

Zhaoyang Sun

Postdoctoral Associate

Department of Mechanical Engineering

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Education

09/2019 -- 06/2024

Ph.D in College of Textiles, Donghua University, supervised by Prof. Liming Wang and Xiaohong Qin.

09/2015 -- 06/2018

M.S. in College of Textile and Clothing Engineering, Soochow University, supervised by Prof. Lan Xu.

09/2010-06/2014

B.S. in College of Textile and Clothing Engineering, Dezhou University.

01/2023 -- 01/2024

Visiting scholar in National University of Singapore (Singapore), under the supervision of Prof. Swee Ching Tan.

06/2017-12/2017

Visiting scholar in North Carolina State University (America), under the supervision of Prof. Rich Spontack.

Research Interests

• Wearable electronics

- Flexible and wearable electrospinning fiber-based water energy harvesting device.
- Design and synthesis of conductive hydrogel for strain sensing.

• Iontronics

- Hydrogel based pizeoioncs for energy haversting and pressure sensing.
- Ionic diode applied in nanofludics.

Publications

1. **Z. Sun**, X. Wen, J. Kim, K. Zhao, Q. Zhou, M. Manmatha, V. Nguyen, Y. Yang, L. Wang, I. Kwon Oh, Moisture-Driven Hydrogel Power Source with Asymmetric Ion Adsorption for Flexible Electronics. **Adv. Funct. Mater.** **2025**, accept. (IF, 19.0)
2. X. Wen, **Z. Sun**, M. Kim, Y. Cho, H. Wang, J. Yin, L. Zhang, I. Oh, L. Wang, I. Kim, X. Qin, Sustained Energy Harvesting via Moisture-induced In-plane Surface Charge Difference. Sustained Energy Harvesting via Moisture-induced In-plane Surface Charge Difference. **Adv. Funct. Mater.** **2025**, under review. (co-first author) (IF, 19.0)
3. **Z. Sun**, X. Wen, S. Guo, X. Guo, K. Qin, Q. Zhou, X. Hong, X. Qin, I. Oh, L. Wang, S. W. Tan, Tunable mechanical and conductivity of hydrogel based on the aggressive of polymer chains and phase separation. **ACS Nano.** **2025**, submitted. (IF, 16.0)
4. **Z. Sun**, X. Wen, S. Guo, M. Zhou, L. Wang, X. Qin, S. C. Tan, Weavable Yarn-Shaped Moisture-Induced Electric Generator. **Nano Energy** 2023, 116, 108748. (IF, 17.1)
5. **Z. Sun**, X. Wen, L. Wang, J. Yu, X. Qin, Capacitor-Inspired High-Performance and Durable Moist-Electric Generator. **Energy Environ. Sci.** 2022, 15 (11), 4584–4591. (IF, 30.6)
6. **Z. Sun**, X. Wen, L. Wang, D. Ji, X. Qin, J. Yu, S. Ramakrishna, Emerging Design Principles, Materials, and Applications for Moisture-Enabled Electric Generation. **eScience** 2022, 2 (1), 32–46. (IF, 36.6)
7. **Z. Sun**, L. Feng, X. Wen, L. Wang, X. Qin, J. Yu, Ceramic Nanofiber-Based Water-Induced Electric Generator. **ACS Appl. Mater. Interfaces** 2021, 13 (47), 56226–56232. (IF, 8.2)
8. **Z. Sun**, L. Feng, X. Wen, L. Wang, X. Qin, J. Yu, Nanofiber Fabric Based Ion-Gradient-Enhanced Moist-Electric Generator with a Sustained Voltage Output of 1.1 Volts. **Mater. Horiz.** 2021, 8 (8), 2303–2309. (IF, 10.7)
9. **Z. Sun**, L. Feng, C. Xiong, X. He, L. Wang, X. Qin, J. Yu, Electrospun Nanofiber Fabric: An Efficient, Breathable and Wearable Moist-Electric Generator. **J. Mater. Chem. A** 2021, 9 (11), 7085–7093. (IF, 9.5)
10. **Z. Sun**, C. Fan, X. Tang, J. Zhao, Y. Song, Z. Shao, L. Xu, Characterization and Antibacterial Properties of Porous Fibers Containing Silver Ions. **Appl. Surf. Sci.** 2016, 387, 828–838. (IF, 6.9)
11. Y. Duan, **Z. Sun**, Q. Zhang, Y. Dong, Y. Lin, D. J, X. Q, Constructing electrospun 3D liquid metal adhesion channel on stretchable yarns for broad-range strain-insensitivity smart textiles. **Nat Commun.** **2025**, 16, 6362. (IF, 14.7)
12. X. Wen, **Z. Sun**, Y. Cho, M. Kim, K. Qin, Q. Zhou, C. Zhang, L. Wang, I. Kim, X. Qin, Climate-Adaptive High-Performance Moisture-Induced Electric Generator Utilizing Electric Double-Layer Gradient. **Adv. Funct. Mater.** **2025**, <https://doi.org/10.1002/adfm.202506700>. (IF, 19.0)

13. X. Wen, **Z. Sun**, X. Xie, Q. Zhou, H. Liu, L. Wang, X. Qin, S. C. Tan, High-Performance Fully Stretchable Moist-Electric Generator. **Adv. Funct. Mater.** **2024**, 34 (11), 2311128. (IF, 19.0)
14. K. Qin, X. Wen, **Z. Sun**, Q. Zhou, L. Wang, D. Ji, X. Qin, The Rise of Hydrogel-Based Moist-Induced Electric Generators: Comprehensive Review and Future Directions. **Adv. Funct. Mater.** **2025**, under review. (IF, 19.0)
15. Y. Dong, J. Yu, X. Wen, **Z. Sun**, Y. Duan, L. Wang, X. Qin, High-Efficiency Dry-Jet Wet Spinning of Ultratoughness Regenerated Wool Keratin Fibers [Click to copy article link](#). **Nano Lett.** **2025**, 25, 13, 5078–5086. (IF, 9.1)
16. Q. Zhou, X. Wen, **Z. Sun**, J. Guo, L. Wang, X. Qin, Research progress of fiber-based moist-electric generators Get Permission. **Chinese Science Bulletin** **2025**, 70, 2704 – 2717.
17. X. Wen, J. Xiong, **Z. Sun**, L. Wang, J. Yu, X. Qin, A General Strategy to Electrospin Nanofibers with Ultrahigh Molecular Chain Orientation. **Engineering** **2023**, 29, 179–187. (IF, 11.6)
18. Y. Yang, S. Oh, J. Roh, **Z. Sun**, W. Ji, Y. Wang, and I. Oh, Bidirectional Antagonistic Snap-through Actuators for Reversibly Programmable Modular Soft Robots. **Adv. Mater. Technol.** **2025**, under review.
19. F. Wang, **Z. Sun**, J. Yin, L. Xu, Preparation, Characterization and Properties of Porous PLA/PEG/Curcumin Composite Nanofibers for Antibacterial Application. **Nanomaterials** **2019**, 9 (4), 508.
20. L. Wang, L. Feng, **Z. Sun**, X. He, R. Wang, X. Qin, J. Yu, Flexible, Self-Cleaning, and High-Performance Ceramic Nanofiber-Based Moist-Electric Generator Enabled by Interfacial Engineering. **Sci. China Technol. Sci.** **2022**, 65 (2), 450–457.
21. C. Fan, **Z. Sun**, L. Xu, Fluid-Mechanic Model for Fabrication of Nanoporous Fibers by Electrospinning. **Therm. Sci.** **2017**, 21 (4), 1621–1625.
22. Y. Song, **Z. Sun**, L. Xu, Z. Shao, Preparation and Characterization of Highly Aligned Carbon Nanotubes/Polyacrylonitrile Composite Nanofibers. **Polymers** **2017**, 9 (1), 1.
23. J. Zhao, **Z. Sun**, Z. Shao, L. Xu, Effect of Surface-Active Agent on Morphology and Properties of Electrospun PVA Nanofibres. **Fibers Polym.** **2016**, 17 (6), 896–901.
24. J. Zhao, N. Si, L. Xu, X. Tang, Y. Song, **Z. Sun**, Experimental and Theoretical Study on the Electrospinning Nanoporous Fibers Process. **Mater. Chem. Phys.** **2016**, 170, 294–302.

AWARD

2022 National Scholarships

2021 Xinweimei Inspirational Scholarship, First Prize

First Prize for Oral Report at the 2022 International Annual Conference for Doctoral Students in the First-Class Disciplines of Textile Science and Engineering

PROJECT

Central University---Donghua University Graduate Innovation Fund Project: Preparation and performance research of yarn-based moisture generator. (~3000 USD) Project leader

Skills

Software skills: Comsol, Materials Studio, 3D Max, Cinerma 4D, Adobe illustator, Origin,Office.