Dr. CHAOCHAO DUN

Project Scientist at Lawrence Berkeley National Laboratory
Phone: 574-250-7592, Email: cdun@lbl.gov; ccdun12@gmail.com

EDUCATION

08/2012-05/2017	**Wake Forest University,** USA
Ph.D. in Physics	Center for Nanotechnology and Molecular Materials, Physics Department
	Dissertation: *Low-Dimensional Chalcogenide based Thermoelectric Composites*
	Advisor: Prof. David L. Carroll and Prof. Natalie A.W. Holzwarth
06/2010-06/2012	**Chinese Academy of Sciences**, China (Joint Training)
M.S. in Physics	Ningbo Institute of Materials Technology & Engineering
(Direct Admission)	**China University of Mining and Technology**, China
	Physics Department, School of Science
09/2006-06/2010	**China University of Mining and Technology**, China
B.S. in Physics	Physics Department, School of Science

RESEARCH KEYWORDS

- **Keywords**: Entropy-driven Materials Design/Characterizations; Flexible Electronics; Thermoelectric and Thermal Management; Hydrogen Storage/Production and Fuel Cells; Sustainable Energy Harvesting; Critical Mining Recovery.

HONORS and AWARDS

- Molecular Foundry Rising Star Award, LBNL (Nominated by Molecular Foundry, **2024-2025**)
- R&D 100 Awards 2023 (Team Award): Cost-Effective and Clean Hydrogen Production with Molten Catalysis (**2023**)
- Spot Recognition of Excellence Award, LBNL (Nominated by Berkeley Lab Directors, **2023**)
- 3rd Lindau Online Sciathon: Self-Powered Electrical Skin for Better Public Health (Team Leader, One of 29 global teams, **2023**)
- Attending the 71st Lindau Nobel Laureate Meetings (Nominated by the University of California, Theme: Chemistry; **2022**)
- National Excellent Self-Funded Students Scholarship (**2017**)

RESEARCH EXPERIENCE

10/2022-Present **Lawrence Berkeley National Laboratory**, USA
Project Scientist **Co-PI**, Molecular Foundry.

- R&D via AI/ML-guided workflows for metal alloys, ceramics, and MOFs; Catalytic and sensing application testing for accelerated learning chemistries; Advanced Research Projects Agency-Energy (ARPA-E, GREENWELLS).
- Selective removal of metal ions from mining influenced waters using H-bonded Organic-Inorganic Frameworks (HOIFs) and HOIF-based membrane composites. Multi-lab DOE-funded National Alliance for Water Innovation (NAWI).
- Separation of Li^{+} and Mg^{2+} ions from brines using polyoxometalates (POMs) and others.

06/2019-09/2022 **Lawrence Berkeley National Laboratory**, USA
Postdoc Fellow Molecular Foundry. Supervisor: Dr. Jeffrey J. Urban (jjurban@lbl.gov)

- Conducted research on thermodynamic and kinetic optimization in nanomaterials for sensing, gas separation, capture, storage, and energy conversion. Contributed to advancing H_2 generation, storage, and fuel cell technologies. Multi-lab DOE-funded Hydrogen Materials Advanced Research Consortium (HyMARC).
- The development of self-supporting electrodes for enhanced high-mass-loading, high-rate and long-life charge storage.
- Non-equilibrium flame aerosol process to create high-entropy nanomaterials.

04/2018-06/2019 **University of Notre Dame**, USA
Research Scientist **Co-PI**, Department of Aerospace and Mechanical Engineering

- Designed colloidal nanocrystals and interface engineering of colloidal inks for flexible thermoelectrics and wearable electronics based on additive manufacturing; Completed goals: (1) synthesized tunable nanocrystals; (2) printed functional films with controlled interfaces; (3) demonstrated proof-of-concept energy-autonomous electronic skin devices. Defense Advanced Research Projects Agency (DARPA) funded.

08/2017-04/2018 **The University of Manchester**, UK
Postdoc Fellow School of Chemistry, National Graphene Institute

Supervisor: Prof. Cinzia Casiraghi (cinzia.casiraghi@manchester.ac.uk)

- Engineered printable water-based 2D crystal inks for large-area, flexible thermoelectric and photo-sensing devices. Supported by the Philip Leverhulme Prize.

08/2012-07/2017 **Wake Forest University,** USA
Research Assistant Center for Nanotechnology and Molecular Materials, Physics Department
Advisors: Prof. David L. Carroll (carroldl@wfu.edu) and Prof. Natalie A.W. Holzwarth (natalie@wfu.edu)

- Developed metal-chalcogenide nanomaterials covering design, synthesis, and characterization, for energy harvesting applications, including flexible thermoelectric/piezoelectric generators and water-splitting catalysts. Supported by DOE, Air Force, and NASA.

FUNDING APPLICATION EXPERIENCE (SELECTED)

- "*Dynamic CO_2 Hydrogenation to Produce Liquid Hydrocarbon Fuels in Induction Heating Catalytic Reactor*" and *"Unifying AI and Automation Systems in High-Throughput Catalysis for Dynamic CO_2 Hydrogenation to Liquids*." DOE, ARPA-E, GREENWELLS, (Lead PI, Hongfei Lin, Northeastern University); 10/2024-10/2027, ***Funded***, **Co-PI**, Total Funds Involved: $7,500, 000; **$650K allocated to DUN**).
- "*Understanding Thermo-Chemo-Mechanical Transformations in Thermal Energy Storage Materials and Composites*", Department of Energy, Energy Earthshots: Long Duration Storage, Industrial Heat, (2024-2027, ***Funded***, co-leading in the proposal writing and contributing to the critical experimental results, Total Funds Involved: $3,445,484 across three years).
- "*Energy-Water Desalination Hub-DWR: NAWI TASK 5.16 - Energy-efficient selective removal of metal ions from mining influenced waters (MIW) using H-bonded Organic-Inorganic Frameworks (HOIFs*) (10/2023-10/2026, ***Funded***, co-leading the proposal writing and contributing to the critical experimental results, Total Funds Involved: $2,375,000 across three years). National Alliance for Water Innovation (NAWI) 5.16 Extension Proposal (Bridge from Phase 1.0 to Phase 2.0, 10/2025, leading the proposal writing).

PATENTS

- "*Nanocomposite comprising semiconductor and metal nanoparticles, and assemblies*", Worldwide applications granted, **(Status, Active)**: US (US11631795B2), CN (CN110546106B), EP (EP3583066A2), KR (KR102571834B1), JP (JP7390001B2), WO (WO2018190919A2). Inventors: David L. Carroll (Ph.D. Advisor) and **Chaochao Dun**, etc. (**US Patent Partial Assignment to Streamline Automation Systems, LLC, USA**)
- "*Metal Extraction using Novel Polyoxometalate Materials*" **(CD 07581 ROI, Provisional appl.ser.no. 63/751,418 filed 30-Jan-2025).** Inventors: **Chaochao Dun**, Linfeng Chen, and Jeffrey. J. Urban. **Working with UC Berkeley Deep Tech Innovation Lab to advance this early-stage commercialization strategy.**

PUBLICATIONS

- 47 first/co-first and corresponding author papers (excluding those under review); 6037 citations by Google Scholar; H-index = 41 and i10-index=110.

SELECTED PUBLICATIONS (Google Scholar: https://scholar.google.com/citations?user=ki6zzg4AAAAJ&hl=en)

- **As a PI or Co-PI (*Corresponding Author)**

Papers Under Review (Revision in Preparation/Revision Submitted)

1. S. Liu#, J. Liang#, J. L. Kaufman, Q. Jiang, D. Wierzbicki, K. Tung, K. Chen, Z. Xuan, M. A. Khan, C. Song, S. Kang, W. Chen, G. Wu*, J. J. Urban*, M. T. Swihart*, and **C. Dun***. "Non-equilibrium Reducing Flame Aerosol Process to Create Supported High-entropy Alloy Nanoparticles", (Ref No. NCHEM-24092584B-Z). Revision Submitted and Under Review by ***Nature Comm***.
2. S. Liu, S. Das, J. Li, J. Liang, C. Zheng, S. Ghose, D. Wierzbicki, K. Chen, C. Scalzo, Z. Xuan, Y. Zhao, K. Wang, J. Guo, B. Mazumder, W. Chen, K. Shi, G. Wu, J. J. Urban*, M. T. Swihart*, **C. Dun***. "Kinetically and Entropically Stabilized MOFs" (Ref No. 2025-05-11983) Revision Submitted and Under Review.
3. Q. Fan#, T. Bo#, W. Guo, M. Chen, Q. Tang, Y. Yang, M. Li, K. Chen, F. Ge, J. Li, S. Qiao, C. Wang, L. Song, L. Yu, J. Guo, M. Naguib, Z. Chai, Q. Huang, **C. Dun***, N. Kang*, Y. Gogotsi*, K. Liang*. "Organometallic-Inorganic Hybrid MXenes with Tunable Superconductivity" (Ref No. 2025-01-02442) Revision Submitted and Under Review by ***Nature***.
4. L. Gao#, S. Hwang#, X. Li#, J. Zheng, S.Liu, J. Liang, B. Zhang, D.Wierzbicki, J. Li, J.Guo, G. Wang*, **C. Dun***, and G. Wu*. "Multi-channel mesoporous carbon confinement to break the activity-stability trade-off enables high-performance intermetallic fuel cell catalysts", (Ref No. NENERGY-25051442) Revision Submitted and Under Review by ***Nature Energy***.
5. W. Guo, **C. Dun***, J. Guo, J. J. Urban, C.Yu, Q. Zhang, J. Qiu*. "Tailoring Materials Design for Energy Storage and Conversion through Electrochemical Reconstruction" (Ref NO. cr-2025-00775g) Revision Submitted and Under Review by ***Chemical Reviews.***

6. J. Liang[#], Y. Li[#], C. Chang, M. Qiao, Z. Feng, **C. Dun**[*], W. Li[*], and G. Wu[*]. "Design of PGM-free and Dry-cathode AEM Water Electrolyzers via Regulation of Hydrogen-bond Networks at Phosphide Heterostructure/electrolyte Interfaces" (NATCATAL-26010167), Submitted to ***Nature Catalysis***.

Papers Published Online

7. S. Liu, **C. Dun**[*], J. J. Urban[*], and M. T. Swihart[*]. "Non-Equilibrium Synthesis Methods to Create Metastable and High-Entropy Nanomaterials", ***Adv Science***, 2026.
8. L. Chen, C. Li, S. Adibnia, S. Yang, J. Li, E. Samolova, A. Dopilka, Z. Huang, R. Giovine, X. B. Fleming, J. Guo, A. Z. Haddad, R. Kostecki, W. Chen, **C. Dun**[*] and J. J. Urban[*]. "Ultra-Selective Sequestration of Li^+ and Mg^{2+} from Brines via a Polyoxoniobate-Based Ion Sponge". ***Science Advances***, *11*, eadz7696.
9. S. Liu, **C. Dun**[*], and M. T. Swihart[*]. "High-entropy nanomaterials by candlelight" ***Nature Chemistry,*** 2025, *17*, 1445.
10. J. Liang[#], H. Yu[#], M. Zachman, S. Hwang, M. Qi, Y. Zeng[*], B. Zhang, J. Li, J. Guo, **C. Dun**[*], N. Macauley[*], and G. Wu[*]. "Creating Favorable Pt/Co Interfaces via a Two-step Approach for Constructing Highly Durable PtCo Intermetallic Fuel Cell Catalysts", ***Advanced Materials***, 2025, e10847.
11. J. Liang, J. Zheng, D. Wierzbicki, S. Liu, G. Wang, **C. Dun**[*], and G. Wu[*]. "Rhenium-doping to Promote Structural Evolution of Metallic Iridium to Oxides on Platinum Nanowire Bundles for Acidic Oxygen Evolution: Utilization, Conductivity, and Stability", ***Angewandte Chemie,*** *2025*, *64*, e202512317.
12. S. Liu, **C. Dun**[*]**,** L. Xiong, S. Das, S. Ghose, D. Wierzbicki, K. Chen, Z.Xuan, K. Wang, F. Yang, B. Mazumder, X. Wang, W. Chen, Z. Lin, J. J. Urban[*], M. T. Swihart[*]. "Entropy-driven Structural Evolution in Ceramic Oxides", ***J. Am. Chem. Soc***, 2025, *147*, 27685−27697.
13. S. Feng, X. He, Y. Deng, H. Xu, **C. Dun**[*], W. Huang[*], "Unraveling Reaction Pathways in CO_2 Hydrogenation to Methanol at Metal-Oxide Interfaces", ***ACS Catal,*** 2025, *15*, 11981.
14. S. Liu, C. Pao, J. Chen, S. Li, K. Chen, Z. Xuan, C. Song, J. J. Urban[*], and Mark T. Swihart[*], **C. Dun**[*], "Non-equilibrium Flame Aerosol Process to High-entropy Nano-ceramics", ***Matter***, 2024, *7*, 3994-4013.
15. S. Liu, **C. Dun**[*], F. Yang, K. Tung, D. Wierzbicki, S. Ghose, K. Chen, L. Chen, R. Ciora, M. A. Khan, Z. Xuan, M. Yu, J. J. Urban[*], and M. T. Swihart[*], "A General Flame Aerosol Route to Kinetically Stabilized Metal Organic Frameworks", ***Nat. Commun***, 2024, *15*, 9365.
16. S. Liu, **C. Dun**[*], Q. Jiang, Z. Xuan, F. Yang, J. Guo, J. J. Urban[*], and Mark T. Swihart[*], "Challenging Thermodynamics: Combining Immiscible Elements in a Single-phase Nano-ceramic", ***Nat. Commun***. 2024, *15*, 1167.
17. S. Zhang, Z. Liu, Z. Wu[*], Z. Yao, W. Zhang, Y. Zhang, Z. Guan, H. Lin, H. Cheng, E. Mu, J. Zeng, **C. Dun**[*], X. Zhang[*], J. C. Ho, Z. Hu[*], "Boosting Self-powered Wearable Thermoelectric Generator with Solar Absorber and Radiative Cooler"***, Nano Energy*** 132, 2024, 110381.
18. **C. Dun**[*], X. Wang, L. Chen, S. Li, H. M. Breunig, J. J. Urban[*], "Nano-enhanced solid-state hydrogen storage: Balancing discovery and pragmatism for future energy solutions", ***Nano Res***. 2024, *17* (10), 8729-8753. (***Invited Paper in Nano Research Award Special Issue*** dedicated to Dr. Yi Cui and Dr. Robert Langer).
19. L. Chen, X. Ding, Z. Wang, S. Xu, Q. Jiang, **C. Dun**[*], J. J. Urban[*], "Advances in *in situ*/*operando* techniques for catalysis research: enhancing insights and discoveries", ***Surf. Sci. Technol.*** 2024, *2*, 9. (***Invited Review***).
20. S. Mortaza, W. Kuang, **C. Dun**[*], and Y. Zhang[*], "3D Conformal Printing and Photonic Sintering of High-Performance Flexible Thermoelectric Films Using 2D Nanoplates" ***Adv Funct Mater***, 2019, *29*, 1901930.

- **As a Postdoc/PhD student (# Equal contribution and Co-first author)**

21. J. Yang[#], J. Zheng[#], **C. Dun**[#], L. J. Falling, Q. Zheng, J. Chen, M. Zhang, N. R. Jaegers, C. Asokan, J. Guo, M. Salmeron, D. Prendergast, J. J. Urban[*], G. A. Somorjai[*], Y. Guo[*], J. Su[*], "Unveiling Highly Sensitive Active Site in Atomically Dispersed Gold Catalysts for Enhanced Ethanol Dehydrogenation", ***Angew. Chemie*** 2024, *63*, e202408894.
22. **C. Dun**[#], S. Li[#], L. Chen, R. D. Horton, M. D. Allendorf, B. C. Wood, V. Stavila[*], J. J. Urban[*], "A Nanoscale Ternary Amide-rGO Composite with Boosted Kinetics for Reversible H_2 Storage", ***Adv. Mater. Interfaces*** 2023, *10* (27), 2370078. **(Cover Art)**
23. W. Guo[#], **C. Dun**[#], M. A. Marcus[#], V. Venturi, Z. Gainsforth, X. Feng, V. Viswanathan, J. J. Urban, C. Yu, Q. Zhang, J. Guo, J. Qiu[*], "The Emerging Layered Hydroxide Plates with Record Thickness for Enhanced High-mass-loading Energy Storage", ***Adv. Mater.*** 2023, 2211603.
24. S. Shi[#], S. Lee[#], **C. Dun**[#], W. Zheng, J. J. Urban, G. Dionisios[*], "Facet-dependent strong metal-support interactions control the C–O bond activation", ***Chem Catal.*** 2023, *3*, 100788.
25. W. Guo[#], **C. Dun**[#], C. Yu[*], X. Song, F. Yang, W. Kuang, Y. Xie, S. Li, Z. Wang, J. Yu, G. Fu, J. Guo, M. A. Marcus, J. J. Urban, Q. Zhang[*], J. Qiu[*], "Mismatching integration-enabled strains and defects engineering in LDH microstructure for high- rate and long-life charge storage" ***Nat. Commun.*** 2022, *13*, 1409.

26. **C. Dun**[#], S. Jeong[#], D. H. Kwon, S. Kang[*], V. Stavila, Z. Zhang, J.-W. Lee, T. M. Mattox, T. W. Heo, B. C. Wood, J. J. Urban[*], "Hydrogen Storage Performance of Preferentially Oriented Mg/rGO Hybrids" ***Chem. Mater.*** 2022, *34*, 2963. **(Cover Art)**
27. **C. Dun**[#], S. Jeong[#], Y. Liu, N. Leick, T. M. Mattox, J. Guo, J. Lee, T. Gennett, V. Stavila, J. J. Urban[*], "Additive Destabilization of Porous Magnesium Borohydride Framework with Core-Shell Structure" ***Small*** 2021, *17*, 2101989.
28. J. Choi[#], **C. Dun**[#], C. Forsythe, P. Gordon, J. J. Urban[*], "Lightweight wearable thermoelectric cooler with rationally designed flexible heatsink consisting of phase-change material/graphite/silicone elastomer", ***J. Mater. Chem. A*** 2021, *9*, 15696.
29. T. Varghese[#], **C. Dun**[#], N. Kempf, S. Mortaza, C. Karthik, J. Richardson, C. Hollar, D. Estrada, Y. Zhang[*], "Flexible Thermoelectric Devices of Ultrahigh Power Factor by Scalable Printing and Interface Engineering", ***Adv Funct Mater***, 2020, *30* (5), 1905796.
30. H. Shang[#], **C. Dun**[#], Y Deng, T Li, Z Gao, L Xiao, H Gu, DJ Singh, Z Ren[*], F. Ding[*], "$Bi_{0.5}Sb_{1.5}Te_3$-based films for flexible thermoelectric devices", ***J. Mater. Chem. A***, 2020, *8*, 4552-4561.
31. **C. Dun**, W. Kuang, N. Kempf, S. Mortaza, D. J. Singh, and Y. Zhang[*], "3D Printing of Solution-Processable 2D Nanoplates and 1D Nanorods for Flexible Thermoelectrics with Ultrahigh Power Factor at Low-Medium Temperatures" ***Adv Science***, 2019, *6*, 1901788.
32. **C. Dun**, C. A. Hewitt, Q. Jiang, Y. Guo, J. Xu, Y. Li, Q. Li, H. Wang and D. L. Carroll[*], "Single Nanopore on Bi_2Te_3 Nanoplates: the Formation of Surface Defect and Self-Repair Growth", ***Chem Mater***, 2018, *30*, 1965–1970.
33. **C. Dun**, Y. Liu, A. Al-Qawasmeh, C. A. Hewitt, Y. Guo, J. Xu, Q. Jiang, J Wang, G. Marcus, D. Cadavid, D., H. Wang, K.Kovnir, A.Cabot, D. L. Carroll[*], "Topological doping effects in 2D chalcogenide thermoelectrics", **2D Materials**, 2018, *5* (4), 045008.
34. D. Yin[#], **C. Dun**[#], X. Gao, Y. Liu, X. Zhang, D. L. Carroll and M. T. Swihart[*], "Controllable Colloidal Synthesis of Tin(II) Chalcogenide Nanocrystals and Their Solution-Processed Flexible Thermoelectric Thin Films", ***Small***, 2018, *14*, 1801949.
35. **C. Dun**, C. A. Hewitt, Q. Li, J. Xu, D. C. Schall, H. Lee, Q. Jiang, D. L. Carroll[*], "2D Chalcogenide Nanoplate Assemblies for Thermoelectric Applications", ***Adv Mater,*** 2017, *29*, 1700070. (**Back inside cover**)
36. **C. Dun**, C. A. Hewitt, Q. Li, Y. Guo, Q. Jiang, J. Xu, G. Marcus, D. C. Schall and D. L. Carroll[*], "Self-Assembled Heterostructures: Selective Growth of Metallic Nanoparticles on V_2–VI_3 Nanoplates", ***Adv Mater***, 2017, *29*, 1702968.
37. Y. Guo[#], **C. Dun**[#], J. Xu, J. Mu, P. Li, L. Gu, C. Hou, C. A. Hewitt, Q. Zhang, Y. Li, D. L. Carroll[*] and H. Wang[*]**,** "Ultrathin, Washable, and Large-Area Graphene Papers for Personal Thermal Management", ***Small***, 2017, *13* (44), 1702645.
38. C. Zhou[#], **C. Dun**[#], K. Wang, X. Zhang, Z. Shi, G. Liu, C. A. Hewitt, G. Qiao[*], D. L. Carroll[*], "General method of synthesis ultrathin ternary metal chalcogenide nanowires for potential thermoelectric applications", ***Nano Energy*** 2016, *30*, 709.
39. **C. Dun**, C. A. Hewitt, H. Huang, J. Xu, C. Zhou, W. Huang, Y. Cui, W. Zhou, Q. Jiang, D. L. Carroll[*], "Flexible n-type thermoelectric films based on Cu-doped Bi_2Se_3 nanoplate and Polyvinylidene Fluoride composite with decoupled Seebeck coefficient and electrical conductivity", ***Nano Energy*** 2015, *18*, 306.
40. **C. Dun**, C. A. Hewitt, H. Huang, J. Xu, D. S. Montgomery, W. Nie, Q. Jiang, D. L. Carroll[*], "Layered Bi_2Se_3 nanoplate/polyvinylidene fluoride composite based n-type thermoelectric fabrics", ***ACS Appl. Mater. Interfaces*** 2015, *7*, 7054.
41. **C. Dun**, C. A. Hewitt, H. Huang, D. S. Montgomery, J. Xu, D. L. Carroll[*], "Flexible thermoelectric fabrics based on self-assembled tellurium nanorods with a large power factor", ***Phys. Chem. Chem. Phys.*** 2015, *17*, 8591. (**Front Cover**)
42. **C. Dun**, N. A. W. Holzwarth[*], Y. Li, W. Huang, D. L. Carroll, "$Cu_2ZnSnS_xO_{4-x}$ and $Cu_2ZnSnS_xSe_{4-x}$: First principles simulations of optimal alloy configurations and their energies", ***J. Appl. Phys.*** 2014, *115*, 193513.

TEACHING and MENTORING EXPERIENCE

08/2025-Present **Lawrence Berkeley National Laboratory**, USA

- Co-Supervisor of Postdoc (Dr. Maroosol Yun) with Dr. Jeffery Urban on the APRA-E, GREENWELLS project.

10/2024-Present **Lawrence Berkeley National Laboratory**, USA

- Co-Supervisor of Postdoc (Dr. Chengshuang Zhou) with Dr. Jeffery Urban on the APRA-E, GREENWELLS project.

12/2019-Present **Lawrence Berkeley National Laboratory**, USA

- Co-mentored Ph.D. candidate Shuo Liu (with Prof. Mark Swihart, University at Buffalo, SUNY) from 12/2019 to 08/2024; Dissertation: *Non-equilibrium Flame Aerosol Process to Create High-entropy Nanomaterials*. **Recipient of the 2025 Best Dissertation Award in Chemical and Biological Engineering**.
- Mentor of Berkeley Lab Undergraduate Research (BLUR) program.

05/2012-08/2017 **Wake Forest University,** USA

Teaching Assistant (9 semesters and 1 summer program section) at Physics Department

- Lectured laboratory course and supervised laboratory exercises (~20 students per session, 9 hours/week)

- Conducted lectures and prepared experiments for science, mathematics, and premedical students in physics, covering electricity, magnetism, optics, and modern physics with calculus-based instruction.

PRESENTATIONS

- **Talks at professional meetings (Invited Talk only**).

1. "Mechanistic Design for Fast-Track Materials Discovery Beyond Equilibrium", Department of Chemistry, **University of California, Riverside**, Oct 13th-14th, **2025**, Riverside, CA, USA.
2. "Fast-Track Materials Discovery Beyond Equilibrium for Energy and Sustainability", Department Chemical Engineering, **Northeastern University**, Oct 2nd-3rd, **2025**, Boston, MA, USA.
3. "Non-equilibrium reducing flame aerosol process to create supported high-entropy alloy nanoparticles", ACS Spring, Mar 23th-Mar 27th, **2025**, San Diego, CA, USA.
4. "Understanding the Role of Entropy in Metastable to High-Entropy Materials", Department of Mechanical and Aerospace Engineering, **University of Central Florida**, March 11th, **2025**, Orlando, FL, USA.
5. "High-Entropy Materials for Clean Energy Applications", Department of Chemical Engineering, **Texas Tech University**, Feb 20th, **2025**, Lubbock, TX, USA.
6. "Understanding the Role of Entropy in Metastable to High-Entropy Materials for Clean Energy Applications", Department of Chemistry, **Tulane University**, Feb 3rd, **2025**, New Orleans, LA, USA.
7. "Metastable and High-Entropy Materials for Clean Energy Applications", Center for Functional Materials, **Wake Forest University**, Nov14th, **2024**, Winston-Salem, NC, USA.
8. "Understanding the Role of Entropy in Metastable to High-Entropy Materials for Clean Energy Applications", The Joint School of Nanoscience and Nanoengineering, **University of North Carolina, Greensboro**, Nov13th, **2024**, Greensboro, NC, USA.
9. "An Advanced Flame Aerosol Technique for the Kinetic Stabilization of Oxides, Alloys, and MOFs", Materials Science and Engineering Program, **University of California, Riverside**, Nov 06th, **2024**, Riverside, CA, USA.
10. "Entropy-Driven Advanced Energy Materials Design and Applications", Department of Chemistry, **University of California, Davis**, Apr 11th, **2024**, Davis, CA, USA.
11. "Understanding the Entropy Effects on Materials Designing in Clean Energy Applications", Materials Science Division, **Lawrence Livermore National Laboratory**, Jan 24th, **2024**, Livermore, USA.
12. "Understanding the Role of Entropy in Medium to High-Entropy Oxides and Alloys", Department of Materials Science & Engineering, **Case Western Reserve University**, Nov 6th, **2023**, Cleveland, USA.
13. "Next Frontier of Materials Science: Metastable and High Entropy Materials for a High-Energy Future", Department of Materials Science & Engineering, **Clemson University**, Nov 1st, **2023**, Clemson, USA.
14. "Accelerating the Advancement of Nanomaterials from Viewpoint of Entropy Driven Principles", Center for Integrated Nanotechnologies, **Los Alamos National Lab**, Sept 20th, **2023**, Santa Fe, USA.
15. "Advanced Materials for a Better Future: Clean and Sustainable Energy", Department of Mechanical Engineering, **University of Houston**, Feb 23th, **2022**, Houston, USA.
16. "Synthesis and Functionlization of Inorganic Nanomaterials and Development of Thermoelectric Generators", Academic Forum at Institute of Electrical Engineering, Chinese Academy of Sciences, Oct 23th -24th, **2018**, Beijing, China.
17. "2D ink based flexible thermal-electrical devices", National Graphene Institute, University of Manchester, Jan 10th, **2018**, Manchester, UK.
18. "Flexible Thermoelectric Generators: Integrated 2D Nanomaterials", Stuttgart Nanodays Workshop, Sep 14th-16th, **2016**, Stuttgart, Germany.
19. "Ultrathin Metal Chalcogenide Nanowires for Potential Thermoelectric Applications", Stuttgart Nanodays Workshop, Sep 14th-16th, **2016**, Stuttgart, Germany.

- **Posters at professional meetings**

1. "Separation of Li^+ and Mg^{2+} Ions from Brines Using Nanoscale Polyoxometalates", May 23rd, **2024**, Molecular Foundry Quinquennial Review, Lawrence Berkeley National Laboratory, Berkeley, CA, USA.
2. "Understanding Entropic Effects in Nanoscale High Entropy Oxides for Clean Energy Applications", May 23rd, **2024**, Molecular Foundry Quinquennial Review, Lawrence Berkeley National Laboratory, Berkeley, CA, USA.
3. "Nanoengineering for Clean Energy: Boosting the Development of Functional Nanomaterials for Various Applications", ACS

meeting, August 13th-17th, **2023**, San Francisco, CA, USA.

4. "Additive Manufacturing and Nanomanufaturting towards Advanced Thermoelectric Energy and Sensor Systems", 2nd ND Energy Research Symposium, Mar 6th, **2019**, Notre Dame, IN, USA.
5. "Flexible Topological Insulator Sb_2Te_3 Nanoplatelets with Growth Spiral", Materials Research Society meeting, Nov 27th- Dec 2nd, **2016**, Boston, MA, USA.
6. "Chiral Two-Dimensional Chalcogenide Nanoplate Assemblies for Thermoelectric Applications", Materials Research Society meeting, Nov 27th- Dec 2cd, **2016**, Boston, MA, USA.
7. The 26th Annual Workshop on Recent Developments in Electronic Structure Theory, May 18th – 21th, **2014**, University of North Texas, Denton, TX, USA.

ACADEMIC SERVICE and ORGANIZER ROLES

- 2023-2024 Host for Inorganic Facility Science Meeting at Molecular Foundry, Berkely Lab.
- 2023-Present Editorial Board: ***Surface Science and Technology***
- 2022-Present Youth Editorial Board: ***Carbon Neutrality***
- 2020-2022 Topic Editor: ***Micromachines***
- 2015-2016 ***Journal of Nanomaterials***
  Guest Editor: *Chalcogenide Nanomaterials for Energy Related Applications*, Open Special Issues
- Reviewer: *Journal of the American Chemical Society, Science Advances*, *Nature Communications*, *Nano Letters*, *ACS Applied Materials & Interfaces*, *Chemical Engineering Journal*, *Materials & Design, Solar Energy Materials & Solar Cells, Applied Energy, Topics in Catalysis, Journal of Materials Chemistry, Journal of Alloys and Compounds, etc.*

Recent Collaborators (PIs Only)

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