Fei, Y. Shi, “Twisted GeS Nanowire with Engineered Stacking Order and Tunable Composition”, ***Advanced Materials Interfaces*** (2025) https://doi.org/10.1002/admi.202400802.
16. H. Xiao, H. Gao, M. Li, F. Chen, Q. Li, Y. Li, C. Li, M. Wang, F. Zhu, L. Yang, S. Wang, **F. Miao**, Y. Chen, C. Chen, B. Cheng, J. Liu, Z. Liu, “Unveiling a Tunable Moiré Bandgap in Bilayer Graphene/hBN Device by Angle-Resolved Photoemission Spectroscopy”, ***Advanced Science*** 12, 2412609(2025).
17. J. Xie, J.-L. Xiong, B. Cheng*, S.-J. Liang*, **F. Miao***, "In-Memory Probabilistic Computing Using Gate-Tunable Layer Pseudospins in van der Waals Heterostructures", ***Chinese Physics Letters*** 42,040202 (2025).
18. Z.-A Li, C. Pan, P. Wang, Y. Yang*, W. Yu, Y. Zhao, G. Ruan, C. Wang, J. Mei, P. Zeng, X. Wang, Z. Ni, B. Cheng, S.-J. liang*, **F. Miao***, "In-Pixel Dual-Band Intercorrelated Compressive Sensing Based on MoS2/h-BN/PdSe2 Vertical Heterostructure", ***ACS Nano***

19, 6263 (2025).
19. C. Pan, P. Su, W. Yu, P. Wang, Y. Yang, C. Wang, S. Liang, B. Cheng, **F. Miao**, “Drain self-blocking ambipolar transistors for complementary circuit applications”, ***Applied Physics Letters*** 125, 183504 (2024).
20. X. Pan, J. Shi, W. Yu, Y. Zhao, Y. Yang, B. Cheng, S. Liang, **F. Miao**, “Rotation-invariant image recognition using interconnected floating-gate phototransistor”, ***Applied Physics Letters*** 125, 133103 (2024).
21. S. Gao, C. Pan, P. Su, X. Yangdong, W. Yu, Z. Zeng, Y. Shen, J. Shi, Y. Cui, P. Wang, Y. Yang, C. Wang, B. Cheng, S. Liang, **F. Miao**, “High precision current mirror circuit based on two-dimensional material transistors”, ***Science China-Information Sciences*** 67, 189405 (2024).
22. X. Liu, J. Shan, T. Cao, L. Zhu, J. Ma, G. Wang, Z. Shi, Q. Yang, M. Ma, Z. Liu, S. Yan, L. Wang, Y. Dai, J. Xiong, F. Chen, B. Wang, C. Pan, Z. Wang, B. Cheng, Y. He, X. Luo, J. Lin, S.-J. liang, **F. Miao***, “On-device phase engineering”, ***Nature Materials*** 23, 1363 (2024).
23. M. Chen, Y. Xie, B. Cheng, Z. Yang, X. Li, F. Chen, Q. Li, J. Xie, K. Watanabe, T. Taniguchi, W. He, M. Wu, S.-J. liang, **F. Miao***, “Selective and quasi-continuous switching of ferroelectric Chern insulator devices for neuromorphic computing”, ***Nature Nanotechnology*** 19, 962 (2024).
24. Z.C. Ma, Z.L. Liu, B. Cheng, S.-J. Liang, **F. Miao**, “In-situ strain engineering and applications of van der Waals materials”, ***Acta Physica Sinica*** 73, 110701 (2024).
25. Z. Ma, S. Yan, Z. Liu, T. Xu, F. Chen, S. Chen, T. Cao, L. Sun, B. Cheng, S. Liang, **F. Miao**, “Anisotropic metal-insulator transition in strained VO_2(B) single crystal”, ***Chinese Physics B*** 33, 67103.
26. T. Cao, S. Hao, C. Wu, C. Pan, Y. Dai, B. Cheng, S. Liang, **F. Miao**, “Improving the electrical performances of InSe transistors by interface engineering”, ***Chinese Physics B*** 33, 47302 (2024).
27. M. Chen, Y. Xie, B. Cheng, S. Liang, **F. Miao**, “Competition and coupling effect between localized and iterant electrons in graphene moiré heterostructures”, ***Scientia Sinica-Physica Mechanica & Astronomica*** 54, 127301 (2024).
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Review paper

1. Z. Ma, Z. Liu, B. Cheng, S. Liang, **F. Miao***, “In-situ strain engineering and applications of van der Waals materials”, ***Acta Physica Sinica*** 73, 110701 (2024).
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4. S.-J. liang*, Y. Li#, B. Cheng, and **F. Miao***, "Emerging Low-Dimensional Heterostructure Devices for Neuromorphic Computing", Small Structures 10, 2200064 (2022)
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8. C. Wang, C. Wang, F. Meng, P. Wang, S. Wang, S.-J. liang*, **F. Miao***, "2D Layered Materials for Memristive and Neuromorphic Applications", ***Advanced Electronic Materials*** 6, 1901107 (2020).
9. Y. Yu, **F. Miao**, J. He, Z. Ni, “Photodetecting and light-emitting devices based on two-dimensional materials”, ***Chinese Physics B*** 26, 036801 (2017).

Patents

Over 30 issued/pending US/China/International patents, with selected list as following:

1. **Feng Miao**, Nanjing, Shijun Liang, Cong Wang, Zaizheng Yang,“System and Method for Robot Control Based on Memristive Crossbar Array”, US 12011833, issued on Jun. 18, 2024.
2. **Feng Miao**, Shijun Liang, Chenyu Wang, “Retinomorphic Sensor Array and Image Convolution Method Therefor”, US 12132134, issued on Oct. 29, 2024.
3. **Feng Miao**, Miao Wang,“High Temperature Resistant Memristor Based on Two-Dimensional Covalent Crystal and Preparation Method Thereof”, US 10418550, issued on Sept. 17, 2019.
4. **Feng Miao**, Joshua Yang, Wei Wu, Shih-Yuan Wang, R. Stanley Williams, “Graphene memristor having modulated graphene interlayer conduction,” US 8294132, issued on Oct. 23, 2012.
5. **Feng Miao**, Joshua Yang, Gilberto Medeiros Ribeiro, R. Stanley Williams, “Changing a memristor state,” US 8331131, issued on Dec. 11, 2012.
6. **Feng Miao**, Joshua Yang, John Paul Strachan, Wei Yi, Gilberto Medeiros Ribeiro, R. Stanley Williams, “High-reliability high-speed memristor,” US 9165645, issued on Oct. 20, 2015.
7. **Feng Miao**, Joshua Yang, John Paul Strachan, Wei Yi, Gilberto Medeiros Ribeiro, R. Stanley Williams, “Memristor with channel region in thermal equilibrium with containing region,” US 9276204, issued on Mar. 1, 2016.
8. Joshua Yang, **Feng Miao**, Wei Wu, Shih-Yuan Wang, R. Stanley Williams, “Defective graphene-based memristor,” US 8203171, issued on Jun. 19, 2012.
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10. Wei Yi, **Feng Miao**, Joshua Yang, “Multi-level memory cell with continuously tunable switching,” US 8923034, issued on Dec. 30, 2014.
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12. **Feng Miao**, Mingsheng Long, "Optoelectronic Device Based on p-g-n Heterojunctions of Two-Dimensional Layered Thin Film Materials", Patent No.: ZL 201511028062.4, Issue Date: Sep. 29, 2017.
13. **Feng Miao**, Mingsheng Long, "Optoelectronic Device Based on p-i-n Heterojunctions of Two-Dimensional Layered Materials", Patent No.: ZL 201511029416.7, Issue Date: Nov. 10, 2017.
14. **Feng Miao**, Lili Zhang, Xinyi Cui, Chenyu Wang, Erfu Liu, Mingsheng Long, "Method for Transferring CVD Two-Dimensional Transition Metal Chalcogenides Assisted by Water-Soluble Salt", Patent No.: ZL 201710350595.7, Issue Date: Dec. 4, 2018.
15. **Feng Miao**, Xinyi Cui, Chenyu Wang, Yi Cao, Ying Li, "Field-Effect Based Biosubstance Sensor and Biosubstance Detection System Based on Layered Materials", Patent No.: ZL 201610018192.8, Issue Date: Jan. 11, 2019.
16. **Feng Miao**, Miao Wang, "High-Temperature Tolerant Memristor Based on Two-Dimensional Atomic Crystal", Patent No.: ZL201810050297.0, Issue Date: Jun. 16, 2020.
17. **Feng Miao**, Xiaomu Wang, Anyuan Gao, "Avalanche Field-Effect Transistor and Measurement Device Based on Two-Dimensional Layered Materials", Patent No.: ZL201910003119.7, Issue Date: Feb. 12, 2021.
18. **Feng Miao**, Shijun Liang, Chen Pan, "Unit Circuit and Multifunctional Logic Circuit Based on Tunable Homojunction Field-Effect Devices", Patent No.: ZL202010596101.5, Issue Date: Jul. 9, 2021.
19. **Feng Miao**, Shijun Liang, Chen Pan, Chenyu Wang, Pengfei Wang, "Artificial Synaptic Circuit and Implementation Method Based on Tunable Homojunction Field-Effect Devices", Patent No.: ZL202010596185.2, Issue Date: Jul. 9, 2021.
20. **Feng Miao**, Shijun Liang, Cong Wang, Zaizheng Yang, "Robot Control System and Method Based on Memristor Crossbar Array", Patent No.: ZL201910993530.3, Issue Date: Nov. 23, 2021. Patentee: Nanjing University, Nanjing University Shenzhen Research Institute.
21. **Feng Miao**, Shijun Liang, Cong Wang, Wei Wei, "System and Method for Edge Computing Using High-Order Differentiation of Analog Sensor Signals", Patent No.: ZL202110607304.4, Issue Date: Mar. 18, 2022.
22. **Feng Miao**, Shijun Liang, Cong Wang, "Apparatus and Method for Frequency Division Multiplexing Parallel Analog In-Memory Computing", Patent No.: ZL202110526207.2, Issue Date: June 21, 2022.
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24. **Feng Miao**, Shijun Liang, Cong Wang, Gongjie Ruan, "MIMO and De-MIMO Method and System Based on Analog In-Memory Computing", Patent No.: ZL202211382662.0, Issue Date: Jul. 28, 2023.
25. **Feng Miao**, Shijun Liang, Cong Wang, Gongjie Ruan, "Modulation and Demodulation Method and System Based on Analog In-Memory Computing", Patent No.: ZL202211382599.0, Issue Date: Sep. 22, 2023.
26. **Feng Miao**, Shijun Liang, Cong Wang, Yichen Zhao, "Method for Correcting Dot Product Error in a Variable Resistance Device Array", Patent No.: ZL202111372955.6, Issue Date: Nov. 17, 2023.
27. **Feng Miao**, Shijun Liang, Chenyu Wang, "Retinal-Morphology Optoelectronic Sensor Array and Its Image Convolution Processing Method", Patent No.: ZL202010189068.4, Issue Date: December 26, 2023.
28. **Feng Miao**, Cong Wang, Shijun Liang, Yichen Zhao, "Training Method and Apparatus for Analog Hardware Neural Network", Patent No.: ZL202410650458.5, Issue Date: Mar. 25, 2025.
29. **Feng Miao**, Shijun Liang, Chen Pan, Cong Wang, " Integrated Memristor Array Based on 2D1R Units", Patent No.: ZL202210392734.3, Issue Date: Feb. 6, 2026.

Invited Talks and Seminars

More than 100 invited talks and seminars, with selected invited talks include: MRS Spring meeting (2025, 2024, 2022, 2021, 2017), APS March meeting (2020), Nature Conference (2024), IEEE International Conference on Solid-State &Integrated Circuit Technology (2020), International Workshop on Nanotechnology (2020), 10th Singapore International Chemistry Conference (2018), Recent Progress in Graphene and Two-dimensional Materials Research Conference (RPGR) (2018), International Symposium on Memory Devices for Abundant Data Computing (2017), *et al*.

List of selected invited talks and seminars:

1. 2D Transition Metal Dichalcogenides Conference, Cambridge, 2025
2. MRS spring meeting, Seattle, 2025
2. IEEE EDTM (Electron Devices Technology and Manufacturing), Hong Kong, 2025
3. Nature Conference on Neuromorphic Computing, Beijing, China, 2024
4. MRS fall meeting, Boston, 2024
5. Hong Kong Forum of Physics, Hong Kong, 2024
6. University of California, Santa Cruz, 2024
7. International Conference on Memristive Materials, Devices & Systems (MEMRISYS 2024）, Korea, 2024
8. Recent Progress in Graphene and 2D Materials Research Conference (RPGR), Nanjing, China, 2024
9. IEEE EDTM (Electron Devices Technology and Manufacturing), India, 2024
10. The University of Hong Kong, Hong Kong, 2024
11. International Symposium on Emerging Memory and Computing (ISMC), Hong Kong, 2024
12. International Workshop on Quantum Materials for 2D Photonics & Optoelectronics (QM2PO), Singapore, 2023
13. Conference of Condensed Matter Physics (CCMP), Liyang, China, 2023
14. IEEE-NANO, Korea, 2023 (online)
15. Future Electronics Materials Research in Australia (FEMRA) workshop, Australia, 2023 (online)
16. 2022 MRS Fall Meeting (online)
17. International Conference on Memristive Materials, Devices & Systems (MEMRISYS 2022), Cambridge, USA, 2022 (online)
18. International Conference on Solid-State and Integrated Circuit Technology (ICSICT), Nanjing, China, 2022
19. National University of Singapore, 2022 (online)
20. 2021 MRS Fall Meeting, Boston, 2021 (online)
21. International conference on “Recent Progress in Graphene and 2D materials Research”(RPGR) 2021, Korea (online)
22. 3rd International Symposium on Memory Devices for Abundant Data Computing, 2021 (online)
23. International Conference on Solid-State and Integrated Circuit Technology (ICSICT), 2020 (online)
24. APS March Meeting, Denver, 2020 (online/cancelled)
25. International Workshop on Nanotechnology (Tnano20), Republic of Georgia, 2020 (online)
26. International Conference on Memristive Materials, Devices & Systems (MEMRISYS), Germany, 2019
27. International Conference on 2D Materials and Technology (ICON-2DMAT), Suzhou, China, 2019
28. Conference of Condensed Matter Physics (CCMP), Liyang, China, 2019
29. 2019 International Workshop on Nanomaterials and Nanodevices, Beijing, China, 2019

30. The 1st UK-China Conference “Grand Challenges and Solutions in 2D Materials Science and Technologies”, Manchester, UK, 2018
31. The 4th International Conference on Two-Dimensional Materials and Technologies (ICON-2DMAT), Melbourne, Australia, 2018
32. The 10th Singapore International Chemistry Conference (SICC10), Singapore, 2018
33. The International Conference on Memristive Materials, Devices & Systems (MEMRISYS 2018), Beijing, China, 2018
34. The 2nd Sino-German Symposium on Electronic and Memory Materials, Xi’an, China, 2018
35. International Symposium on Emerging Memory and Computing (ISMC), Jiangxi, China, 2018
36. MRS spring meeting, Phoenix, 2017
37. Third International Conference on 2D Materials and Technology (ICON-2DMAT), Singapore, 2017
38. Nanyang Technological University, Singapore, 2017
39. International Symposium on emerging Memory and Computing (ISMC), Hong Kong, China, 2017
40. University of California, Riverside, 2017
41. Asia-Pacific Symposium on Solid Surfaces and Cross-Strait Symposium on Solid Surfaces, Taipei, 2016
42. 2016 Asia Communications and Photonics Conference (ACP), Wuhan, China, 2016
43. 2016 EMN 2D Materials Meeting, Spain, 2016
44. The 9th Singapore International Chemical Conference (SICC-9), Singapore, 2016
45. University of California, Los Angeles, 2015
46. University of California, Riverside, 2015
47. University of Southern California, 2015
48. HP Labs, Palo Alto, California, 2015
49. University of Massachusetts, Amherst, 2015