

Yu-Tsun (Jim) Shao, Ph.D.

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EDUCATION

- Ph.D. Materials Science and Engineering, University of Illinois at Urbana-Champaign, IL** 12/2018
Advisor: Prof. Jian-Min Zuo
Thesis title: Local Symmetry and Order Parameters in Complex, Multi-Element, Crystals
- B.S. Physics, National Taiwan University, Taipei, Taiwan** 06/2012

EXPERIENCE

- Mork Department of Chemical Engineering and Materials Science, University of Southern California, CA**
Assistant Professor 01/2023 –
- School of Applied and Engineering Physics, Cornell University, NY** 01/2019 – 12/2022
Postdoctoral Associate
Advisor: Prof. David A. Muller
- Department of Physics, Norwegian University of Science and Technology, Trondheim** 06/2017 – 07/2017
Invited scientist of Lars Onsager Professorship
Faculty host: Prof. Randi Holmestad
- Department of Materials Science and Engineering, Monash University, Australia** 04/2016 – 06/2016
Exchange Graduate Research Assistant
Faculty host: Prof. Philip Nakashima
- Republic of China (Taiwan) Armed Forces, Taiwan** 08/2012 – 08/2013
Political Warfare Officer, Second Lieutenant

ACADEMIC HONORS

- **Robert P. Apkarian Memorial Postdoctoral Scholar Award** 2021
Microscopy Society of America
- **Racheff-Intel Award for Outstanding Graduate Research** 2018
University of Illinois at Urbana-Champaign
- **Ludo Frevel Crystallography Scholarship Award** 2018
International Centre for Diffraction Data (ICDD)
- **Conference Travel Award** 2018
University of Illinois at Urbana-Champaign
- **Presidential Student Scholar Award** 2016
Microscopy Society of America

JOURNAL PUBLICATIONS

1. Yao Yang, Sheena Louisia, Sunmoon Yu, Jianbo Jin, Inwhan Roh, Chubai Chen, Maria V Fonseca Guzman, Julian Feijóo, Peng-Cheng Chen, Hongsen Wang, Christopher J Pollock, Xin Huang, **Yu-Tsun Shao**, Cheng Wang, David A. Muller, Héctor D. Abruña, Peidong Yang, “Operando studies reveal active Cu nanograins for CO₂ electroreduction”, *Nature*, **614**, 262 (2023).
2. Ruijuan Xu, Kevin J. Crust, Varun Harbola, Rémi Arras, Kinnary Y. Patel, Sergey Prosandeev, Hui Cao, **Yu-Tsun Shao**, Piush Behera, Lucas Caretta, Woo Jin Kim, Aarushi Khandelwal, Megha Acharya, Melody M Wang, Yin

- Liu, Edward S Barnard, Archana Raja, Lane W Martin, X Wendy Gu, Hua Zhou, Ramamoorthy Ramesh, David A. Muller, Laurent Bellaiche, Harold Y Hwang, “Size-Induced Ferroelectricity in Antiferroelectric Oxide Membranes”, *Advanced Materials*, *accepted* (2023).
- Lucas Caretta*, **Yu-Tsun Shao***, Jia Yu, Antonio B. Mei, Bastien F. Grosso, Cheng Dai, Piush Behera, Daehun Lee, Margaret McCarter, Eric Parsonnet, Fei Xue, Ed Barnard, Steffen Ganschow, Archana Raja, Lane W. Martin, Long-Qing Chen, Manfred Fiebig, Keji Lai, Nicola A. Spaldin, David A. Muller, Darrell G. Schlom, Ramamoorthy Ramesh, “Nonvolatile Electric-Field Control of Inversion Symmetry”, *Nature Materials*, **22**, 207 (2023). (*featured news articles in Cornell Chronicles*).
 - Xiang Chen, **Yu-Tsun Shao**, Rui Chen, Sandhya Susarla, Tom Hogan, Yu He, Hongrui Zhang, Siqi Wang, Jie Yao, Peter Ercius, David A. Muller, Ramamoorthy Ramesh, Robert J. Birgeneau, “Pervasive Beyond Room-Temperature Ferromagnetism in a Doped van der Waals Magnet”, *Physical Review Letters*, **128**, 217203 (2022).
 - Hongrui Zhang*, **Yu-Tsun Shao***, Rui Chen*, Xiang Chen*, Sandhya Susarla, Jonathan T. Reichanadter, Lucas Caretta, Xiaoxi Huang, Nicholas S. Settineri, Zhen Chen, Jingcheng Zhou, Edith Bourret-Courchesne, Peter Ercius, Jie Yao, Jeffrey B. Neaton, David A. Muller, Robert J. Birgeneau, Ramamoorthy Ramesh, “A Room Temperature Polar Ferromagnetic Metal”, *Physical Review Materials*, **6**, 044403 (2022). (*featured news articles in Physics Magazine*).
 - Hongrui Zhang*, David Raftrey*, Ying-Ting Chan*, **Yu-Tsun Shao***, Rui Chen, Xiang Chen, Xiaoxi Huang, Jonathan T. Reichanadter, Kaichen Dong, Sandhya Susarla, Lucas Caretta, Zhen Chen, Jie Yao, Peter Fischer, Jeffrey B. Neaton, Weida Wu, David A. Muller, Robert J. Birgeneau, Ramamoorthy Ramesh, “Room Temperature Skyrmion Lattice in a Layered Magnet (Fe_{0.5}Co_{0.5})₅GeTe₂”, *Science Advances*, **8**, eabm7103 (2022). (*featured news articles in EurekaAlert! by AAAS*).
 - Hugh T. Philipp, Mark W. Tate, Katherine S. Shanks, Luigi Mele, Maurice Peemen, Pleun Dona, Reinout Hartong, Gerard van Veen, **Yu-Tsun Shao**, Zhen Chen, Julia Thom-Levy, David A. Muller, Sol M. Gruner, “Very-High Dynamic Range, 10,000 Frames/Second Pixel Array Detector for Electron Microscopy”, *Microscopy and Microanalysis*, **28**, 425 (2022).
 - Kayla X. Nguyen, Xiyue S. Zhang, Emrah Turgut, Michael C. Cao, Jack Glaser, Zhen Chen, Matthew J. Stolt, Celesta S. Chang, **Yu-Tsun Shao**, Song Jin, Gregory D. Fuchs, David A. Muller, “Disentangling Magnetic and Grain Contrast in Polycrystalline Thin Films Using Four-Dimensional Lorentz Scanning Transmission Electron Microscopy”, *Physical Review Applied*, **17**, 034066 (2022).
 - Yao Yang, **Yu-Tsun Shao**, Francis J. DiSalvo, David A. Muller, Héctor D. Abruña, “Metal Monolayers on Command: Underpotential Deposition at Nanocrystal Surfaces: A Quantitative *Operando* Electrochemical Transmission Electron Microscopy Study”, *ACS Energy Letters*, **7**, 1292 (2022).
 - Jian-Min Zuo, Renliang Yuan, **Yu-Tsun Shao**, Haw-Wen Hsiao, Saran Pidaparthy, Yang Hu, Qun Yang, Jiong Zhang, “Data-Driven Electron Microscopy: Electron Diffraction Imaging of Materials Structural Properties”, *Microscopy*, **71**, i116 (2022).
 - Julia A. Mundy*, Bastien F. Grosso*, Colin A. Heikes*, Dan Ferenc Segedin, Zhe Wang, **Yu-Tsun Shao**, Cheng Dai, Berit H. Goodge, Quintin N. Meier, Christopher T. Nelson, Bhagwati Prasad, Fei Xue, Steffen Granschow, David A. Muller, Lena F. Kourkoutis, Long-Qing Chen, William D. Ratcliff, Nicola A. Spaldin, Ramamoorthy Ramesh, Darrell G. Schlom, “Liberating a Hidden Antiferroelectric Phase with Interfacial Electrostatic Engineering”, *Science Advances*, **5**, eabg5860 (2022). (*featured news articles in TechXplore*).

12. Yang Xu, Ariana Ray, **Yu-Tsun Shao**, Shengwei Jiang, Daniel Weber, Joshua E. Goldberger, Kenji Watanabe, Takashi Taniguchi, David A. Muller, Kin Fai Mak, Jie Shan, “Coexisting Ferromagnetic-Antiferromagnetic State in Twisted Bilayer CrI₃”, *Nature Nanotechnology*, **17**, 143 (2022).
13. Maryam Vatanparast, **Yu-Tsun Shao**, Mohana Rajpalke, Bjørn-Ove Fimland, Turid Reenaas, Randi Holmestad, Per Erik Vullum, and Jian-Min Zuo, “Detecting minute amounts of nitrogen in GaNAs thin films using STEM and CBED”, *Ultramicroscopy*, **231**, 113299 (2021). (*invited special issue, a tribute to Professor John Spence*).
14. **Yu-Tsun Shao**, Renliang Yuan, Haw-Wen Hsiao, Qun Yang, Yang Hu, and Jian-Min Zuo, “Cepstral Scanning Transmission Electron Microscopy Imaging of Severe Lattice Distortions”, *Ultramicroscopy*, **231**, 113252 (2021). (*invited special issue, a tribute to Professor John Spence*).
15. Joseph Casamento, Ved Gund, Hyunjea Lee, Kazuki Nomoto, Takuya Maeda, Benyamin Davaji, Mohammad Javad Asadi, John Wright, **Yu-Tsun Shao**, David A. Muller, Amit Lal, Debdeep Jena, “Ferroelectricity in Polar ScAlN/GaN Epitaxial Semiconductor Heterostructures”, *arXiv:2105.10114* (2021).
16. Zhen Chen, Yi Jiang, **Yu-Tsun Shao**, Megan E. Holtz, Michal Odstrčil, Manuel Guizar-Sicairos, Isabelle Hanke, Steffen Ganschow, Darrell G. Schlom, and David A. Muller, “Electron Ptychography Achieves Atomic-Resolution Limits Set by Lattice Vibrations”, *Science*, **372**, 826-831 (2021) (*featured news articles on Science Magazine, Scientific American*).
17. Sujit Das*, Zijian Hong*, Vladimir A. Stoica*, Mauro A.P. Gonçalves*, **Yu-Tsun Shao**, Eric Parsonnet, Eric J. Marksz, Sahar Saremi, Margaret McCarter, A Reynoso, Christian J. Long, Aaron M. Hagerstrom, D Meyers, V Ravi, B Prasad, H. Zhou, Z. Zhang, H. Wen, Fernando Gómez-Ortiz, Pablo García-Fernández, J Bokor, Jorge Íñiguez, JW Freeland, Nathan D. Orloff, Javier Junquera, Long-Qing Chen, Sayeef Salahuddin, David A. Muller, Lane W. Martin, Ramamoorthy Ramesh, “Local Negative Permittivity and Topological Phase Transition in Polar Skyrmions”, *Nature Materials*, **20**, 194-201 (2021).
18. **Yu-Tsun Shao**, Sujit Das, Zijian Hong, Ruijuan Xu, Swathi Chandrika, Fernando Gómez-Ortiz, Pablo García-Fernández, Long-Qing Chen, Harold Y Hwang, Javier Junquera, Lane W Martin, Ramamoorthy Ramesh, and David A. Muller, “Emergent Chirality in a Polar Meron to Skyrmion Phase Transition”, *Nature Communications*, *under revision*. arXiv:2101.04545.
19. Sujit Das, Zijian Hong, Margaret McCarter, Pedraic Shafer, **Yu-Tsun Shao**, David A. Muller, Lane W. Martin, and Ramamoorthy Ramesh, “A New Era in Ferroelectrics”, *APL Materials*, **8**, 120902 (2020).
20. Aram Yoon, **Yu-Tsun Shao**, Jane Howe, and Jian-Min Zuo, “Electron Image Contrast Analysis of Mosaicity in Rutile Nanocrystals Using Direct Electron Detection”, *Acta Crystallography Section A*, **76**, 687-697 (2020).
21. Joseph Casamento, Celesta S. Chang, **Yu-Tsun Shao**, John Wright, David A. Muller, Huili Grace Xing, and Debdeep Jena, “Structural and Piezoelectric Properties of Ultra-Thin Sc_xAl_{1-x}N Films Grown on GaN by Molecular Beam Epitaxy”, *Applied Physics Letters*, **117**, 112101 (2020).
22. Kevin lee, Shyam Bharadwaj, **Yu-Tsun Shao**, Len van Deurzen, Vladimir Protasenko, David A. Muller, Huili Grace Xing, and Debdeep Jena, “Light-Emitting Diodes with AlN Polarization-Induced Buried Tunnel Junctions: A second look”, *Applied Physics Letters*, **117**, 061104 (2020).
23. Elliot Padgett, Megan E. Holz, Paul Cueva, **Yu-Tsun Shao**, Eric Langenberg, Darrell G. Schlom, and David A. Muller, “The Exit-Wave Power-Cepstrum Transform for Scanning Nanobeam Electron Diffraction: Robust Strain Mapping at Subnanometer Resolution and Subpicometer Precision”, *Ultramicroscopy*, **214**, 112994 (2020).

24. Arnoud Everhardt, Thibaud Denneulin, Anna Grünebohm, **Yu-Tsun Shao**, Petr Ondrejko, Silang Zhou, Neus Domingo, Gustau Catalan, Jiří Hlinka, Jian-Min Zuo, Sylvia Matzen, and Beatriz Noheda, “Temperature-Independent Giant Dielectric Response in Transitional BaTiO₃ Thin Films”, *Applied Physics Reviews*, 7, 011402 (2020).
25. Neil Wilson, Yung-Tin Pan, **Yu-Tsun Shao**, Jian-Min Zuo, Hong Yang, and David Flaherty, “Direct Synthesis of H₂O₂ on AgPt octahedra: The Importance of Ag-Pt Coordination for High H₂O₂ Selectivity”, *ACS Catalysis*, 8(4), 2880 (2018).
26. **Yu-Tsun Shao** and Jian-Min Zuo, “Lattice-Rotation Vortex at the Charged Monoclinic Domain Boundary in a Relaxor Ferroelectric Crystal”, *Physical Review Letters*, 118, 157601 (2017).
27. **Yu-Tsun Shao** and Jian-Min Zuo, “Nanoscale Symmetry Fluctuations in Ferroelectric Barium Titanate, BaTiO₃”, *Acta Crystallographic Section B*, 73, 708-714 (2017) (*invited special issue, a tribute to Professor Philip Coppens*).
28. Huigang Zhang, Hailong Ning, John Busbee, Zihan Shen, Chadd Kiggins, Yuyan Hua, Janna Eaves, Jerome Davis III, Tan Shi, **Yu-Tsun Shao**, Jian-Min Zuo, Xuhao Hong, Yanbin Chan, Shuangbao Wang, Peng Wang, Pengcheng Sun, Sheng Xu, Jinyun Liu, and Paul V. Braun, “Electroplating Lithium Transition Metal Oxides”, *Science Advances*, 3, e1602427 (2017).
29. Yung-Tin Pan, Linqing Yan, **Yu-Tsun Shao**, Jian-Min Zuo, and Hong-Yang, “Regioselective Atomic Rearrangement of Ag-Pt Octahedral Catalysts by Chemical Vapor-Assisted Treatment”, *Nano Letters*, 16(12), 7988-7992 (2016).
30. Yung-Tin Pan, Yuqi Yan, **Yu-Tsun Shao**, Jian-Min Zuo, and Hong-Yang, “Ag-Pt Compositional Intermetallics Made from Alloy Nanoparticles”, *Nano Letters*, 16(10), 6599-6603 (2016).
31. Sheng-Yong Chang, Hsueh-Chung Liao, **Yu-Tsun Shao**, Yu-Ming Sung, Sheng-Hao Hsu, Yang-Fang Chen, and Wei-Fang Su, “Enhancing the Efficiency of Low Bandgap Conducting Polymer Bulk Heterojunction Solar Cell Using P3HT as a Morphology Control Agent”, *Journal of Materials Chemistry A*, 1(7), 2447-2452 (2013).
32. Hsueh-Chung Liao, Cheng-Si Tsao, **Yu-Tsun Shao**, Sheng-Yong Chang, Tsung-Han Lin, Yu-Ching Huang, Chih-Ming Chuang, Charn-Ying Chen, Chun-Jen Su, U-Ser Jeng, Yang-Fang Chen, and Wei-Fang Su, “Bi-hierarchical Nanostructures of Donor-acceptor Copolymer and Fullerene for High Efficient Bulk Heterojunction Solar Cells”, *Energy & Environmental Science*, 6, 1938-1948 (2013).
33. Hsueh-Chung Liao, Cheng-Si Tsao, Tsung-Han Lin, Meng-Huan Jao, Chih-Ming Chuang, Sheng-Yong Chang, Yu-Ching Huang, **Yu-Tsun Shao**, Charn-Ying Chen, Chun-Jen Su, U-Ser Jeng, Yang-Fang Chen, and Wei-Fang Su, “Nanoparticle-Tuned Self-Organization of a Bulk Heterojunction Hybrid Solar Cell with Enhanced Performance”, *ACS Nano*, 6, 1657-1666 (2012).

INVITED TALKS

1. [forthcoming] “**Functional Oxides and Interfaces**” workshop at Ringberg Castle, *Max Planck Institute for Solid State Research*, Munich, Bavaria, Germany (July 2023).
2. [forthcoming] *Microscopy & Microanalysis Meeting*, Technologist’s forum, Minneapolis, MN (July, 2023)
3. [forthcoming] *Microscopy & Microanalysis Meeting*, A04—The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials, Minneapolis, MN (July, 2023)

4. [forthcoming] *Materials Research Society Spring Meeting*, QM04—Charged Topological Defects in Functional Materials, San Francisco, CA (April, 2023)
5. [forthcoming] *Minerals, Metals & Materials Society (TMS) Meeting*, Symposium on “Characterization of Materials through High Resolution Coherent Imaging”, San Diego, CA (March, 2023)
6. “Direct Imaging of Topological Phase Transitions in Polar Skyrmions, Merons, and Anti-merons in Oxide Heterostructures”, *Materials Research Society Fall Meeting*, EQ08—Higher-Order Topological Structures in Real Space—From Charge to Spin, Boston, MA (November 27th, 2022)
7. “Advanced Electron Microscopy Techniques to Investigate New Semiconductor-Related Materials and Devices”, *International Conference on Frontiers of Characterization and Metrology for Nanoelectronics*, Monterey, CA (June 22nd, 2022)
8. “Imaging of Real-Space Topological Textures and Their Order Parameters”, invited seminar at Center for Nanophase Materials Sciences Division, *Oak Ridge National Laboratory*, Oak Ridge, TN (virtual, June 10th, 2022)
9. “Picometer-Scale Characterization of Structure, Fields and Defects in 2D Materials Using 4D-STEM”, *Materials Research Society Spring Meeting*, NM01—Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications, Honolulu, Hawai’i (May 10th, 2022)
10. “Imaging of Topological Textures and Their Order Parameters”, Department of Materials Science and Engineering Seminar, *University of Pennsylvania*, Philadelphia, PA (March 15th, 2022)
11. “Imaging of Topological Textures and Their Order Parameters”, Mork Family Department of Chemical Engineering and Materials Science Seminar, *University of Southern California*, Los Angeles, CA (Feb 14th, 2022)
12. “Imaging of Topological Textures and Their Order Parameters”, Department of Mechanical Engineering and Materials Science Seminar, *Yale University*, New Haven, CT (virtual, Jan 31st, 2022)
13. “Principles and Applications of Scanning Convergent Beam Electron Diffraction (SCBED) for Characterizing Complex, Multi-element Crystals”, Symposium on “IT6 – Diffraction techniques”, *19th International Microscopy Congress*, Sydney, Australia (Sep 10th, 2018)
14. “Determination of Local Symmetry and Polarization in Ferroelectric Perovskites Using Scanning Convergent Beam Electron Diffraction (SCBED)”, Cornell University, Applied and Engineering Physics Seminar, NY (July 11th, 2018)
15. “Determination of Local Symmetry and Polarization in Ferroelectric Perovskites Using Scanning Convergent Beam Electron Diffraction (SCBED)”, School of Physical Science and Technology Seminar, *ShanghaiTech University*, Shanghai, China (May 14th, 2018)
16. “Determination of Local Symmetry and Polarization in Ferroelectric Perovskites Using Scanning Convergent Beam Electron Diffraction (SCBED)”, *International Workshop on Scanning Transmission Electron Microscopy*, University of Chinese Academy of Science, Beijing, China (May 12, 2018)
17. “Using Scanning Convergent Beam Electron Diffraction to Determine Local Symmetry and Polarization in Ferroelectric Perovskites”, Center for Nanophase Materials Sciences, *Oak Ridge National Laboratory*, Oak Ridge, TN (March 14, 2018)
18. “Nanometer resolution mapping of structure and bonding in ferroelectrics”, Symposium on “2.2.5 – Electron diffraction of solid-state materials”, *American Crystallography Association 67th Annual Meeting*, New Orleans, LA (May 28, 2017)

CONTRIBUTED PLATFORM PRESENTATIONS

1. Yu-Tsun Shao, Sujit Das, Zijian Hong, Ruijuan Xu, Swathi Chandrika, Fernando Gómez-Ortiz, Pablo García-Fernández, Long-Qing Chen, Harold Y Hwang, Javier Junquera, Lane W Martin, Ramamoorthy Ramesh, and David A. Muller, “Probing the dynamics of ferroelectric topological oscillators with the electron beam”, *MRS Spring Meeting. 2022*. (oral presentation)
2. Yu-Tsun Shao, Sujit Das, Yousra Nahas, Prokhorenko Sergei, Sujit Das, Ruijuan Xu, Swathi Chandrika, KP Harikrishnan, Harold Hwang, Ramamoorthy Ramesh, Laurent Bellaiche, David Muller, “Direct Imaging of Emergent Chirality Changes in a Polar Meron to Skyrmion Transition in Oxide Superlattices”, *Microsc. & Microanal. 2021*. (poster, virtual platform)
3. Yu-Tsun Shao, Sujit Das, Zijian Hong, Ruijuan Xu, Swathi Chandrika, Fernando Gómez-Ortiz, Pablo García-Fernández, Long-Qing Chen, Harold Hwang, Javier Junquera, Lane Martin, Ramamoorthy Ramesh, David Muller, “Emergent chirality in a polar meron to skyrmion transition revealed by 4D-STEM”, *Microsc. & Microanal. 2021*. (oral presentation, virtual platform)
4. Yu-Tsun Shao, Sujit Das, Ruijuan Xu, Javier Junquera, Swathi Chandrika, Harold Y Hwang, Ramamoorthy Ramesh, David Muller, “Mapping Topological Dipole Textures, Chirality, and the Potential Energy Landscape of Polar Skyrmions Using 4D-STEM”, *Microsc. & Microanal. 2020*. (oral presentation, virtual platform)
5. Yu-Tsun Shao, Sujit Das, Ruijuan Xu, Swathi Chandrika, Harold Hwang, Ramamoorthy Ramesh, David Muller, “Direct imaging of the internal Bloch-components of polar-skyrmions and anti-hedgehogs in oxide heterostructures”, *APS March Meeting 2020*. (oral presentation, cancelled due to covid-19)
6. Yu-Tsun Shao, Zhen Chen, Antonio Mei, Megan Holtz, Elliot Padgett, Darrell Schlom, and David A. Muller, “Decoupling Polarization, Crystal Tilt and Symmetry in Epitaxially-Strained Ferroelectric Thin Films Using 4D-STEM”, *Microsc. & Microanal. 2019*. (oral presentation)
7. Yu-Tsun Shao and Jian-Min Zuo, “Local Symmetry in Real Crystals”, *Sydney Workshop on STEM with Advanced Detectors 2018*. (oral presentation)
8. Yu-Tsun Shao and Jian-Min Zuo, “Nanoscale Order Parameter and Symmetry Fluctuations in Ferroelectric BaTiO₃ Single Crystal”, *MRS Spring Meeting 2018*. (oral presentation)
9. Yu-Tsun Shao and Jian-Min Zuo, “Nanoscale Order Parameter and Symmetry Fluctuations in Ferroelectric BaTiO₃ Single Crystal”, *APS March Meeting 2018*. (oral presentation)
10. Yu-Tsun Shao and Jian-Min Zuo, “Symmetry Breaking Nanoregions in Single-Phase High Entropy Alloys Determined using Scanning Convergent Beam Electron Diffraction”, *Microsc. & Microanal. 2017*. (poster)
11. Yu-Tsun Shao and Jian-Min Zuo, “Lattice-Rotation Vortex Observed Between Polar Nanoregions in Relaxor-Ferroelectric (1-x)Pb(Zn_{1/3}Nb_{2/3})-xPbTiO₃ Single Crystal”, *APS March Meeting 2017*. (oral presentation)
12. Yu-Tsun Shao and Jian-Min Zuo, “Fundamental Symmetry of Barium Titanate Single Crystal Determined using Energy-Filtered Scanning Convergent Beam Electron Diffraction”, *Microsc. & Microanal. 2016*. (poster)
13. Yu-Tsun Shao and Jian-Min Zuo, “Principles and Applications of Energy-Filtered Scanning CBED for Ferroelectric Domain Imaging and Symmetry Determination”, *Microsc. & Microanal. 2015*. (oral presentation)

SYNERGISTIC ACTIVITIES

Materials Research Society Fall Meeting

12/2023

Organizer for the symposium *F23-086: Emerging Electron Microscopy Techniques to Understand Structure-Property Relationship in Quantum Materials*.

Cornell Electron Microscopy Summer School

06/2021

Organizer and TA for the *Electron Diffraction and Imaging Simulations* tutorial module.

TA for the experimental demonstration of imaging electric and magnetic fields using 4D-STEM.

A total of 41 students/postdocs across the US.

Sunday Short Courses, Microscopy and Microanalysis Meeting

08/2021

TA for the afternoon tutorial of *X-12 Guidelines for Performing 4D-STEM Characterization from the Atomic to >Micrometer Scales: Experimental Considerations, Data Analysis and Simulation*.

A total of >80 students across US, Europe, Asia.