Kaichen Dong

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Professional Experience

2022/11– Now	Assistant Professor, Institute of Data and Information, Tsinghua Shenzhen International Graduate School Tsinghua University	Shenzhen, China
2019/02 – 2022/09	Postdoctoral Researcher in Materials Science and Engineering University of California, Berkeley Advisors: Professor Junqiao Wu, Professor Jie Yao	Berkeley, CA, USA
2019/03 – 2022/09	Affiliate in Materials Science Division Lawrence Berkeley National Laboratory Supervisor: Professor Junqiao Wu	Berkeley, CA, USA
2017/10 – 2019/01	Research Associate in Precision Instrument Tsinghua University Supervisor: Professor Zheng You	Beijing, China

Education

2012/09 – 2017/10	Ph.D. in Precision Instrument Tsinghua University Advisor: Professor Zheng You	Beijing, China
2014/12 – 2016/12	Visiting Ph.D. student in Materials Science and Engineering University of California, Berkeley Advisors: Professor Junqiao Wu, Professor Jie Yao	Berkeley, CA, USA
2015/07 – 2016/12	Affiliate in Materials Science Division Lawrence Berkeley National Laboratory Supervisor: Professor Junqiao Wu	Berkeley, CA, USA
2008/08 – 2012/07	B.E. in Precision Instrument Tsinghua University	Beijing, China

Professional Appointment

2024/01 – Now	Director, Intelligent Passive Thermal Control Center Research Institute of Tsinghua University in Shenzhen	Shenzhen, China
2023/09 – Now	Deputy Director, Center of Double Helix Tsinghua Shenzhen International Graduate School Director: Professor Quanshui Zheng	Shenzhen, China

Research Interests

- Smart photonic materials: smart radiative temperature control materials, metamaterials/metasurfaces, etc.
- Smart micro-sensors: zero-power micro-electro-mechanical sensors, etc.
- Nanophotonics: moiré photonic crystals, moiré physics, etc.
- AI-for-Science

Awards and Honors

- 2025/01 Outstanding Sci-tech People of 2024 (Young Scientist) by Scientific Chinese
- 2024/09 MINE Young Scientist Award
- 2024/03 PIERS Young Scientist Award

- 2023/12 Chief Scientist of National Key R&D (Young Scientist) Program of China
- 2022/12 Pengcheng Peacock Plan Talent
- 2022/10 NSFC Early-Career Award
- 2022/06 MIT Technology Review Top 35 Innovators Under 35 (TR35, Global List)
- 2018/11 National Excellent Doctoral Dissertation in the Field of Measurement, Control and Instrument by China Instrument and Control Society (ranking 1st)
- 2018/07 Excellent Doctoral Dissertation of Tsinghua University
- 2016/10 The Hainengchizi Scholarship for outstanding graduate students
- 2011/12 Prize for Excellence in Tsinghua University Electronic Design Contest
- 2011/11 The Hongqian Electronics Scholarship for outstanding academic performance
- 2010/11 The Huangqianheng Scholarship for outstanding academic performance
- 2010/06 Third Prize in Beijing Mechanical Innovation Design Competition

Professional Activities

- Member of CSMNT, CIS, IEEE, Optica, MRS, APS
- Session Chair of *ACTS 2024*
- Independent Reviewer of International Journals (26): *Nature Photonics, Joule, Nature Sustainability, Nature Communications, Advanced Materials, ACS Nano, Advanced Functional Materials, Advanced Energy Materials, Small, APL Photonics, IEEE Transactions on Electron Devices, Nano-Micro Letters, Advanced Materials Technologies, ACS Applied Electronic Materials, Advanced Electronic Materials, Advanced Optical Materials, Responsive Materials, Scientific Reports, Applied Physics Letters, Optics Letters, Optics Express, Advanced Intelligent Systems, ACS Applied Materials & Interfaces, Physica Status Solidi B: Basic Solid State Physics, iScience, Acta Physica Sinica.*

Graduates and undergraduates supervised

- Graduates: (Current) Xuzhe Zhao, Chunjiang Li, Shujie Yang, Qiyue Chen, Xinxiang Ye, Zhiyun Wang, Jiahao Cheng, Yuqi Zhang, Jianyao Song.
- Undergraduates: (Current) Ziyun Wang, Yongzhao Li; (Past) Jiachen Li, Yiwen Wang, Tiancheng Zhang, Daniel Cui, Derick Tseng, Yuxuan Wan.

Community Service

- 2023/07 Lecturer for Shenzhen X-Institute
- 2020/03 Referee at Alameda County Science and Engineering Fair (ACSEF)

Publications (*co-first author, #corresponding author)

1. S. Yang, X. Zhao, Y. Zhang, Y. Tang#, K. Dong#. CoSP: Reconfigurable Multi-state Metamaterial Inverse Design via Contrastive Pretrained Large Language Model, **submitted** (2025).
2. S. Yang, C. Li, H. Fu, Y. Tang#, K. Dong#. Cauchyformer: Physics-informed Few-shot Spectrum Inference for Photonic Metasurfaces, **submitted** (2025).
3. R. Guo, Q. Feng, K. Ma, G.-H. Lee, M. Jamal, X. Zhao, K. Bustillo, J. Wan, D. S. Ritchie, L. Shan, Y. Cai, J. Li, J. Shen, K. Dong, R. Huang, Y. Cai, F. Wang, M. Salmeron, H. Zheng, M. Sherburne, M. Scott, W. Yang, M. Asta, K. Tang, J. Wu, Mem-sensing at Sub-Debye Screening Length Scale, ***Nature Materials*** (accepted).
4. L. Yuan, R. Shi, Y. Wu, S. Feng, Y. Fu, Y. Wei, X. Zhao, K. Dong, K. Jiang, K. Liu, X. Zhang. Wafer-scale Transfer and Integration of Tungsten-doping Vanadium Dioxide Films, ***ACS Nano*****,** 19, 6, 6209-6220 (2025).
5. R. Chen, F. Meng, H. Zhang, Y. Liu, S. Yan, X. Xu, L. Zhu, J. Chen, T. Zhou, J. Zhou, F. Yang, P. Ci, X. Huang, X. Chen, T. Zhang, Y. Cai, K. Dong, Y. Liu, K. Watanabe, T. Taniguchi, C.-C. Lin, A. V. Penumatcha, I. Young, E. Chan, J. Wu, L. Yang, R. Ramesh, J. Yao. Room-temperature Multiferroicity in Sliding van der Waals Semiconductors with Sub-0.3V Switching, ***Nature Communications***, 16, 3648 (2025).
6. X. Zhao*, J. Li*, K. Dong#, J. Wu#, Switchable and Tunable Radiative Cooling: Mechanisms, Applications, and Perspectives, ***ACS Nano***, 18, 28, 18118-18128 (2024).
7. H. Wang, B. Yuan, X. Zhu, X. Shan, S. Chen, W. Ding, Y. Cao, K. Dong, X. Zhang, R. Guo, Y. Yao, B. Wang, J. Tang, J. Liu. Multi-stimulus Perception and Visualization by an Intelligent Liquid Metalelastomer Architecture, ***Science Advances***, 10, eadp5215 (2024).

8. J. Li*, K. Dong*, T. Zhang, D. Tseng, C. Fang, R. Guo, J. Li, Y. Xu, C. Dun, J. J. Urban, T. Hong, C. P. Grigoropoulos, A. Javey, J. Yao, and J. Wu. Printable, emissivity-adaptive and albedo-optimized covering for year-round energy saving. ***Joule***, 7, 1-16 (2023).
9. T. Zhang*, K. Dong*,#, J. Li, F. Meng, J. Li, S. Munagavalasa, C. P. Grigoropoulos, J. Wu, and J. Yao#. Twisted Moiré Photonic Crystal Enabled Optical Vortex Generation through Bound States in the Continuum. ***Nature Communications***, 14, 6014 (2023).
10. J. Li and K. Dong#. Scalable and Durable Temperature-stabilizing Janus Thermal Cloak. ***Joule***, 7, 1399-1414 (2023).
11. K. Dong and J. Wu. Radiative Cooling, What's Next? ***Next Energy***, 1, 100003 (2023).
12. K. Dong*,#, J. Li*, T. Zhang, F. Gu, Y. Cai, N. Gupta, K. Tang, A. Javey, J. Yao, and J. Wu#. Single-Pixel Reconstructive Mid-Infrared Micro-Spectrometer. ***Optics Express***, 9, 14367-14376 (2023).
13. K. Dong, D. Tseng, J. Li, S. Warkander, J. Yao, and J. Wu. Reducing Temperature Swing of Space Objects with Temperature-Adaptive Solar or Radiative Coating. ***Cell Reports Physical Science***, 3, 101066 (2022).
14. H. Zhang, D. Raftery, Y. Chan, Y. Shao, R. Chen, X. Chen, X. Huang, J. T. Reichanadter, K. Dong, S. Susarla, L. Caretta, Z. Chen, J. Yao, P. Fischer, J. B. Neaton, W. Wu, D. A. Muller, R. J. Birgeneau, and R. Ramesh. Room-temperature skyrmion lattice in a layered magnet $(Fe_{0.5}Co_{0.5})_5GeTe_2$. ***Science Advances***, 8, abm7103 (2022).
15. D. Wang, K. Dong, J. Li, C. Grigoropoulos, J. Yao, J. Hong, and J. Wu. Low-loss, geometry-invariant optical waveguides with near-zero-index materials. ***Nanophotonics***, 11, 4747-4753 (2022).
16. K. Tang*, K. Dong*, J. Li*, M. P. Gordon, F. G. Reichertz, H. Kim, Y. Rho, Q. Wang, C.-Y. Lin, C. P. Grigoropoulos, A. Javey, J. J. Urban, J. Yao, R. Levinson, and J. Wu. Temperature Adaptive Radiative Coating for All-Season Household Thermal Regulation, ***Science***, 374, 1504-1509 (2021).
    - *Highlighted internationally in more than 70 news media, including Ministry of Science and Technology of the People's Republic of China, Chinese Academy of Sciences, Xinhua Net, China Daily, People's Daily Online, United Press International, EurekAlert!, Popular Science, Physics Today, Lawrence Berkeley National Laboratory News, California News Times, ABC7 News, etc.*
17. K. Dong*, T. Zhang*, J. Li, Q. Wang, F. Yang, Y. Rho, D. Wang, C. P. Grigoropoulos, J. Wu, and J. Yao. Flat Bands in Magic-Angle Bilayer Photonic Crystals at Small Twists, ***Physical Review Letters***, 126, 2223601 (2021).
    - *Selected as "Editors' suggestion" in Physical Review Letters.*
    - *Highlighted by the department of Materials Science and Engineering at U.C. Berkeley.*
18. K. Tang*, K. Dong*, C. J. Nicolai, Y. Li, J. Li, S. Lou, C.-W. Qiu, D. H. Raulet, J. Yao, and J. Wu. Millikelvin-resolved Ambient Thermography, ***Science Advances***, 6, eabd8688 (2020).
    - *Highlighted in the magazine of Berkeley Engineering as the cover story*.
19. G. Xu, K. Dong, Y. Li, H. Li, K. Liu, L. Li, J. Wu, and C.-W. Qiu. Tunable Analog Thermal Material, ***Nature Communications***, 11, 6028 (2020).
20. K. Tang, X. Wang, K. Dong, Y. Li, J. Li, B. Sun, X. Zhang, C. Dames, C. Qiu, J. Yao, and J. Wu, Thermal Radiation Beyond the Stefan-Boltzmann Law by Emissivity Engineering with Graded Metal-insulator Transition, ***Advanced Materials***, 32, 1907071 (2020).
    - *Highlighted by the School of Engineering at U.C. Berkeley and Materials Views China.*
21. Y. Deng*, X. Wang*, Z. Gong*, K. Dong, S. Lou, N. Pégard, K. B. Tom, F. Yang, Z. You, L. Waller, and J. Yao. All-Silicon Broadband Ultraviolet Metasurfaces, ***Advanced Materials***, 30, 1802632 (2020).
22. K. Dong*, S. Hong*, Y. Deng*, H. Ma, J. Li, X. Wang, J. Yeo, L. Wang, S. Lou, K. B. Tom, K. Liu, Z. You, Y. Wei, C. P. Grigoropoulos, J. Yao, and J. Wu. A Lithography-Free and Field-Programmable Photonic Metacanvas, ***Advanced Materials***, 30, 1703878 (2018).
    - *Highlighted in Journal inside back cover.*
    - *Highlighted by the School of Engineering and the department of Materials Science and Engineering at U.C. Berkeley, Nanowerk, Chinese Society of Micro-Nano Technology, Tsinghua University, Research & Development Affairs Office and the department of Precision Instrument at Tsinghua University.*
    - *Introduced in the book of "Nanoengineering: The Skills and Tools Making Technology Invisible".*
23. X. Wang*, K. Dong*, H. S. Choe, H. Liu, S. Lou, K. B. Tom, H. A. Bechtel, Z. You, J. Wu, and J. Yao. Multifunctional Microelectro-Opto-Mechanical Platform Based on Phase-Transition Materials, ***Nano***

Letters, 18, 1637-1643 (2018).

24. K. Dong, H. S. Choe, X. Wang, H. Liu, B. Saha, C. Ko, Y. Deng, K. B. Tom, S. Lou, L. Wang, C. P. Grigoropoulos, Z. You, J. Yao, and J. Wu. A 0.2 V Micro-Electromechanical Switch Enabled by a Phase Transition, ***Small***, 14, 1703621 (2018).
    - *Highlighted in Journal cover.*
25. K. Dong*, Y. Deng*, X. Wang, K. B. Tom, Z. You, and J. Yao. Subwavelength Light Confinement and Enhancement Enabled by Dissipative Dielectric Nanostructures, ***Optics Letters***, 43, 1826-1829 (2018).
26. K. Dong, S. Lou, J. Yao, J. Wu, and Z. You. Measurement of Residual Stresses in Pulsed Laser Deposited Thin Films. ***Optics and Precision Engineering,*** 26, 70-76 (2018).
27. H. S. Choe, J. Suh, C. Ko, K. Dong, S. Lee, J. Park, Y. Lee, K. Wang, and J. Wu. Enhancing Modulation of Thermal Conduction in Vanadium Dioxide Thin Film by Nanostructured Nanogaps, ***Scientific Reports***, 7, 7131 (2017).
28. K. Dong#, S. Lou, H. S. Choe, K. Liu, Z. You, J. Yao, and J. Wu. Stress Compensation for Arbitrary Curvature Control in Vanadium Dioxide Phase Transition Actuators, ***Applied Physics Letters***, 109, 023504 (2016).
29. J. Hou, X. Wang, D. Fu, C. Ko, Y. Chen, Y. Sun, S. Lee, K. X. Wang, K. Dong, Y. Sun, S. Tongay, L. Jiao, J. Yao, K. Liu, and J. Wu. Modulating Photoluminescence of Monolayer Molybdenum Disulfide by Metal–Insulator Phase Transition in Active Substrates, ***Small***, 12, 3976-3984 (2016).
30. X. Wang, Z. Gong, K. Dong, S. Lou, J. Slack, A. Anders, and J. Yao. Tunable Bragg Filters with a Phase Transition Material Defect Layer, ***Optics Express***, 24, 20365-20372 (2016).
31. W. Fan, X. Zhu, F. Ke, Y. Chen, K. Dong, J. Ji, B. Chen, S. Tongay, J. W. Ager, K. Liu, H. Su, and J. Wu. Vibrational Spectrum Renormalization by Enforced Coupling Across the Van der Waals Gap between MoS_2 and WS_2 Monolayers, ***Physical Review B***, 92, 241408 (2015).

Conferences

1. K. Dong. Magic-angle and Optical Vortex Generation in Twisted Bilayer Photonic Crystal. *Lasers, Optics, Photonics, Sensors, Biophotonics, Ultrafast Nonlinear Optics & Structured Light (LOPS),* 2025. (Plenary/Virtual)
2. K. Dong. Magic-angle and Optical Vortex Generation in Twisted Bilayer Photonic Crystal. *The 4th China Metamaterials Conference*, Shenzhen, 2025. (Invited)
3. K. Dong. Zero-Power Smart Radiative Temperature-control Technologyl. *The 4th China Metamaterials Conference*, Shenzhen, 2025. (Invited)
4. K. Dong. Smart Micro-Electromechanical and Nano-Photonic Devices Enabled by a Phase Transition. *Conference of Science & Technology for Integrated Circuits (CSTIC)*, Shanghai, 2025. (Invited)
5. K. Dong. Zero-power Phase-change Smart Micro/nano-devices. *Microsystems & Nanoengineering (MINE)*, Xi'an, 2024.
6. K. Dong, J. Li, K. Tang, and T. Zhang. Zero-power Smart Thermal Management by Temperature-adaptive Radiative Coatings. *The Third Asian Conference on Thermal Sciences (ACTS 2024)*, Shanghai, 2024.
7. T. Zhang, K. Dong, Jiachen Li, F. Meng, Jingang Li, S. Munagavalasa, C. P. Grigoropoulos, J. Wu, and J. Yao. Moiré photonic crystal enabled optical vortex generation through bound states in the continuum, *Materials Research Society (MRS) spring meeting*, 2024.
8. K. Dong, J. Li, K. Tang, and T. Zhang. Zero-power Smart Thermal Management by Temperature-adaptive Radiative Coatings. *PhotonIcs and Electromagnetics Research Symposium (PIERS) 2024*, Chengdu, 2024.
9. K. Dong, J. Li, K. Tang, and T. Zhang. Zero-power Smart Thermal Management by Temperature-adaptive Radiative Coatings. *25th Annual Conference of the Chinese Society of Micro-Nano Technology & 14th International conference of the Chinese Society of Micro-Nano Technology*, Shenzhen, 2023.
10. K. Dong. Zero-power Smart Micro-devices Based on the Phase-change Material of Vanadium Dioxide, *Guanggu Forum*, *The Chinese Optical Society Academic Conference*, Wuhan, 2023. (Invited)
11. J. Wu, J. Li, K. Dong, D. Tseng, and K. Xu. Temperature Adaptive Solar and Radiative Coating for Thermal Management of Terrestrial and Space Objects, *Materials Research Society (MRS) spring meeting*, 2023.
12. J. Wu, J. Li, T. Zhang, K. Dong, and J. Yao. Programmable Photonics with Metal Insulator Transition,

Materials Research Society (MRS) spring meeting, 2023.

13. K. Dong, T. Zhang, J. Li, Q, Wang, F. Yang, Y. Rho, D. Wang, C. P. Grigoropoulos, J. Wu, and J. Yao. Magic-Angle Flat Bands and Light Localization in Bilayer Honeycomb Photonic Crystals with A Small Twist, *Materials Research Society (MRS) spring meeting*, 2022.
14. J. Li, K. Tang, K. Dong, M. P. Gordon, F. G. Reichertz, H. Kim, Y. Rho, Q. Wang, C.-Y. Lin, C. P. Grigoropoulos, A. Javey, J. J. Urban, J. Yao, R. Levinson, and J. Wu. Self-Adaptive Radiative Cooler for Maximizing Year-Round Energy Saving of Households, *Conference on Lasers and Electro-Optics (CLEO)*, 2022.
15. K. Tang, K. Dong, J. Li, M. P. Gordon, F. G. Reichertz, H. Kim, Y. Rho, Q. Wang, C.-Y. Lin, C. P. Grigoropoulos, A. Javey, J. J. Urban, J. Yao, R. Levinson, and J. Wu. Temperature-adaptive Radiative Coating for All-Season Household Thermal Regulation by VO_2 Based Metamaterials, *Photonics and Electromagnetics Research Symposium (PIERS)*, 2022.
16. Y. Deng, X. Wang, Z. Gong, K. Dong, S. Lou, N. Pégard, K. B. Tom, F. Yang, Z. You, L. Waller, and J. Yao. Ultraviolet Metasurface Based on Highly Scattering Silicon Antennas. *SPIE Photonics West*, 2019.
17. X. Wang, K. Dong, H. S. Choe, H. Liu, S. Lou, K. B. Tom, H. A. Bechtel, Z. You, J. Wu, and J. Yao. A Multifunctional Micro-Electro-Opto-Mechanical (MEOM) Platform Based on Phase-transition Materials, *Conference on Lasers and Electro-Optics (CLEO)*, 2018.
18. K. Dong, S. Hong, Y. Deng, H. Ma, J. Li, X. Wang, J. Yeo, L. Wang, S. Lou, K. B. Tom, K. Liu, Z. You, Y. Wei, C. P. Grigoropoulos, J. Yao, and J. Wu. A Reprogrammable Photonic Meta-platform, *Conference on Lasers and Electro-Optics (CLEO)*, 2018.
19. X. Wang, Z. Gong, K. Dong, S. Lou, J. Slack, A. Anders, and J. Yao. All-solid-state Tunable Bragg filters Based on A Phase Transition Material, *Conference on Lasers and Electro-Optics (CLEO)*, 2017.

Invited/Keynote/Panel Talks and Seminars

1. K. Dong. "Zero-Power Smart Phase-change Micro/nano-devices", School of Materials Science and Engineering, Harbin Institute of Technology, Shenzhen, 2024/04/15. Host: Prof. Zuhuang Chen.
2. K. Dong. "Zero-power Smart Microdevices and Moiré Photonic Crystals", iCANX Youth Talks, 2025/03/11. Moderator and Panelists: Prof. Haixia Zhang, Prof. Yuqing Zheng, Prof. Xiaomin Xu, Prof. Nan Liu.
3. K. Dong, Cheng Tang, Clive Ding, Leyun Wang. "Rising Talents, Leading Innovations". Meet TR35 Summit 2024, 17th Pujiang Innovation Forum, Shanghai, 2024/09/09. Host: Vincent Chen. (Panel Discussion)
4. K. Dong. "Zero-power Smart Micro/nano Devices and Moiré Photonic Crystals", School of Integrated Circuits, Peking University, 2024/06/12. Host: Prof. Kechao Tang.
5. K. Dong. "Zero-power Smart Micro/nano Devices and Moiré Photonic Crystals", Department of Precision Instrument, Tsinghua University, 2024/06/11. Host: Prof. Xiaoguang Zhao.
6. K. Dong. "What One Single Material Can Do? Smart Micromechanical and Nanophotonic Devices Based on the Phase-Change Material of Vanadium Dioxide", Department of Materials Science and Engineering, Southern University of Science and Technology, 2023/12/08. Host: Prof. Chun Cheng.
7. K. Dong. "What One Single Material Can Do? Smart Micromechanical and Nanophotonic Devices Based on the Phase-Change Material of Vanadium Dioxide", School of Mechanical Engineering, Shanghai Jiao Tong University, 2023/11/29. Host: Prof. Jing Wang. (Virtual broadcast by Research Cloud with 13k views)
8. K. Dong. "What One Single Material Can Do? Smart Micromechanical and Nanophotonic Devices Based on the Phase-Change Material of Vanadium Dioxide", Tsinghua Shenzhen International Graduate School, Tsinghua University, 2023/11/28. Host: Prof. Xuan Zhang.
9. K. Dong. Opening Assembly Address, Institute of Data and Information, Tsinghua Shenzhen International Graduate School, Tsinghua University, 2023/09/09.
10. K. Dong. "MEMS Switches and Infrared Smart Flexible Membrane Technologies Based on Vanadium Dioxide", Academic Workshop, Smart Microsystem Group, Tsinghua University, 2023/04/29 (Keynote).
11. K. Dong. "Endowing Radiative Cooling Materials with Intelligence", Institute of Data and Information, Tsinghua Shenzhen International Graduate School, Tsinghua University, 2023/02/25 (Keynote).
12. K. Dong. "Passive temperature-adaptive flexible membranes based on vanadium dioxide", School of

Materials Science and Engineering, Sichuan University, 2023/02/21. Host: Prof. Qiwu Shi.

13. K. Dong. “Endowing Radiative Cooling Materials with Intelligence”, World Science and Technology Youth Forum, Hangzhou, China, 2022/11/14 (Virtual).
14. K. Dong. “The Most Common Artwork”, Lecture Series Celebrating the 10-Year Anniversary of the Department of Precision Instrument, Tsinghua University, 2022/07/22 (Keynote/Opening/Virtual). Host: Prof. Lei Deng.
15. K. Dong. “Smart radiative cooling for all-season household thermal regulation”. Department of Precision Instrument, Tsinghua University, Doctoral Academic Forum, 2022/06/12 (Keynote/Virtual).
16. K. Dong. “Smart radiative cooling for all-season household thermal regulation”, MSE Seminar at U.C. Berkeley, 2022/04/07. Host: Prof. Zakaria Al Balushi.
17. K. Dong. “Smart radiative cooling for all-season household thermal regulation”, Engineering and Applied Science Forum, 2022/03/13 (Virtual). Host: Prof. Jing Wang.