

Yang Cheng

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Device Research Laboratory, Electrical and Computer Engineering Department, UCLA
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RESEARCH INTERESTS

Spintronics, CMOS compatible nanoscale devices, neuromorphic computing, cryogenic electronics, ultrafast magneto-optics dynamics, van der Waals quantum materials

EMPLOYMENT

University of California, Los Angeles 2021 –
Postdoctoral Scholar, Electrical and Computer Engineering Department
Advisor: Prof. Kang L. Wang

EDUCATION

The Ohio State University 2015 – 2021
Ph.D. in Physics
Advisor: Prof. Fengyuan Yang
Thesis: Manipulation of Magnetization Dynamics in Ferromagnetic and Antiferromagnetic Hetero-structures

University of Science and Technology of China 2011 – 2015
B.S. with Summa Cum Laude in Physics

REFEREED JOURNAL PUBLICATIONS

[Google Scholar](#) (*equal contribution)

35. “Transient Antiskyrmion-Mediated Topological Transitions in Isotropic Magnets”
Bingqian Dai, Tianyi Wang, Albert Lee, Shijie Xu, Zhongjian Bian, Xinyue Zhu, Puyang Huang, Aadi Chaturvedi, Yaochen Li, Yang Cheng, Qingyuan Shu, Haoran He, Hanshen Huang, Lixuan Tai, Kin Wong, Jinbo Yang, Anjan Soumyanarayanan, Zhaochu Luo, and Kang L. Wang
[Advanced Science](#) (2026): e13126
34. “Antiferromagnetic Materials Exhibiting Unconventional Properties”
Bingqian Dai, **Yang Cheng**, Tao Qu, Puyang Huang, Yaochen Li, Tianyi Wang, Hanshen Huang, Qingyuan Shu, and Kang L. Wang
[Advanced Functional Materials](#) (2025): e08282
33. “Spintronic Bayesian Hardware Driven by Stochastic Magnetic Domain Wall Dynamics”
Tianyi Wang, Bingqian Dai, Kin Wong, Yaochen Li, **Yang Cheng**, Qingyuan Shu, Haoran He, Puyang Huang, Hanshen Huang, and Kang L. Wang
[arXiv:2507.17193](#) (2025)
32. “Spin–Orbit Torque-Assisted Voltage-Controlled Magnetization Switching for Reliable Nonvolatile Memory”
Qingyuan Shu, **Yang Cheng**, Albert Lee, Tyler Schopen, Haoran He, Junzheng Guan, Chih-Yao Wang, Shan-Yi Yang, Yu-Chen Hsin, Cheng-Yi Shih, Hsin-Han Lee, Jeng-Hua Wei, Hwajeong Lee, Puyang Huang, Tianyi Wang, Tao Qu, Bingqian Dai, and Kang L. Wang
[ACS Nano](#) 19 (41), 36653-36662 (2025)
31. “Voltage-Controlled Magnetoelectric Devices for Neuromorphic Diffusion Process”
Yang Cheng, Qingyuan Shu, Albert Lee, Haoran He, Ivy Zhu, Minzhang Chen, Renhe Chen, Zirui Wang, Hantao Zhang, Chih-Yao Wang, Shan-Yi Yang, Yu-Chen Hsin, Cheng-Yi Shih, Hsin-Han Lee, Ran Cheng, and Kang L. Wang
[Nature Communications](#) 16, 5022 (2025)

30. “Observation of Real-Time Spin-Orbit Torque Driven Dynamics in Antiferromagnetic Thin Film”
Yang Cheng*, Hanshen Huang*, Junyu Tang, Joseph Lanier, Katelyn Lazareno, Hao-Kai Chang, Shang-Jui Chui, Chao-Yao Yang, Fengyuan Yang, Ran Cheng, and Kang L. Wang
[Advanced Materials](#), 2417240 (2025)
29. “Current-Driven Magnetization Switching for Superconducting Diode Memory”
Yang Cheng*, Qingyuan Shu*, Haoran He, Bingqian Dai, and Kang L. Wang
[Advanced Materials](#), 2415480 (2025)
28. “Ultrafast Dynamics of Wavelength-Sensitive Magnons in Unconventional Compensated Semiconducting Antiferromagnet”
 Hanshen Huang, Tao Qu, **Yang Cheng**, Lixuan Tai, Christopher Eckberg, Qunjun Pan, Abdullah Alrasheed, Su Kong Chong, Bingqian Dai, Yaochen Li, Qingyuan Shu, Chao-Yao Yang, Jie-Xiang Yu, Gen Yin, and Kang L. Wang
[arXiv:2405.04686](#) (2024)
27. “Intrinsic Exchange Biased Anomalous Hall Effect in an Uncompensated Antiferromagnet MnBi_2Te_4 ”
 Su Kong Chong*, **Yang Cheng***, Huiyuan Man, Seng Huat Lee, Yu Wang, Bingqian Dai, Masaki Tanabe, Ting-Hsun Yang, Zhiqiang Mao, Kathryn A. Moler, and Kang L. Wang
[Nature Communications](#) 15, 2881 (2024)
26. “Exchange-Driven Chern States in High-Mobility Intrinsic Magnetic Topological Insulators”
 Su Kong Chong, Chao Lei, **Yang Cheng**, Seng Huat Lee, Zhiqiang Mao, Allan H. MacDonald, and Kang L. Wang
[Phys. Rev. Lett.](#) 132, 146601 (2024)
25. “Unveiling the Anomalous Hall Response of the Magnetic Structure Changes in the Epitaxial MnBi_2Te_4 Films”
 Kejing Zhu*, **Yang Cheng***, Menghan Liao*, Su Kong Chong, Ding Zhang, Ke He, Kang L. Wang, Kai Chang, and Peng Deng
[Nano Lett.](#) 2024, 24, 7, 2181–2187 (2024)
24. “Pressure Tunable Quantum Anomalous Hall States in a Topological Antiferromagnet”
 Su Kong Chong, Chao Lei, Jie Li, **Yang Cheng**, David Graf, Seng Huat Lee, Masaki Tanabe, Ting-Hsun Yang, Zhiqiang Mao, Allan H MacDonald, and Kang L. Wang
[arXiv:2306.10325](#) (2023)
23. “Manipulating Topological Phases in Magnetic Topological Insulators”
 Gang Qiu, Hung-Yu Yang, Su Kong Chong, **Yang Cheng**, Lixuan Tai, and Kang L. Wang
[Nanomaterials](#) 13 (19), 2655 (2023)
22. “Current-Induced Switching of Thin Film $\alpha\text{-Fe}_2\text{O}_3$ Devices Imaged Using a Scanning Single-Spin Microscope”
 Qiaochu Guo, Anthony D’Addario, **Yang Cheng**, Jeremy Kline, Isaiah Gray, Hil Fung Harry Cheung, Fengyuan Yang, Katja C. Nowack, and Gregory D. Fuchs
[Phys. Rev. Materials](#) 7, 064402 (2023)
21. “High-Order Harmonic Generation from a Thin Film Crystal Perturbed by a Quasi-Static Terahertz Field”
 Sha Li, Yaguo Tang, Lisa Ortmann, Bradford K. Talbert, Cosmin I. Blaga, Yu Hang Lai, Zhou Wang, **Yang Cheng**, Fengyuan Yang, Alexandra S. Landsman, Pierre Agostini, and Louis F. DiMauro
[Nature Communications](#) 14, 2603 (2023)
20. “Unidirectional Spin Hall Magnetoresistance in Antiferromagnetic Heterostructures”
Yang Cheng, Junyu Tang, Justin J. Michel, Su Kong Chong, Fengyuan Yang, Ran Cheng, and Kang L. Wang
[Phys. Rev. Lett.](#) 130, 086703 (2023)

19. “Electric Field Manipulation of Spin Chirality and Skyrmion Dynamic”
Bingqian Dai, Di Wu, Seyed Armin Razavi, Shijie Xu, Haoran He, Qingyuan Shu, Malcolm Jackson, Farzad Mahfouzi, Hanshen Huang, Quanjun Pan, **Yang Cheng**, Tao Qu, Tianyi Wang, Lixuan Tai, Kin Wong, Nicholas Kioussis, and Kang L. Wang
[Science Advances 9 \(7\), eade6836 \(2023\)](#)
18. “Single- and Multimagnon Dynamics in Antiferromagnetic α -Fe₂O₃ Thin Films”
Jiemin Li, Yanhong Gu, Yoshihiro Takahashi, Keisuke Higashi, Taehun Kim, **Yang Cheng**, Fengyuan Yang, Jan Kuneš, Jonathan Pelliciari, Atsushi Hariki, and Valentina Bisogni
[Phys. Rev. X 13, 011012 \(2023\)](#)
17. “Review of Voltage-Controlled Magnetic Anisotropy and Magnetic Insulator”
Bingqian Dai, Malcolm Jackson, **Yang Cheng**, Haoran He, Qingyuan Shu, Hanshen Huang, Lixuan Tai, and Kang L. Wang
[Journal of Magnetism and Magnetic Materials 563, 169924 \(2022\)](#)
16. “RF Characterization on Nb-based Superconducting Silicon Interconnect Fabric for Future Large Scale Quantum Applications”
Yu-Tao Yang, Haoxiang Ren, Su Kong Chong, Gang Qiu, Shu-Yun Ku, **Yang Cheng**, Chaowei Hu, Tiema Qian, Kuan-Neng Chen, Ni Ni, Kang L. Wang, and Subramanian S Lyer
[IEEE 72nd Electronic Components and Technology Conference \(ECTC\), 949-955 \(2022\)](#)
15. “Third Harmonic Characterization of Antiferromagnetic Heterostructures”
Yang Cheng, Egecan Cogulu, Rachel D. Resnick, Justin J. Michel, Nahuel N. Statuto, Andrew D. Kent, and Fengyuan Yang
[Nature Communications 13, 3659 \(2022\)](#)
14. “Quantifying Spin-Orbit Torques in Antiferromagnet–Heavy-Metal Heterostructures”
Egecan Cogulu, Hantao Zhang, Nahuel N. Statuto, **Yang Cheng**, Fengyuan Yang, Ran Cheng, and Andrew D. Kent
[Phys. Rev. Lett. 128, 247204 \(2022\)](#)
13. “Enhancing Perpendicular Magnetic Anisotropy in Garnet Ferrimagnet by Interfacing with Few-Layer WTe₂”
Guanzhong Wu, Dongying Wang, Nishchhal Verma, Rahul Rao, **Yang Cheng**, Side Guo, Guixin Cao, Kenji Watanabe, Takashi Taniguchi, Chun Ning Lau, Fengyuan Yang, Mohit Randeria, Marc Bockrath, and P. Chris Hammel
[Nano Lett. 2022, 22, 3, 1115–1121 \(2022\)](#)
12. “Tunable Topological Hall Effects in Noncollinear Antiferromagnet Mn₃Sn/Pt Bilayers”
Yang Cheng, Sisheng Yu, Menglin Zhu, Jinwoo Hwang, and Fengyuan Yang
[APL Materials 9, 051121 \(2021\)](#)
11. “Direct Imaging of Electrical Switching of Antiferromagnetic Néel Order in α -Fe₂O₃ Epitaxial Films”
Egecan Cogulu, Nahuel N. Statuto, **Yang Cheng**, Fengyuan Yang, Rajesh V. Chopdekar, Hendrik Ohldag, and Andrew D. Kent
[Phys. Rev. B 103, L100405 \(2021\)](#) [Selected as Editors’ Suggestion, Letter]
10. “Nanoscale Imaging of Gilbert Damping Using Signal Amplitude Mapping”
Guanzhong Wu, **Yang Cheng**, Side Guo, Fengyuan Yang, Denis V. Pelekhov, and P. Chris Hammel
[Appl. Phys. Lett. 118, 042403 \(2021\)](#)
9. “Nonlocal Uniform-Mode Ferromagnetic Resonance Spin Pumping”
Yang Cheng, Aidan J. Lee, Guanzhong Wu, Denis V. Pelekhov, P. Chris Hammel, and Fengyuan Yang
[Nano Lett. 20\(10\), 7257-7262 \(2020\)](#)

8. “Changes of Magnetism in A Magnetic Insulator due to Proximity to A Topological Insulator”
Tao Liu, James Kally, Timothy Pillsbury, Chuanpu Liu, Houchen Chang, Jinjun Ding, **Yang Cheng**
Maria Hilde, Roman Engel-Herbert, Anthony Richardella, Nitin Samarth, and Mingzhong Wu
[Phys. Rev. Lett. 125, 017204 \(2020\)](#)
7. “Electrical Switching of Tristate Antiferromagnetic Néel Order in α -Fe₂O₃ Epitaxial Films”
Yang Cheng*, Sisheng Yu*, Menglin Zhu, Jinwoo Hwang, and Fengyuan Yang
[Phys. Rev. Lett. 124, 027202 \(2020\)](#)
6. “Symmetry-Breaking Actuation Mechanism for Soft Robotics and Active Metamaterial”
Shuai Wu, Qiji Ze, Rundong Zhang, Nan Hu, **Yang Cheng**, Fengyuan Yang, and Ruike Zhao
[ACS Appl. Mater. Interfaces 2019, 11, 44, 41649-41658 \(2019\)](#)
5. “Anisotropic Magnetoresistance and Nontrivial Spin Hall Magnetoresistance in Pt/ α -Fe₂O₃ Bilayers”
Yang Cheng*, Sisheng Yu*, Adam S. Ahmed, Menglin Zhu, You Rao, Maryam Ghazisaeidi, Jinwoo Hwang, and Fengyuan Yang
[Phys. Rev. B 100, 220408\(R\) \(2019\)](#)
4. “Evidence of the Topological Hall Effect in Pt/Antiferromagnetic Insulator Bilayers”
Yang Cheng*, Sisheng Yu*, Menglin Zhu, Jinwoo Hwang, and Fengyuan Yang
[Phys. Rev. Lett. 123, 237206 \(2019\)](#)
3. “Nonsinusoidal Angular Dependence of FMR-Driven Spin Current Across An Antiferromagnet in Y₃Fe₅O₁₂/NiO/Pt Trilayers”
Yang Cheng, Jack Brangham, Shane White, P. Chris Hammel, Ricardo Zarzuela, Yaroslav Tserkovnyak, and Fengyuan Yang
[Phys. Rev. B 99, 060405\(R\) \(2019\)](#)
2. “Thickness and Angular Dependent Ferromagnetic Resonance of Ultra-Low Damping Co₂₅Fe₇₅ Epitaxial Films”
Yang Cheng, Aidan J. Lee, Jack T. Brangham, Shane P. White, William T. Ruane, P. Chris Hammel, and Fengyuan Yang
[Appl. Phys. Lett. 113, 262403 \(2018\)](#)
1. “Metallic Ferromagnetic Films with Magnetic Damping Under 1.4×10^{-3} ”
Aidan J. Lee, Jack T. Brangham, **Yang Cheng**, Shane P. White, William T. Ruane, Bryan D. Esser, David W. McComb, P. Chris Hammel, and Fengyuan Yang
[Nature Communications 8, 234 \(2017\)](#)

HONORS AND AWARDS

Presidential Fellowship, The Ohio State University	2020 — 2021
Poster Award at Magnetism and Magnetic Materials Meeting 2020	2020
Outstanding Undergraduate Thesis Award, University of Science and Technology of China	2015
Outstanding Freshman Scholarship, University of Science and Technology of China	2011

SCIENTIFIC PRESENTATIONS

18. Invited Talk, Department of ECE Seminar, Stanford University, CA	07/2025
17. Invited Talk, Department of ECE Seminar, University of California Los Angeles, CA	03/2025
16. Invited Talk, Department of ECE Seminar, Texas State University, San Marcos, TX	03/2025
15. Talk, APS March Meeting 2025, Anaheim, CA	03/2025
14. Invited Talk, Department of MSE Seminar, University of Texas at Arlington, TX	02/2025
13. Invited Talk, APS March Meeting 2024, Minneapolis, MN	03/2024
12. Invited Talk, Latest Trends in Semiconductor Devices Workshop, Los Angeles, CA	03/2023
11. Talk, APS March Meeting 2023, Las Vegas, NV	03/2023
10. Talk, Magnetism and Magnetic Materials (MMM) Meeting 2022, Minneapolis, MN	11/2022
9. Talk, APS March Meeting 2021, Online	03/2021

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| 8. Talk, Magnetism and Magnetic Materials (MMM) Meeting 2019, Las Vegas, NV | 11/2019 |
| 7. Talk, APS March Meeting 2019, Boston, MA | 03/2019 |
| 6. Talk, Magnetism and Magnetic Materials - Intermag Joint conference 2019, Washington, DC | 01/2019 |
| 5. Poster, Spin Caloritronics IX, Columbus, OH | 06/2018 |
| 4. Poster, NSF site visit, Columbus, OH | 05/2018 |
| 3. Talk, Magnetism and Magnetic Materials (MMM) Meeting 2017, Pittsburgh, PA | 11/2017 |
| 2. Poster, Materials Week, Columbus, OH | 05/2017 |
| 1. Talk, APS March Meeting 2017, New Orleans, LA | 03/2017 |

TEACHING EXPERIENCE

Teaching Assistant, Physics 1200, Mech, Fluids, Waves, OSU	2017
Teaching Assistant, Physics 1250, Mech, Thermo, Waves, OSU	2016
Grader, Physics 2300, Intermediate Mechanics (part II), OSU	2016
Grader, Physics 2300, Intermediate Mechanics (part I), OSU	2015

RESEARCH ADVISING EXPERIENCE

Malcolm Jackson (graduate student at UCLA), Qingyuan Shu (graduate student at UCLA), Hanshen Huang (graduate student at UCLA), Bingqian Dai (graduate student at UCLA), Haoran He (graduate student at UCLA), Samuel Li (graduate student at UCLA), Tianyi Wang (graduate student at UCLA), Minzhang Chen (graduate student at UCLA), Alex Walburg (undergraduate student at UCLA), Hiroshi Goto (visiting student at Tohoku University), Justin Michel (graduate student at OSU), Rachel Resnick (graduate student at OSU), Cordy Null (undergraduate student at OSU), Alexander King (undergraduate student at OSU)

SERVICE

- Referee for Advanced Functional Materials, Advanced Materials Interfaces, Advanced Science, Journal of Applied Physics, Journal of Magnetism and Magnetic Materials, Physical Review B, Physical Review Letters, Physical Review Materials, Science Advances, Small, Thin Solid Films
- Session Chair for GG05 V: Growth, Characterization and Modeling of Topological Materials, APS March Meeting 2024