Xi CHEN

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RESEARCH INTERESTS

Thermal management, spin caloritronics, thermoelectrics, lithium-ion batteries, crystal growth

EDUCATION

Ph.D. in Materials Science and Engineering, The University of Texas at Austin Dec. 2014
M.S. in Materials Science and Engineering, Zhejiang University Apr. 2010
B.S. in Materials Science and Engineering (with honor), Southeast University July 2007

PROFESSIONAL EXPERIENCE

University of California, Riverside
Assistant Professor, Dept. of Electrical and Computer Engineering July 2019-Present

Participating Faculty, Materials Science and Engineering Program Oct. 2019-Present

The University of Texas at Austin
Postdoctoral Fellow, Materials Science and Engineering Program Jan. 2015-June 2019

- Advisors: Li Shi, John B. Goodenough (Nobel laureate in chemistry)

Graduate Researcher, Materials Science and Engineering Program Sept. 2010-Dec. 2014

- Ph.D. Dissertation: *Synthesis and Thermoelectric Properties of Higher Manganese Silicides for Waste Heat Recovery*
- Advisors: Li Shi, Jianshi Zhou

Zhejiang University
Graduate Researcher, Dept. of Materials Science and Engineering Aug. 2007-Apr. 2010

- Master Thesis: *Controlled Synthesis of PbTe Nanostructures for Thermoelectric Applications*
- Advisors: Tiejun Zhu, Xinbing Zhao

AWARDS AND HONORS

- National Science Foundation CAREER Award, 2022
- Emerging Investigator, Journal of Materials Chemistry A, 2024
- OASIS Entrepreneurial Fellowship Award, 2023
- Regents Faculty Fellowship, University of California, Riverside, 2022-2023
- Professional Development Award, The University of Texas at Austin, 2011&2014
- Outstanding Student Award and First-Class Scholarship, Zhejiang University, 2008&2009
- Graduate with honors, Southeast University, 2007

PUBLICATIONS

Google Scholar: Link

44 peer-reviewed papers (including **29 first author or corresponding author**) published in prestigious journals, such as *Science, PNAS, Nature Communications, Physical Review Letters, Journal of the American Chemical Society, Advanced Functional Materials, and Cell Reports Physical Science*.

(1) Shuchen Li, and Xi Chen, "Effect of water treatment on microstructure and magnon thermal transport in spin ladder compound Sr12Y2Cu24O41," ***Journal of Materials Chemistry C*** (2025) (link).
(2) Shucheng Guo, Xue Bai, Boqun Liang, Thomas Hoke, Ming Liu, Rafal E. Dunin-Borkowski, and Xi Chen, "Achieving Large and Anisotropic Spin-Mediated Thermal Transport in Textured Quantum Magnets," ***Advanced Functional Materials***, 2417505 (2024) (link)
(3) Junjun Jia, Shuchen Li, Xi Chen, and Yuzo Shigesato, Emerging solid–state thermal switching materials, ***Advanced Functional Materials***, 2406667 (2024) (link).
(4) Shuchen Li, Shucheng Guo, Yitian Wang, Hongze Li, Youming Xu, Veronica Carta, Jianshi Zhou, and Xi Chen, Enhanced Magnon Thermal Transport in Yttrium-doped Spin Ladder Compounds Sr14-xYxCu24O41, ***Journal of Applied Physics***, 136, 045105 (2024) (link).
(5) Yitian Wang, Shuchen Li, Nan Wu, Qianru Jia, Thomas Hoke, Li Shi, Yutao Li, and Xi Chen, Thermal Properties and Lattice Anharmonicity of Li-ion Conducting Garnet Solid Electrolyte Li6.5La3Zr1.5Ta0.5O12, ***Journal of Materials Chemistry A***, 12, 18248 (2024) (link). [Invited for JMCA Emerging Investigators 2024]
(6) Shucheng Guo, Hongze Li, Xue Bai, Yitian Wang, Shuchen Li, Rafal E. Dunin-Borkowski, Jianshi Zhou, and Xi Chen, Size-dependent magnon thermal transport in a nanostructured quantum magnet, ***Cell Reports Physical Science*** 5, 101879, (2024) (link). [Featured by UCR College of Engineering]
(7) Youming Xu, Yan Wu, Huibo Cao, Shucheng Guo, Jiaqiang Yan, and Xi Chen, Single crystal growth and thermoelectric properties of Nowotny chimney-ladder compound Fe2Ge3, ***Physical Review Materials*** 7, 125404 (2023) (link).
(8) Zahra Ebrahim Nataj, Youming Xu, Dylan Wright, Jonas O. Brown, Jivtesh Garg, Xi Chen, Fariborz Kargar, and Alexander A. Balandin, Cryogenic characteristics of graphene composites—evolution from thermal conductors to thermal insulators, ***Nature Communications*** 14, 3190 (2023) (link).
(9) Shucheng Guo, Youming Xu, Thomas Hoke, Gobind Sohi, Shuchen Li, and Xi Chen, Thermal characterization for quantum materials, ***Journal of Applied Physics*** 133 (2023) (link). [Selected as Editor's Pick]
(10) Youming Xu, Shucheng Guo, and Xi Chen, Crystal Growth and Thermal Properties of Quasi-One-Dimensional van der Waals Material ZrSe3, ***Micromachines*** 13, 1994 (2022) (link).
(11) Youming Xu, Zahra Barani, Penghao Xiao, Sriharsha Sudhindra, Yitian Wang, Amir Ardalan Rezaie, Veronica Carta, Krassimir N. Bozhilov, Diana Luong, Boniface P. T. Fokwa, Fariborz Kargar, Alexander A. Balandin, and Xi Chen, Crystal Structure and Thermoelectric Properties of Layered Van der Waals Semimetal ZrTiSe4, ***Chemistry of Materials*** 34, 8858 (2022) (link).
(12) Yi-Tian Wang and Xi Chen, Single crystal growth and electrochemical studies of garnet-type fast Li-ion conductors, ***Tungsten*** 4, 263 (2022) (link).

(13) Shuchen Li, Shucheng Guo, Youming Xu, Jianshi Zhou, and Xi Chen, Role of Grain Size on Magnon and Phonon Thermal Transport in the Spin Ladder Compound Ca9La5Cu24O41, ***ACS Applied Electronic Materials*** 4, 787 (2022) (limk).
(14) Junxue Li, Mina Rashetnia, Mark Lohmann, Jahyun Koo, Youming Xu, Xiao Zhang, Kenji Watanabe, Takashi Taniguchi, Shuang Jia, Xi Chen, Binghai Yan, Yong-Tao Cui, and Jing Shi, Proximity-magnetized quantum spin Hall insulator: monolayer 1 T' WTe2/Cr2Ge2Te6, ***Nature Communications*** 13, 5134 (2022) (link).
(15) Songrui Hou, Bo Sun, Fei Tian, Qingan Cai, Youming Xu, Shanmin Wang, Xi Chen, Zhifeng Ren, Chen Li, and Richard B. Wilson, Thermal Conductivity of BAs under Pressure, ***Advanced Electronic Materials*** 8, 2200017 (2022) (link).
(16) Shucheng Guo, Youming Xu, Ran Cheng, Jianshi Zhou, and Xi Chen, Thermal Hall effect in insulating quantum materials, ***The Innovation*** 3, 100290 (2022) (link).
(17) Xi Chen, Chunhua Li, Youming Xu, Andrei Dolocan, Gareth Seward, Ambroise Van Roekeghem, Fei Tian, Jie Xing, Shucheng Guo, Ni Ni, Zhifeng Ren, Jianshi Zhou, Natalio Mingo, David Broido, and Li Shi, Effects of Impurities on the Thermal and Electrical Transport Properties of Cubic Boron Arsenide, ***Chemistry of Materials*** 33, 6974 (2021) (link).
(18) Ji Qi, Baojuan Dong, Zhe Zhang, Zhao Zhang, Yanna Chen, Qiang Zhang, Sergey Danilkin, Xi Chen, Jiaming He, Liangwei Fu, Xiaoming Jiang, Guozhi Chai, Satoshi Hiroi, Koji Ohara, Zongteng Zhang, Weijun Ren, Teng Yang, Jianshi Zhou, Sakata Osami, Jiaqing He, Dehong Yu, Bing Li, and Zhidong Zhang, Dimer rattling mode induced low thermal conductivity in an excellent acoustic conductor, ***Nature Communications*** 11, 5197 (2020) (link).
(19) Chenguang Fu, Mengyu Yao, Xi Chen, Lucky Zaehir Maulana, Xin Li, Jiong Yang, Kazuki Imasato, Fengfeng Zhu, Guowei Li, Gudrun Auffermann, Ulrich Burkhardt, Walter Schnelle, Jianshi Zhou, Tiejun Zhu, Xinbing Zhao, Ming Shi, Martin Dressel, Artem V. Pronin, G. Jeffrey Snyder, and Claudia Felser, Revealing the Intrinsic Electronic Structure of 3D Half-Heusler Thermoelectric Materials by Angle-Resolved Photoemission Spectroscopy, ***Advanced Science*** 7, 1902409 (2020) (link).
(20) Xi Chen, Jaehyun Kim, Qianru Jia, Sean E. Sullivan, Youming Xu, Karalee Jarvis, Jianshi Zhou, and Li Shi, Synthesis and Magnon Thermal Transport Properties of Spin Ladder Sr14Cu24O41 Microstructures, ***Advanced Functional Materials*** 30, 2001637 (2020) (link).
(21) Ke Chen, Bai Song, Navaneetha K. Ravichandran, Qiye Zheng, Xi Chen, Hwijong Lee, Haoran Sun, Sheng Li, Geethal Amila Gamage Udalamatta Gamage, Fei Tian, Zhiwei Ding, Qichen Song, Akash Rai, Hanlin Wu, Pawan Koirala, Aaron J. Schmidt, Kenji Watanabe, Bing Lv, Zhifeng Ren, Li Shi, David G. Cahill, Takashi Taniguchi, David Broido, and Gang Chen, Ultrahigh thermal conductivity in isotope-enriched cubic boron nitride, ***Science*** 367, 555 (2020) (link).
(22) Xi Chen, Chunhua Li, Fei Tian, Geethal Amila Gamage, Sean Sullivan, Jianshi Zhou, David Broido, Zhifeng Ren, and Li Shi, Thermal Expansion Coefficient and Lattice Anharmonicity of Cubic Boron Arsenide, ***Physical Review Applied*** 11, 064070 (2019) (link).
(23) Xi Chen, Jesús Carrete, Sean Sullivan, Ambroise van Roekeghem, Zongyao Li, Xiang Li, Jianshi Zhou, Natalio Mingo, and Li Shi, Coupling of Spinons with Defects and Phonons in the Spin Chain Compound Ca2CuO3, ***Physical Review Letters*** 122, 185901 (2019) (link).

(24) Fei Tian#, Bai Song#, Xi Chen#, (#contributed equally) Navaneetha K. Ravichandran, Yinchuan Lv, Ke Chen, Sean Sullivan, Jaehyun Kim, Yuanyuan Zhou, Te-Huan Liu, Miguel Goni, Zhiwei Ding, Jingying Sun, Geethal Amila Gamage Udalamatta Gamage, Haoran Sun, Hamidreza Ziyaee, Shuyuan Huyan, Liangzi Deng, Jianshi Zhou, Aaron J. Schmidt, Shuo Chen, Ching-Wu Chu, Pinshane Y. Huang, David Broido, Li Shi, Gang Chen, and Zhifeng Ren, Unusual high thermal conductivity in boron arsenide bulk crystals, ***Science*** 361, 582 (2018) (link). [Featured by Physics Today, Physics World, and Phys.org]

(25) Jie Xing, Xi Chen, Yuanyuan Zhou, James. C. Culbertson, Jaime A. Freitas, Jr., Evan R. Glaser, Jianshi Zhou, Li Shi, and Ni Ni, Multimillimeter-sized cubic boron arsenide grown by chemical vapor transport via a tellurium tetraiodide transport agent, ***Applied Physics Letters*** 112 (2018) (link).

(26) Yutao Li, Xi Chen, Andrei Dolocan, Zhiming Cui, Sen Xin, Leigang Xue, Henghui Xu, Kyusung Park, and John B. Goodenough, Garnet Electrolyte with an Ultralow Interfacial Resistance for Li-Metal Batteries, ***Journal of the American Chemical Society*** 140, 6448 (2018) (link).

(27) C. Hu, K. Xia, X. Chen, X. Zhao, and T. Zhu, Transport mechanisms and property optimization of p-type (Zr, Hf)CoSb half-Heusler thermoelectric materials, ***Materials Today Physics*** 7, 69 (2018) (link).

(28) Haoran Man, Zhong Shi, Guangyong Xu, Yadong Xu, Xi Chen, Sean Sullivan, Jianshi Zhou, Ke Xia, Jing Shi, and Pengcheng Dai, Direct observation of magnon-phonon coupling in yttrium iron garnet, ***Physical Review B*** 96, 100406 (2017) (link). [selected as Editors' Suggestion]

(29) Xi Chen, Karalee Jarvis, Sean Sullivan, Yutao Li, Jianshi Zhou, and Li Shi, Effects of grain boundaries and defects on anisotropic magnon transport in textured Sr14Cu24O41, ***Physical Review B*** 95, 144310 (2017) (link). [selected as Editors' Suggestion, featured in PRB Kaleidoscopes]

(30) Libin Zhang, Xi Chen, Yinglu Tang, Li Shi, G. Jeffrey Snyder, John B. Goodenough, and Jianshi Zhou, Thermal stability of Mg2Si0.4Sn0.6 in inert gases and atomic-layer-deposited Al2O3 thin film as a protective coating, ***Journal of Materials Chemistry A*** 4, 17726 (2016) (link).

(31) Yutao Li#, Weidong Zhou#, Xi Chen#, (#contributed equally) Xujie Lü, Zhiming Cui, Sen Xin, Leigang Xue, Quanxi Jia, and John B. Goodenough, Mastering the interface for advanced all-solid-state lithium rechargeable batteries, ***Proceedings of the National Academy of Sciences*** 113, 13313 (2016) (link).

(32) Xi Chen, Dipanshu Bansal, Sean Sullivan, Douglas L. Abernathy, Adam A. Aczel, Jianshi Zhou, Olivier Delaire, and Li Shi, Weak coupling of pseudoacoustic phonons and magnon dynamics in the incommensurate spin-ladder compound Sr14Cu24O41, ***Physical Review B*** 94, 134309 (2016) (link). [selected as Editors' Suggestion]

(33) Kyongmo An, Kevin S. Olsson, Annie Weathers, Sean Sullivan, Xi Chen, Xiang Li, Luke G. Marshall, Xin Ma, Nikita Klimovich, Jianshi Zhou, Li Shi, and Xiaoqin Li, Magnons and Phonons Optically Driven out of Local Equilibrium in a Magnetic Insulator, ***Physical Review Letters*** 117, 107202 (2016) (link).

(34) Xi Chen, Jianshi Zhou, John B. Goodenough, and Li Shi, Enhanced thermoelectric power factor of Re-substituted higher manganese silicides with small islands of MnSi secondary phase, ***Journal of Materials Chemistry C*** 3, 10500 (2015) (link).

(35) Xi Chen, Annie Weathers, Jesús Carrete, Saikat Mukhopadhyay, Olivier Delaire, Derek A. Stewart, Natalio Mingo, Steven N. Girard, Jie Ma, Douglas L. Abernathy, Jiaqiang Yan, Raman Sheshka, Daniel P. Sellan, Fei Meng, Song Jin, Jianshi Zhou, and Li Shi, Twisting phonons in complex crystals with quasi-one-dimensional substructures, ***Nature Communications*** 6, 6723 (2015) (link).
(36) Xi Chen, Li Shi, Jianshi Zhou, and John B. Goodenough, Effects of ball milling on microstructures and thermoelectric properties of higher manganese silicides, ***Journal of Alloys and Compounds*** 641, 30 (2015) (link).
(37) Steven N. Girard, Xi Chen, Fei Meng, Ankit Pokhrel, Jianshi Zhou, Li Shi, and Song Jin, Thermoelectric Properties of Undoped High Purity Higher Manganese Silicides Grown by Chemical Vapor Transport, ***Chemistry of Materials*** 26, 5097 (2014) (link).
(38) Xi Chen, Steven N. Girard, Fei Meng, Edgar Lara-Curzio, Song Jin, John B. Goodenough, Jianshi Zhou, and Li Shi, Approaching the Minimum Thermal Conductivity in Rhenium-Substituted Higher Manganese Silicides, ***Advanced Energy Materials*** 4, 1400452 (2014) (link).
(39) Xi Chen, Annie Weathers, Daniel Salta, Libin Zhang, Jianshi Zhou, John B. Goodenough, and Li Shi, Effects of (Al,Ge) double doping on the thermoelectric properties of higher manganese silicides, ***Journal of Applied Physics*** 114 (2013) (link).
(40) Xi Chen, Annie Weathers, Arden Moore, Jianshi Zhou, and Li Shi, Thermoelectric Properties of Cold-Pressed Higher Manganese Silicides for Waste Heat Recovery, ***Journal of Electronic Materials*** 41, 1564 (2012) (link).
(41) T. J. Zhu, X. Chen, X. Y. Meng, X. B. Zhao, and J. He, Anisotropic Growth of Cubic PbTe Nanoparticles to Nanosheets: Controlled Synthesis and Growth Mechanisms, ***Crystal Growth & Design*** 10, 3727 (2010) (link).
(42) Tie-Jun Zhu, Xi Chen, Yi-Qi Cao, and Xin-Bing Zhao, Controllable Synthesis and Shape Evolution of PbTe Three-Dimensional Hierarchical Superstructures via an Alkaline Hydrothermal Method, ***The Journal of Physical Chemistry C*** 113, 8085 (2009) (link).
(43) Xi Chen, Tie-Jun Zhu, and Xin-Bing Zhao, Synthesis and growth mechanism of rough PbTe polycrystalline thermoelectric nanorods, ***Journal of Crystal Growth*** 311, 3179 (2009) (link).
(44) T. J. Zhu, S. H. Yang, X. Chen, X. X. Liu, X. B. Zhao, L. Lu, and M. O. Lai, Step-flow Growth Of Heteroepitaxial SrRuO3 Thin Films on 0.04° SrTiO3 (001) Vicinal Substrates, ***Functional Materials Letters*** 01, 253 (2008) (link).

PATENTS

(1) Zhifeng Ren, Fei Tian, Gang Chen, Bai Song, Ke Chen, Li Shi, Xi Chen, Sean Sullivan, David Broido, and Navaneetha Krishnan Ravichandran, Unusual high thermal conductivity in boron arsenide bulk crystals, US Patent 11975979B2 (link).

SELECTED PRESENTATIONS & INVITED TALKS

(1) Phase Changing the Future of Buildings, Climate Action Conference, Riverside, CA, January 2024.
(2) Extraordinary Thermal Transport by Phonons and Spins in Functional Materials, Zhejiang University, September 2023.
(3) Spin-mediated Thermal Transport in Quantum Magnets, TMS Annual Meeting, San Diego,

CA, March 2023.

(4) Spin-mediated Thermal Transport in Low-dimensional Quantum Magnets, John Goodenough 100th Birthday Symposium, University of Texas at Austin, TX, July 2022
(5) Effects of Impurities on the Thermal and Electrical Transport Properties of Cubic Boron Arsenide, MRS Fall Meeting, Boston, MA, December 2021.
(6) Heat and Spin Transport in Bulk and Nanostructured Quantum Materials, Mini-Workshop Current Trends in Materials and Device Research, Riverside, CA, February 2020.
(7) Nowotny Chimney Ladder Phases for Thermoelectric Applications, TMS Annual meeting, San Antonio, Texas, March 2019.
(8) *Effects of Grain Boundaries and Defects on Anisotropic Magnon Transport in Textured* $Sr_{14}Cu_{24}O_{41}$, MRS Spring meeting, Phoenix, AZ, April 2017 (nominated for Best Poster Award)

PROFESSIONAL SERVICES & ACTIVITIES

Journal Editor

(1) Academic Editor, *The Innovation* (Cell press, impact factor: 33.2), 2021-present
(2) Review Editor, *Frontiers in Physics* (Frontiers, impact factor: 1.9), 2023-present
(3) Early Career Editorial Advisory Board, *Applied Physics Letters* (AIP, IF: 3.5), 2024-present

Conference/Workshop Session Chair

Thermal Materials, Modeling and Technoeconomic Impacts for Thermal Management and Energy Application, MRS Fall meeting, 2021

Award Nominator

Invited as Official Nominator for The VinFuture Prize, 2024

Proposal Panelist/Reviewer

(1) Panelist for NSF CBET program, 2023
(2) Panelist for NSF CBET program, 2021
(3) Reviewer for DoD and DOE proposals

Journal Reviewer

Peer Reviewer for over 35 journals, including *Nature Physics, Physical Review Letters, Physical Review B, Advanced Materials, Advanced Functional Materials, Applied Physics Letters, Journal of Materials Chemistry A, Chemical Engineering Journal*, and so on.

Department/University Services and Outreach Activities

(1) ECE faculty search committee, 2023
(2) Search committee for a professional researcher in ECE, 2023
(3) Search committee for a project scientist in ECE, 2020
(4) UCR ECE graduate committee, 2019-2020
(5) UCR ECE colloquium committee, 2021-present
(6) CalIT2 Nanofabrication and Electron Microscopy Facility Advisory Committee, 2024
(7) Judge at the Riverside Unified School District Science Fair, 2020&2024
(8) Mentor for the Creative ECEs: UCLA-UCR Design Contest, 2022

TEACHING

Spring 2024 MSE230: Functional Materials: Semiconductors (graduate)

Winter 2024	EE202/MSE217: Fundamentals of Semiconductors and Nanostructures (graduate)
Fall 2023	EE133: Solid State Electronics (undergraduate)
Spring 2023	MSE230: Functional Materials: Semiconductors (graduate, new course developed by myself)
Winter 2023	EE202/MSE217: Fundamentals of Semiconductors and Nanostructures (graduate)
Fall 2022	EE133: Solid State Electronics (undergraduate)
Spring 2022	EE216/MSE237B: Nanoscale Phonon Engineering (graduate)
Winter 2022	EE202/MSE217: Fundamentals of Semiconductors and Nanostructures (graduate)
Fall 2021	EE133: Solid State Electronics (undergraduate)
Spring 2021	EE133: Solid State Electronics (undergraduate)
Winter 2021	EE202/MSE217: Fundamentals of Semiconductors and Nanostructures (graduate)
Fall 2020	EE133: Solid State Electronics (undergraduate)
Spring 2020	EE216/MSE237B: Nanoscale Phonon Engineering (graduate, new course developed by myself)
Fall 2020	EE133: Solid State Electronics (undergraduate)

ACADEMIC MENTORING

Ph.D. students

Youming Xu	2019-2024 (graduated)
Tekwam Geremew (co-chaired)	2021-2024 (graduated)
Erick Guzman (co-chaired)	2021-2024 (graduated)
Shuchen Li	2020-present
Shucheng Guo	2021-present
Yitian Wang	2021-present
Thomas Hoke	2023-present

Master students

Zahra Ebrahimnatajmalekshah (co-chaired)	2021-2024 (graduated)
Gobind Sohi	2021-present
Yiu Chan	2023-present
Christopher Nguyen	Summer 2022
Thomas Hoke	Summer 2022
Hanh Nguyen	Summer 2022

Undergraduate students

Adam Miller	2020
Gilberto Martinez	2020
Ping Lu	2020
Yiu Chan	2022-2023
Isaac Lee	2024
Lawrence Lor	2024
Zach Lyman	2025

High school students

Russel Cody Rawlings	2022