Jason N. Armstrong, Ph.D.

Professor of Teaching
Department of Mechanical & Aerospace Engineering

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Education

University at Buffalo, State University of New York, Buffalo, NY

Ph.D. Mechanical Engineering	2010
B.S. Mechanical Engineering	2004
B.S. Aerospace Engineering	2004

Professional Experience

University at Buffalo, State University of New York, Buffalo, NY
Department of Mechanical & Aerospace Engineering

Professor of Teaching	2024-present
Associate Professor of Teaching	2018 - 2024
Teaching Assistant Professor	2012 - 2018
Postdoctoral Associate	2010 - 2012 (full-time)
Lecturer	2010 - 2012 (part-time)

Teaching Experience

MAE377 Product Design in a CAE Environment	2013 - present (fall, summer)
MAE381 Engineering Materials	2014 - present (fall)
MAE385 Engineering Materials Laboratory	2015 - present (spring)
MAE485/585 Mechanical Properties of Materials	2020 - present (spring)
MAE177 Introduction to CAD	2015 - 2019 (spring)
MAE204 Thermodynamics	2010 - 2013 (fall)
MAE334 Engineering Lab 1	2013 - 2018 (spring)
MAE364 Manufacturing Processes	2013 - 2014 (spring)

Teaching Awards

UB Teaching Innovation Award, University at Buffalo, 2019.
Best Teaching Faculty of the Year Award, School of Engineering and Applied Sciences, 2018.
Vanderhoef Award, Department of Mechanical and Aerospace Engineering, 2018.
Milton Plesur Teaching Award, UB Student Association, 2015.

University Service

Department of Mechanical and Aerospace Engineering

Director of Undergraduate Studies, Mechanical Engineering	Jan. 2021 - present
Director, MAE Materials Teaching Labs	July 2016 - present
Faculty Advisor, SAE (UB Motorsports)	Mar. 2016 - present

Grants & Contracts

Funding

1. Modular Design and Additive Manufacturing of Interlocking Superinsulation Panel from Bio-based Feedstock for Autonomous Construction, PI: Jason Armstrong, Co-PIs: Chi Zhou, Jongmin Shim, Jin Young Song, 09/01/2023-11/30/2024, University of Maryland, $450,203 (25% share).
2. To improve the performance and sustainability of polyethylenimine-based membrane adsorbents, PI: Haiqing Lin, Co-PI: Jason Armstrong, 08/01/2023-07/31/2024, Columbia University, $67,560 (40% share).
3. High Temperature Conformal Hybrid Electronics on Flexible Ceramics, PI: Shenqiang Ren, Co-PIs: Chi Zhou, Jason Armstrong, 7/1/2021-6/30/2022, NextFlex, $300,000 (10% Share).
4. 3Digital Mechanical Testing, PI: Jason Armstrong, 03/01/19-08/30/19, 3Digital Group LLC, $5,220 (100% share).
5. SPIR: Metallurgy for the Non-Metallurgist Training, PI: Jason Armstrong, 12/17/18-03/29/19, Niagara Specialty Metals, $10,895 (100% share).
6. Commercialization of an ultra-stable pico-resolution metrology system, PI: Jason Armstrong, 10/01/14-08/30/15, SUNY Research Foundation Technology Accelerator Fund, $50,000 (100% share).
7. Measurement & manipulation of cells & biomolecules using US-patented pico-resolution metrology R&D equipment, PI: Jason Armstrong, 07/01/14-06/30/15, UB Center for Advanced Biomedical and Bioengineering Technology, $25,000 (100% share).
8. Ultra-stable pico-resolution metrology system for devices beyond Moore's law, PI: Jason Armstrong, 06/04/13-03/04/14, SUNY Research Foundation Technology Accelerator Fund, $50,000 (100% share).

Peer Reviewed Publications

Google Scholar Profile (Citations: 620, h-index: 12)

1. Zipeng Guo, Ruizhe Yang, Jun Liu, Jason Armstrong, Ruogang Zhao, Chi Zhou*. Continuous Stereolithography 3D Printing of Multi-Network Hydrogels in Triply Periodic Minimal Structures With Tunable Mechanical Strength for Energy Absorption. *J. Manuf. Sci. Eng.* 2024, 146(3): 031001. https://doi.org/10.1115/1.4063905
2. Arpita Sarkar, Abdullah Islam, Jason N. Armstrong, and Shenqiang Ren*. Natural Straw–Hemp-Reinforced Hybrid Insulation Materials. *ACS Appl. Eng. Mater.*, 2023, 1, 10, 2487-2493. https://doi.org/10.1021/acsaenm.3c00325
3. Massimigliano Di Luigi, Yu Fu, Zheng Li, Jason N. Armstrong, Fei Yao, Shenqiang Ren*. Hierarchical Cellulose Superinsulation Membrane. *Advanced Engineering Materials*, 2023. https://doi.org/10.1002/adem.202300124
4. Meng-Lun Lee, Arpita Sarkar, Zipeng Guo, Chi Zhou, Jason N. Armstrong, and Shenqiang Ren*. Additive manufacturing of eco-friendly building insulation materials by recycling pulp and paper. *Nanoscale Adv.*, 2023, 5, 2547–2552. https://doi.org/10.1039/D3NA00036B

5. Saurabh Khuje, Firas Alshatnawi, Mohammed Alhendi, Jian Yu*, Aaron Sheng, Yulong Huang, Cheng-Gang Zhuang, Jason Armstrong, Chi Zhou, Mark Poliks, and Shenqiang Ren*. High-temperature oxidation-resistant printed copper conductors. *Advanced Electronic Materials*, 2022. https://doi.org/10.1002/aelm.202200979
6. Lu An, Zheng Li, Zipeng Guo, Yong Hu, Yulong Huang, Jason N Armstrong, Chi Zhou and Shenqiang Ren*. Transparent thermal insulation ceramic aerogel materials for solar thermal conversion, Nanoscale Adv., 2022. 4, 4291-4295. https://doi.org/10.1039/D2NA00412G
7. Zipeng Guo, Lu An, Saurabh Khuje, Aditya Chivate, Jiao Li, Yiquan Wu, Yong Hu, Jason Armstrong, Shenqiang Ren * and Chi Zhou*. 3D-Printed Electrically Conductive Silicon Carbide, Additive Manufacturing. 2022, 103109. https://doi.org/10.1016/j.addma.2022.103109
8. Massimigliano Di Luigi, Zipeng Guo, Lu An, Jason N. Armstrong, Chi Zhou*, and Shenqiang Ren*. Manufacturing Silica Aerogel and Cryogel through Ambient Pressure and Freeze Drying. *RSC Adv.*, 2022, 12, 21213-21222. https://doi.org/10.1039/D2RA03325A
9. Lu An, Jason Armstrong, Yong Hu, Yulong Huang, Zheng Li, Donghui Zhao, Jesse Sokolow, Zipeng Guo, Chi Zhou and Shenqiang Ren*. High temperature ceramic thermal insulation material. *Nano Research*, 2022, 15, 6662-6669. https://doi.org/10.1007/s12274-022-4214-9
10. Massimigliano Di Luigi, Lu An, Jason Armstrong and Shenqiang Ren*, Scalable and robust silica aerogel materials from ambient pressure drying. *Mater. Adv.* 2022, Advance Article. https://doi.org/10.1039/D1MA01086G
11. Lu An, Massimigliano Luigi, Donald Petit, Yong Hu, Yingjie Chen, Jason Armstrong, Yuguang Li and Shenqiang Ren*. Nanoengineering Porous Silica for Thermal Management. *ACS Appl. Nano Mater.* 2022, 5, 2, 2655–2663. https://doi.org/10.1021/acsanm.1c04354
12. Yong Hu, Taishan Zhu, Zipeng Guo, Henna Popli, Hans Malissa, Yulong Huang, Lu An, Zheng Li, Jason N. Armstrong, Christoph Boehme, Z. Valy Vardeny, Alpha T. NDiaye, Chi Zhou, Manfred Wuttig, Jeffrey C. Grossman*, Shenqiang Ren*. Printing Air-Stable High Tc Molecular Magnet with Tunable Magnetic Interaction, *Nano Lett.* 2022, 22, 2, 545–553. https://doi.org/10.1021/acs.nanolett.1c01879
13. Zipeng Guo, Lu An, Sushil Lakshmanan, Jason N. Armstrong, Shenqiang Ren, Chi Zhou*. Additive Manufacturing of Porous Ceramics with Foaming Agent. *J. Manuf. Sci. Eng.* 2022, 144, 021010. https://doi.org/10.1115/1.4051828
14. Alireza Jalouli, Saurabh Khuje, Aaron Sheng, Abdullah Islam, Massimigliano Di Luigi, Donald Petit, Zheng Li, Cheng-Gang Zhuang, Lanrik Kester, Jason Armstrong, Jian Yu, and Shenqiang Ren*, Flexible Copper–Graphene Nanoplates on Ceramic Supports for Radiofrequency Electronics with Electromagnetic Interference Shielding and Thermal Management Capacity. *ACS Appl. Nano Mater.* 2021, **4**, 11, 11841-11848. https://doi.org/10.1021/acsanm.1c02415
15. Yong Hu, Dasharath Adhikari, Andrew Tan, Xi Dong, Taishan Zhu, Xiaoyu Wang, Yulong Huang, Travis Mitchell, Ziheng Yao, Nathan Dasenbrock-Gammon, Elliot Snider, Ranga P. Dias, Chuankun Huang, Richard Kim, Ian Neuhart, Ahmed H. Ali, Jiawei Zhang, Hans A. Bechtel, Michael C. Martin, Stephanie N. Gilbert Corder, Feng Hu, Zheng Li, Jason N. Armstrong, Jigang

Wang, Mengkun Liu, Jason Benedict, Eva Zurek, Ganapathy Sambandamurthy, Jeffrey C. Grossman, Pengpeng Zhang & Shenqiang Ren*, Laser-Induced Cooperative Transition in Molecular Electronic Crystal, *Advanced Materials* 2021. https://doi.org/10.1002/adma.202103000

16. Lu An, Baoshan Liang, Zipeng Guo, Jieyu Wang , Changning Li, Yulong Huang, Yong Hu, Zheng Li, Jason N. Armstrong, Chi Zhou, Danial Faghihi, Shenqiang Ren*. Wearable Aramid-Ceramic Aerogel Composite for Harsh Environment. *Advanced Engineering Materials,* 2020, ASAP.
17. Lu An, Zefan Shao, Jason N. Armstrong, Yulong Huang, Yong Hu, Zheng Li, Danial Faghihi*, Shenqiang Ren*. Hierarchical Structural Engineering of Ultrahigh-Molecular-Weight Polyethylene. *ACS Applied Materials & Interface,* 2020, **12**, 50024-50032. https://doi.org/10.1002/adem.202001169
18. Lu An, Jieyu Wang, Donald Petit, Jason N. Armstrong, Changning Li, Yong Hu, Yulong Huang, Zefan Shao, Shenqiang Ren*. A Scalable Crosslinked Fiberglass-Aerogel Thermal Insulation Composite. *Applied Materials Today,* 2020, **21**, 100843. https://doi.org/10.1016/j.apmt.2020.100843
19. Ruizhe Yang, Jieyu Wang, Lu An, Donald Petit, Jason N. Armstrong, Yuzi Liu, Yulong Huang, Yong Hu, Zefan Shao, and Shenqiang Ren*, A macromolecular assembly directed ceramic aerogel monolith material. *Journal of Materials Chemistry C,* 2020, **8**, 10319-10324. https://doi.org/10.1039/D0TC02481C
20. Yulong Huang, Yong Hu, Lu An, Zheng Li, Jason N. Armstrong, and Shenqiang Ren*, Electron transfer induced magnetic ordering of metal-cyanide magnets. *Materials Advances*, 2020, **1**, 1061-1065. https://doi.org/10.1039/D0MA00173B
21. Lu An, Jieyu Wang, Donald Petit, Jason N. Armstrong, Karen Hanson, Jason Hamilton, Mauricio Souza, Donghui Zhao, Changning Li, Yuzi Liu, Yulong Huang, Yong Hu, Zheng Li, Zefan Shao, Andre Omer Desjarlais, and Shenqiang Ren*. An All-Ceramic, Anisotropic, and Flexible Aerogel Insulation Material. *Nano Letters*, 2020, **20**, 5, 3828-3835. https://doi.org/10.1021/acs.nanolett.0c00917
22. Feng Hu, Lu An, Aditya Chivate, Zipeng Guo, Saurabh Khuje, Yulong Huang, Yong Hu, Jason Armstrong, Chi Zhou and Shenqiang Ren*. Flexible and printable dielectric polymer composite with tunable permittivity and thermal stability. *Chemical Communications*, 2020, **56**, 2332-2335. https://doi.org/10.1039/C9CC08648J
23. Ruizhe Yang, Feng Hu, Lu An, Jason Armstrong, Yong Hu, Changning Li, Yulong Huang, Shenqiang Ren*. A Hierarchical Mesoporous Insulation Ceramic. *Nano Letters*, 2020, **20**, 1110-1116. https://doi.org/10.1021/acs.nanolett.9b04411
24. Yulong Huang, Yong Hu, Feng Hu, Ruizhe Yang, Changning Li, Jason N. Armstrong and Shenqiang Ren*. Correlation at Two-Dimensional Charge-Transfer FeSe Interface, *Chemical Communications,* 2019, **55**, 12643-12646. https://doi.org/10.1039/C9CC06163K
25. Jun Wang, Jason N. Armstrong, Rahul Rai*. Investigation of compressive deformation behaviors of cubic periodic cellular structural cubes through 3D printed parts and FE simulations. *Rapid Prototyping Journal,* 2019, **26**, 459-472. https://doi.org/10.1108/RPJ-03-2019-0069

26. Yong Hu, Guohua Zhong, Ying-Shi Guan, Jason N. Armstrong, Changning Li, Changjiang Liu, Alpha N'Diaye, Anand Bhattacharya, Shenqiang Ren*. Strongly Correlated Aromatic Molecular Conductor. *Small*, 2019, **15**, 1900299. https://doi.org/10.1002/smll.201900299
27. Yong Hu, Guohua Zhong, Ying-Shi Guan, Nam Hoon Lee, Yuan Zhang, Yang Li, Travis Mitchell, Jason N. Armstrong, Jason Benedict, Saw-Wai Hla, Shenqiang Ren*. Alkali-Metal-Intercalated Percolation Network Regulates Self-Assembled Electronic Aromatic Molecules. *Advanced Materials*, 2019, **31**, 1807178. https://doi.org/10.1002/adma.201807178
28. Jingming Zhang, Changning Li, Jason Armstrong, Shenqiang Ren*. Eutectic Melt Crystallization of L10- FePt. *Chemical Communications*, 2019, **55**, 656. https://doi.org/10.1039/C8CC08199A
29. Jason N. Armstrong, Susan Z. Hua, Harsh Deep Chopra*. Anisotropic Curie temperature materials. *Physica Status Solidi B*, 2013, **250**, 387. https://doi.org/10.1002/pssb.201248186
30. Jason N. Armstrong, Eric M. Gande, John W. Vinti, Susan Z. Hua, Harsh Deep Chopra*. Physical properties of a two-component system at the Fermi and Sharvin length scales. *Journal of Applied Physics*, 2012, **112**, 104320. https://doi.org/10.1063/1.4766454
31. Jason N. Armstrong, Susan Z. Hua, Harsh Deep Chopra*. Strength of metals at the Fermi length scale. *Physica Status Solidi (RRL) Rapid Research Letters*, 2012, **6**, 99. https://doi.org/10.1002/pssr.201105541
32. Jason N. Armstrong, Susan Z. Hua, Harsh Deep Chopra*. Mechanics of quantum and Sharvin conductors. *Physical Review B*, 2011, **83**, 235422. https://doi.org/10.1103/PhysRevB.83.235422
33. Jason N. Armstrong, Susan Z. Hua, Harsh Deep Chopra*. Cooperative motion of domain walls in magnetic multilayers. *Physical Review B*, 2011, **83**, 054426. https://doi.org/10.1103/PhysRevB.83.054426
34. Jason N. Armstrong, R. M. Schaub, Susan Z. Hua, Harsh Deep Chopra*. Channel saturation and conductance quantization in single-atom gold constrictions. *Physical Review B*, 2010, **82**, 195416. https://doi.org/10.1103/PhysRevB.82.195416
35. Jason N. Armstrong, James D. Felske, Harsh Deep Chopra*. Multiple phase transitions found in a magnetic Heusler alloy and thermodynamics of their magnetic internal energy. *Physical Review B*, 2010, **81**, 174405. https://doi.org/10.1103/PhysRevB.81.174405
36. Cédric Bathany, Maëlane Le Romancer, Jason N. Armstrong, Harsh Deep Chopra*. Morphogenesis of maze-like magnetic domains. *Physical Review B*, 2010, **82**, 184411. https://doi.org/10.1103/PhysRevB.82.184411
37. Jason N. Armstrong, Matthew R. Sullivan, Harsh Deep Chopra*. Antiferromagnetic spin and twin domain walls govern hysteretic expressions of exchange anisotropy. *Physical Review B*, 2009, **80**, 104429. https://doi.org/10.1103/PhysRevB.80.104429
38. Mark D. Huntington, Jason N. Armstrong, Matthew R. Sullivan, Susan Z. Hua, Harsh Deep Chopra*. Mechanistic understanding of transition between quantized conductance plateaus under strain perturbation. *Physical Review B*, 2008, **78**, 035442. http://doi.org/10.1103/PhysRevB.78.035442

39. Jason N. Armstrong, Matthew R. Sullivan, Maëlane Le Romancer, Volodymyr A. Chernenko, Harsh Deep Chopra*. Role of magnetostatic interactions in micromagnetic structure of multiferroics. *Journal of Applied Physics*, 2008, **103**, 023905. https://doi.org/10.1063/1.2817640
40. Harsh Deep Chopra*, Matthew R. Sullivan, Jason N. Armstrong, Susan Z. Hua. The quantum spin-valve in cobalt atomic point contacts. *Nature Materials*, 2005, **4**, 832-837. https://doi.org/10.1038/nmat1510

Conference Papers

1. Zipeng Guo, Ruizhe Yang, Jun Liu, Jason Armstrong, Ruogang Zhao, Chi Zhou. Continuous Stereolithography 3D Printing of Multi-Network Hydrogels in Triply Periodic Minimal Structures (TPMS) With Tunable Mechanical Strength for Energy Absorption. *Proceedings of the ASME 2022 International Mechanical Engineering Congress and Exposition. Volume 3: Advanced Materials: Design, Processing, Characterization and Applications; Advances in Aerospace Technology*. Columbus, Ohio, USA. October 30–November 3, 2022. V003T03A021. ASME. https://doi.org/10.1115/IMECE2022-95806
2. Anosh P. Amaria, Jason N. Armstrong, Felipe M. Pasquali, John F. Hall. Rule of Mixtures Model for 3D Printed Kevlar Reinforced Nylon: Determination of Volume Fraction Using Thermal Gravimetric Analysis. *Proceedings of the ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 11A: 46th Design Automation Conference (DAC).* Virtual, Online. August 17–19, 2020. V11AT11A032. ASME.
3. Kaiyue Deng, Hamid Khakpour Nejadkhaki, Felipe M. Pasquali, Anosh P. Amaria, Jason N. Armstrong, John F. Hall. Rule of Mixtures Model to Determine Elastic Modulus and Tensile Strength of 3D Printed Carbon Fiber Reinforced Nylon. *Proceedings of the ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 2A: 45th Design Automation Conference.* Anaheim, California, USA. August 18–21, 2019. V02AT03A039. ASME.

Patents

1. "Metrology Probe and Method of Configuring a Metrology Probe" Harsh Deep Chopra, Jason N. Armstrong, and Zonglu Hua. US Patent number 8,397,311, 03-12-2013.
2. "Selectively conductive structure wherein a magnetic conductor is sized to have a cross-section diameter similar to a Fermi wavelength of electrons" Harsh Deep Chopra, Zonglu Hua, Matthew R. Sullivan, and Jason N. Armstrong. US Patent # 7,425,826 B2, 9-16-2008.