XU Lizhi（徐立之）, Ph.D.

Assistant Professor
Department of Mechanical Engineering,
The University of Hong Kong
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EDUCATION

University of Illinois, Urbana-Champaign 08/2009-12/2014
Ph.D. Degree in Materials Science and Engineering
Advisor: Prof. John A. Rogers

Beihang University (Beijing University of Aeronautics & Astronautics) 09/2005-06/2009
B.Sc. Degree in Applied Physics (in SAE Honors Program)
Advisor: Prof. Guang-Hong Lu

PROFESSIONAL EXPERIENCE

The University of Hong Kong 10/2018-present
Assistant Professor
Department of Mechanical Engineering

Advanced Biomedical Instrumentation Centre 01/2021-present
Co-PI

University of Michigan, Ann Arbor 01/2015-10/2018
Postdoctoral Research Fellow
Advisor: Prof. Nicholas A. Kotov

RESEARCH INTERESTS

Biomimetic Nanocomposites
Soft Electronics
Biomaterials and Biomedical Devices
Advanced Micro-/Nano-Fabrication

PUBLICATIONS

30. H. Liu, X. Ji, Z. Guo, X. Wei, J. Fan, P. Shi, X. Pu*, F. Gong*, and **L. Xu***, "A High-Current Hydrogel Generator with Engineered Mechanoionic Asymmetry" ***Nature Communications*** (accepted 2024).

29. H. He†, H. Li†, A. Pu, W. Li, K. Ban, and **L. Xu***, "Hybrid Assembly of Polymeric Nanofiber Network for Robust and Electronically Conductive Hydrogels" ***Nature Communications*** 14, 759 (2023). (ESI Highly Cited)

28. M. Sun†, H. Li†, Y. Hou, N. Huang, X. Xia, H. Zhu, Q. Xu, Y. Lin, and **L. Xu***, "Multifunctional Tendon-Mimetic Hydrogels" ***Science Advances*** 9, eade697 (2023). (***Nature*** research highlight)

27. F. Chen, X. Li, Y. Yu, Q. Li, H. Lin, **L. Xu**, and H.C. Shum*, "Phase-Separation Facilitated One-Step Fabrication of Multiscale Heterogeneous Two-Aqueous-Phase Gel" ***Nature Communications*** 14, 2793 (2023).

26. Z. Wang†, H. Zhu†, H. Li, Z. Wang, M. Sun, B. Yang, Y. Wang, L. Wang, and **L. Xu***, "High-Strength Magnetic Hydrogels with Photoweldability Made by Stepwise Assembly of Magnetic-Nanoparticle-Integrated Aramid Nanofiber Composites" ***ACS Nano*** 17, 9622 (2023).

25. H. Li, W. Zhang, J. Liu, M. Sun, L. Wang, and **L. Xu***, "Self-Assembled Nanofibrous Hydrogels with Tunable Porous Network for Highly Efficient Solar Desalination in Strong Brine*" **Advanced Functional Materials*** 33, 2308492 (2023).

24. W. Xu, H. Liu, M.-C. Wong, H. He, J. Hao, and **L. Xu***, "Robust and Durable Triboelectric Nanogenerators Enabled by A Mechanically Strong and Mildly Healable Polymer" ***Journal of Materials Chemistry A*** 11, 18893 (2023).

23. J. Yang, H. He, D. Li, Q. Zhang, **L. Xu**, and C. Ruan*, "Advanced Strategies in The Application of Gelatin-Based Bioink for Extrusion Bioprinting" ***Bio-Design and Manufacturing*** 6, 586 (2023).

22. H. He†, X. Wei†, B. Yang, H. Liu, M. Sun, Y. Li, A. Yan, C.Y. Tang, Y. Lin*, and **L. Xu***, "Ultrastrong and Multifunctional Aerogels with Hyperconnective Network of Composite Polymeric Nanofibers" ***Nature Communications*** 13, 4242 (2022). (Public news highlights: 文匯報, Phys.org, HKU news, etc.)

21. H. Liu†, H. Li†, Z. Wang†, X. Wei, H. Zhu, M. Sun, Y. Lin, and **L. Xu***, "Robust and Multifunctional Kirigami Electronics with Tough and Permeable Aramid Nanofiber Framework" ***Advanced Materials*** 34, 2207350 (2022). (Inside back cover hightlight).

20. H. Li, Z. Wang, M. Sun, H. Zhu, H. Liu, C.Y. Tang and **L. Xu***, "Breathable and Skin-Conformal Electronics with Hybrid Integration of Microfabricated Multifunctional Sensors and Kirigami-Structured Nanofibrous Substrates" ***Advanced Functional Materials*** 32, 2202792 (2022).

19. J.L. Hu, F.R. Chen, J. Bian, N.N. Sun, K.X. Wang, H. Ling, H.Y. Yu, M.X. Gai, **L.Z. Xu**, and Y.A. Huang*, "Laser Projection Proximity Transfer for Deterministic Assembly of Microchip Arrays at Scale" ***Science China Technological Sciences*** 65, 2205 (2022).

18. J. Gao, J. Zhou, C. Wang, X. Ma, K. Jiang, E. Kim, C. Li, H. Liu, **L. Xu**, H.C. Shum, S.-P. Feng, and D.-M. Shin*, "Engineered Networking in a Family of Solvent-Free Single-Ion Conducting Borate Network Polymer Electrolytes for Li-Metal Battery Applications" ***Chemical Engineering Journal*** 450, 138407 (2022)

17. H. Li, H. Liu, M. Sun, Y.A. Huang and **L. Xu***, "3D Interfacing Between Soft Electronic Tools and Complex Biological Tissues" ***Advanced Materials*** 33, 2004425 (2021).

16. H. He, Y. Li, H. Liu, Y. Kim, A. Yan and **L. Xu***, "Elastic, Conductive, and Mechanically Strong Hydrogels from Dual-Crosslinked Aramid Nanofiber Composites" ***ACS Applied Materials & Interfaces*** 13, 7539 (2021).

15. **L. Xu**, X. Zhao, C. Xu and N.A. Kotov*, "Water-Rich Biomimetic Composites with Abiotic Self-Organizing Nanofiber Network" ***Advanced Materials*** 30, 1703343 (2018). (Back cover highlight, also covered by many news agencies).

14. **L. Xu***, T.C. Shyu and N.A. Kotov*, "Origami and Kirigami Nanocomposites" ***ACS Nano*** 11, 7587 (2017).

13. J. Zhu, M. Yang, A. Emre, J.H. Bahng, **L. Xu**, J. Yeom, B. Yeom, Y. Kim, K. Johnson, P. Green and N.A. Kotov*, "Branched Aramid Nanofibers" ***Angewandte Chemie International Edition*** 56, 11744 (2017).

12. J. Lyu, M.D. Hammig, L. Liu, **L. Xu**, H. Chi, C. Uher, T. Li, and N.A. Kotov*, "Stretchable Conductors by Kirigami Patterning of Aramid-Silver Nanocomposites with Zero Conductance Gradient" ***Applied Physics Letters*** 111, 161901 (2017).

11. **L. Xu**, X. Wang, Y. Kim, T.C. Shyu, J. Lyu and N.A. Kotov*, "Kirigami Nanocomposite as Wide-Angle Diffraction Gratings" ***ACS Nano*** 10, 6156 (2016).

10. J. Lyu, X. Wang, L. Liu, Y. Kim, E.K. Tanyi, H. Chi, W. Feng, **L.Xu**, T. Li, M.A. Noginov, C. Uher, M.D. Hammig and N.A. Kotov*, "High Strength Conductive Composites with Plasmonic Nanoparticles Aligned on Aramid Nanofibers" ***Advanced Functional Materials*** 26, 8435 (2016).

9. Y. Su*, Z. Liu and **L. Xu**, "A Universal and Easy-to-Use Model for the Pressure of Arbitrary-Shape 3D Multifunctional Integumentary Cardiac Membranes" ***Advanced Healthcare Materials*** 5, 889 (2016).

8. **L. Xu**, S.R. Gutbrod, Y. Ma, A. Petrossians, Y. Liu, R.C. Webb, Z. Yang, J.A. Fan, R.Xu, J.J. Whalen, J.D. Weiland, Y. Huang, I.R. Efimov and J.A. Rogers*, "Materials and Fractal Designs for 3D Multifunctional Integumenraty Membranes with Capabilities in Cardiac Electrotherapy" ***Advanced Materials*** 27, 1731 (2015). (Frontispiece highlight)

7. T.C. Shyu, P.F. Damasceno, P.M. Dodd, A. Lamoureux, **L. Xu**, M. Shlian, M. Shtein, S.C. Glotzer and N.A. Kotov*, "A kirigami approach to engineering elasticity in nanocomposites" ***Nature Materials*** 14, 785 (2015). (Front Cover Highlight)

6. J.-W. Jeong, G. Shin, S.I. Park, K.J. Yu, **L. Xu** and J.A. Rogers*, "Soft Materials in Neuroengineering for Hard Problems in Neuroscience" ***Neuron*** 86, 175 (2015).

5. **L. Xu**†, S.R. Gutbrod†, A.P. Bonifas, Y. Su, M.S. Sulkin, N. Lu, H.-J. Chung, K.-I. Jang, Z. Liu, M. Ying, C. Lu, R.C. Webb, J.-S. Kim, J.I. Laughner, H. Cheng, Y. Liu, A. Ameen, Y. Huang, I.R. Efimov* and J.A. Rogers*, "3D Multifunctional Integumentary Membranes for Spatiotemporal Cardiac Measurements and Stimulation across the Entire Epicardium" ***Nature Communications*** 5, 3329 (2014). (Highlighted by ***Nature*** DOI:10.1038/507043a and many news agencies including *NPR, ABC, National Geographic, MIT Technology Review, etc.*)

4. D.-H. Kim†, R. Ghaffari†, N. Lu†, S. Wang†, S.P. Lee, H. Keume, R. D'Angelo, L. Klinker, Y. Su, C. Lu, Y.-S. Kim, A. Ameen, Y. Li, Y. Zhang, B. de Graff, Y.-Y. Hsu, Z. Liu, J. Ruskin, **L. Xu**, C. Lu, F.G. Omenetto, Y. Huang, M. Mansour, M.J. Slepian and J.A. Rogers*, "Electronic Sensor and Actuator Webs for Large-Area Complex Geometry Cardiac Mapping and Therapy" ***PNAS*** 109, 19910 (2012).

3. D.-H. Kim†, N. Lu†, R. Ghaffari†, Y.-S. Kim, S.P. Lee, **L. Xu**, J. Wu, R.-H. Kim, J. Song, Z. Liu, J. Viventi, B. de Graff, B. Elolampi, M. Mansour, M.J. Slepian, S. Hwang, J. D. Moss, S.-M. Won, Y. Huang, B. Litt and J.A. Rogers*, "Materials for Multifunctional Balloon Catheters with Capabilities in Cardiac Electrophysiological Mapping and Ablation Therapy" ***Nature Materials*** 10, 316 (2011).

2. D.-H. Kim†, N. Lu†, R. Ma†, Y.-S. Kim, R.-H. Kim, S. Wang, J. Wu, S.M. Won, H. Tao, A. Islam, K.J. Yu, T.-I. Kim, R. Chowdhury, M. Ying, **L. Xu**, M. Li, H.-J. Chung, H. Keum, M. McCormick, P. Liu, Y.-W. Zhang, F.G. Omenetto, Y. Huang, T. Coleman and J.A. Rogers*, "Epidermal Electronics" ***Science*** 333, 838 (2011).

1. **L. Xu**, Y.-L. Liu, H.-B. Zhou, L.-H. Liu and G.-H. Lu*, "Ideal Strengths, Structure Transitions, and Bonding Properties of a ZnO Single Crystal under Tension" ***Journal of Physics: Condensed Matter*** 21, 495402 (2009).

PATENTS

1. J.A. Rogers, I. Efimov, S. Gutbrod, **L. Xu**, A. Bonifas, R.C. Webb, and A. Koh**,** "Organ Mounted Electronics" WO2015051085.

2. N.A. Kotov, T. Shyu, and **L. Xu**, "Kirigami Patterned Polymeric Materials and Tunable Optical Devices Made Therefrom" U.S. Patent US11156749B2.

3. N.A. Kotov, S. Glotzer, B. Shahbazian, R. Branch, **L. Xu**, W. Choi, M. Cha, and M. Spellings "Material-Sensing Light Imaging, Detection, and Ranging (LIDAR) Systems" U.S. Patent US10983219B2.

4. **L. Xu**, and H. Li, "Breathable and Skin-Conformal Electronics with Hybrid Integration of Microfabricated Multifunctional Sensors and Kirigami-Structured Nanofibrous Substrates" U.S. Patent Application no. 18/302,865

5. **L. Xu**, M. Sun, and H. Li, "Tendon-Mimetic Materials with Anisotropic Assembly of Aramid Nanofibers" US Provisional Patent Application no. 63/387,743

6. **L. Xu** and H. Liu, "A High-Current Hydrogel-based Generator with Engineered Mechanoionic Asymmetry" US Provisional Patent Application no. 63/506,587
7. **L. Xu**, H. Li, H. Liu, and H. He, "Ultrastrong Aerogels Based on Aramid Nanofiber Composites and Membrane Devices Made Therefrom" U.S. Patent Application no. 18/169,722
8. **L. Xu**, Z. Wang, and H. Zhu, "High-strength magnetic and method for producing the same" US Provision Patent Application no. 63/491,959
9. **L. Xu**, H. He, and H. Li, "Electroconductive hydrogel and devices with conducting polymers assembled around a 3D nanofiber framework" US Provisional Patent Application no. 63/443,628

RECENT INVITED TALKS

5th International Conference on Flexible Electronics, Hangzhou, China	12/10/2023
2023 ChinaNANO, Beijing, China	08/28/2023
2023 柔性电子技术与应用创新论坛, Suzhou, China	05/22/2023
2023 MRS Spring Meeting, San Francisco, USA	04/14/2023
2022 Hong Kong Musculoskeletal &Biomaterials Summit for Young Scholars, Hong Kong	12/14/2022
2022 海峡两岸暨港澳青年科学家智能可穿戴技术创新论坛, Hangzhou, China	11/07/2022
2020 TMS Annual Meeting, San Diego, USA	02/22/2020
2nd international symposium on "Low Dimensional Materials for Optoelectronics", Shenzhen, China	12/14/2019
19th IEEE Conference on Nanotechnology, Macau	07/25/2019
Microsystems & Nanoengineering Summit 2019, Shanghai, China	07/10/2019

EXTERNAL RESEARCH GRANTS (PI)

1. "Biomimetic Aramid Nanofiber Composites for Rugged, Breathable and Skin-Conformal Electronics", no. 27210019, Early Career Scheme, The Research Grants Council, University Grants Committee, Hong Kong, 411,565 HKD (2019-2021)
2. "Epidermal Biochemical Sensors with Tissue-Compliant, Aramid-Nanofiber-Based Microneedles", no. 17200320, General Research Fund, The Research Grants Council, University Grants Committee, Hong Kong, 1,106,260 HKD (2021-2024)
3. "Structure-Conformal and Mechanically Robust Batteries for Miniaturized Mobile Machineries", no. 125/2021, Environment and Conservation Fund, Hong Kong, 497,520 HKD (2023-2024)
4. "Framework-Assisted Assembly of Conducting Polymer Nanostructures for Strong and Electronically Conductive Hydrogels and Devices", no. 17200722, General Research Fund, The Research Grants Council, University Grants Committee, Hong Kong, 1,122,534 HKD (2023-2025)
5. "Tissue-Mimetic Anisotropic Nanocomposite Hydrogels for Advanced Multifunctional Biointerfaces", no. 17201523, General Research Fund, The Research Grants Council, University Grants Committee, Hong Kong, 1,098,559 HKD (2024-2026)
6. " Design Paradigm of Multiphase Soft Composite Materials with Emergent Mechanical Properties", no. C6004-22Y, Young Collaborative Research Grant, The Research Grants Council, University Grants Committee, Hong Kong, 3,917,544 HKD (2023-2026) (Co-PI)
7. Advanced Biomedical Instrumentation Centre, Health@InnoHK Project (2020-2025) (Co-PI)

TEACHING (HKU)

MECH 6046: Microsystems for Energy, Biomedical, and Consumer Electronics Applications

MECH 3409: Mechanics of Solids

ENGG 1300: Fundamental Mechanics

MATH 1851: Calculus and Ordinary Differential Equations

SELECTED HONORS AND AWARDS

Microsystems & Nanoengineering Young Scientist Award	2023
Croucher Innovation Award Finalist	2020
Beihang SAE Honors Program	2005

JOURNAL EDITORSHIP

BioMedical Engineering OnLine (ISSN: 1475-925X)	Associate Editor	2019-present

JOURNAL REFEREE

Nature Electronics, Nature Communications, Science Advances, Advanced Materials, ACS Nano, Nano Letters, Advanced Functional Materials, Chemistry of Materials, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Electron Devices, Advanced Optical Materials, Advanced Materials Interfaces, Journal of Applied Physics, AIP Advances, Scientific Reports, Smart Materials and Structures, Biointerphases, ChemPhysChem, Journal of Materials Research