Huixin Jiang (Anna), Ph.D.

Technical Professional Research Scientist | Materials, Energy & Building
Oak Ridge National Laboratory
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U.S. Permanent Resident

Professional Summary
Research scientist with 10+ years of experience in energy materials, indoor air quality, antimicrobial coatings, and carbon capture technologies. Proven record of peer-reviewed publications, patent filings, and technology translation at Oak Ridge National Laboratory. Recognized for scientific communication, interdisciplinary collaboration across multiple ORNL divisions, and leadership in national-level research dissemination, including presentation at the U.S. Congress.

Professional Experience

Technical Professional Research Scientist

Oak Ridge National Laboratory | July. 2025 – present

- Lead and support research on antimicrobial air filters, indoor air quality, and energy-efficient building materials.
- Design and execute experiments for applied building technologies, including filtration, dehumidification, and conductive materials.
- Collaborate across materials science, HVAC, and building technology teams to advance deployable energy solutions.

Postdoctoral Research Associate

Oak Ridge National Laboratory | Sep. 2022 – June.2025

- Developed functional antimicrobial coatings for air filters to improve indoor air quality.
- Engineered desiccant-coated metal foams for advanced dehumidification and moisture management.
- Created electrospinning and brush-coating approaches for ultra-conductive copper composites.
- Contributed to CO_2 capture and decarbonization strategies using novel sorbent systems.
- Authored 7 peer-reviewed papers and filed 3 invention disclosures.

Master Research Experience

Nagaoka University of Technology, Nagaoka, Japan | Apr. 2014 - Jun. 2017

- Developed biopolymer-based hydrogel drug delivery systems.
- Innovated biopolymer extraction methods from sustainable resources.

Bachelor Research Experience

Donghua University, Shanghai, China | Sep. 2010 - Mar. 2013

- Developed gene delivery systems using functionalized polymers.

Education

- **Ph.D., Energy and Environment Science**
  Nagaoka University of Technology, Nagaoka, Japan | 2017
- **M.S., Biochemical Engineering**
  Donghua University, Shanghai, China | 2013
- **Joint Training Program**
  Shanghai Institute of Organic Chemistry, CAS | 2011–2012
- **B.S., Food Quality and Safety**
  Changshu Institute of Technology, China | 2010

Publications

Journals

1. Jan, K.; Jyoti Deka, D.; Yu, E.; Lu, T.; Li, K.; Jiang, H.; Nawaz, K.; G Webb, E.; Ozcan, S.; Zou, R.; Dai, L.; Lei, H.; Ruan, R.; C. Zhao, X.; Grace Chen, W.-T. Recent Advances in Chemical Recycling and Upcycling of Plastic Waste into Valuable Materials, Chemicals, and Energy: A Comprehensive Review. *RSC Sustainability* **2026**. https://doi.org/10.1039/D5SU00506J.
2. Shamim, J. A.; Liu, X.; Krishnan, E.; Li, K.; Muneeshwaran, M.; Jiang, H.; Ilani-Kashkouli, P.; Nawaz, K. Advances in Desiccant Wheels for Dehumidification, VOC Mitigation, and CO2 Removal for Energy-Efficient IAQ Management. *International Journal of Heat and Mass Transfer* **2025**, *245*, 126906. https://doi.org/10.1016/j.ijheatmasstransfer.2025.126906.
3. Brechtl, J.; Jiang, H.; Meyer, H. M. I.; Aytug, T.; Li, K.; Nawaz, K. Hygroscopic Metal-Complex Coated Metal Foam for Moisture Management. *ACS Appl. Eng. Mater.* **2025**, *3* (9), 2877–2883. https://doi.org/10.1021/acsaenm.5c00424.
4. Li, K.; Jiang, H.; McGuire, M.; Yoon, M.; Lupini, A.; List, F. A.; Bowland, C. C.; Naskar, A.; Paranthaman, M. P.; Nawaz, K.; Lara-Curzio, E.; Haynes, J. A.; Aytug, T. Multilayered Cu-Carbon Nanotube Composites for Advanced Conductors. *ACS Appl. Nano Mater.* **2025**, *8* (37), 17986–17993. https://doi.org/10.1021/acsanm.5c03028.
5. Li, K.; Kesler, M. S.; McGuire, M. A.; Zhang, M.; Aytug, T.; Jiang, H.; Sholl, D. S.; Lara-Curzio, E.; Thompson, M. J.; Li, Y.; Tener, Z. P.; Nawaz, K. Magnetic Nanoparticle-Induced Sorbent Regeneration for Direct Air Capture. *AIChE Journal* **2024**, *70* (9), e18500. https://doi.org/10.1002/aic.18500.
6. Vilaro, P.; Li, K.; Moyna, G.; Jiang, H.; Gurau, G.; Rogers, R. D. Use of Ionic Liquids for Hemp Fiber Degumming. *ACS Sustainable Chem. Eng.* **2024**, *12* (34), 12819–12826. https://doi.org/10.1021/acssuschemeng.4c03260.
7. Jiang, H.; Muneeshwaran, M.; Liu, X.; An, K.; Zhao, X.; Ozcan, S.; Aytug, T.; Li, K.; Nawaz, K. A Review of Antimicrobial Implications for Improving Indoor Air Quality. *J Mater Sci* **2024**, *59* (30), 13725–13755. https://doi.org/10.1007/s10853-024-09989-4.
8. Li, K.; Kesler, M. S.; McGuire, M. A.; Zhang, M.; Aytug, T.; Jiang, H.; Sholl, D. S.; Lara-Curzio, E.; Thompson, M. J.; Li, Y.; Tener, Z. P.; Nawaz, K. Magnetic Nanoparticle-Induced Sorbent

Regeneration for Direct Air Capture. *AIChE Journal* **2024**, *70* (9), e18500. https://doi.org/10.1002/aic.18500.

9. Jiang, H.; Cooke, L.; Srivilliputhur, K.; McGuire, M. A.; Meyer, H. M. I.; Yoon, M.; Haynes, J.; Nawaz, K.; Lupini, A. R.; Li, K.; Aytug, T. Copper–Carbon Nanotube Composites Enabled by Brush Coating for Advanced Conductors. *ACS Appl. Nano Mater.* **2024**, *7* (10), 11176–11183. https://doi.org/10.1021/acsanm.4c00679.
10. Jiang, H.; Li, K.; Graham, D. E.; Hollander, A.; Paranthaman, M. P.; Muneeshwaran, M.; Liu, X.; Theodore, M.; Aytug, T.; An, K.; Nawaz, K. Quaternary Ammonium Salt Coated Air Filter for Bioaerosol Removal from Building Indoor Air. *Building and Environment* **2024**, *250*, 111158. https://doi.org/10.1016/j.buildenv.2023.111158.
11. Zhao, X.; Bhagia, S.; Gomez-Maldonado, D.; Tang, X.; Wasti, S.; Lu, S.; Zhang, S.; Parit, M.; Rencheck, M. L.; Korey, M.; Jiang, H.; Zhu, J.; Meng, X.; Lamm, M. E.; Copenhaver, K.; Peresin, M. S.; Wang, L.; Tekinalp, H.; Yang, G.; Kumar, V.; Chen, G.; Nawaz, K.; Chelsea Chen, X.; Vaidya, U.; Ragauskas, A. J.; Webb, E.; Gardner, D. J.; He, P.; He, X.; Li, K.; Ozcan, S. Bioinspired Design toward Nanocellulose-Based Materials. *Materials Today* **2023**, *66*, 409–430. https://doi.org/10.1016/j.mattod.2023.04.010.
12. Jiang, H.; Kobayashi, T. Ultrasound Effect on Cellulose Decomposition in Solution and Hydrogels. *International Journal of Engineering and Technical Research* **2017**, *7* (3), 265045.
13. Jiang, H.; Kobayashi, T. Ultrasound Stimulated Release of Gallic Acid from Chitin Hydrogel Matrix. *Materials Science and Engineering: C* **2017**, *75*, 478–486. https://doi.org/10.1016/j.msec.2017.02.082.
14. Jiang, H.; Tovar-Carrillo, K.; Kobayashi, T. Ultrasound Stimulated Release of Mimosa Medicine from Cellulose Hydrogel Matrix. *Ultrasonics Sonochemistry* **2016**, *32*, 398–406. http://dx.doi.org/10.1016/j.ultsonch.2016.04.008

Book Chapters

1. Jiang, H.; Snider, H.; Zhao, X.; Pethe, S.; De S.; Aytug, T; Ozcan, S.; Nawaz, K.; Li, K. *Cellulose Nanofibrils Composite Films*, In *Building a Low-Carbon Society Through Applied Environmental Materials Science*, Takaomi Kobayashi, Ed., IGI Global, 2024. https://doi.org/10.4018/979-8-3693-0003-9.

Patents

1. Jiang, H.; Nawaz, K.; Li, K.; Aytug, T. *Fabrication of multifunctional metal–organic framework–coated antimicrobial filter.* U.S. Provisional Patent Application No. 63/953,010, USPTO, Jan. 2026.
2. Jiang, H.; Li, K.; Brechtl, J.; Nawaz, K. *Water-based superabsorbent materials synthesis and in situ coating for dehumidification.* U.S. Provisional Patent Application, USPTO, 2025.
3. Jiang, H.; Shi, X.; Liu, H. *Gene transfection method based on polyamide arborescent macromolecule carrier.* Chinese Patent Application CN102698290 A, published 2012.

Proceedings and Conference Papers

1. Aytug, T.; Li, K.; Yoon, M.; McGuire, M.; Jiang, H.; Lupini, A.; List, F.; Haynes, J. A. *Carbon nanomaterial–enabled ultra-high-conductivity Cu composites for advanced conductors.* Electrochemical Society Meeting Abstracts (PRiME 2024), Nov. 2024.

2. Jiang, H.; Liu, H.; Shan, Y.; Luo, T.; Sheng, R.; Zheng, F.; Cao, A.; Shi, X. *Liver cancer cell–targeting gene delivery using lactobionic acid–functionalized dendrimers as nonviral vectors.* International Forum on Biomedical Textile Materials, Shanghai, China, 2012.
3. Liu, H.; Jiang, H.; Shi, X. *Dendrimer-mediated synthesis and shape control of gold–silver alloy nanoparticles.* National Symposium on Polymer, China, 2011.

Presentations before Meetings and Workshops

1. Li, K.; Brechtl, J.; Jiang, H.; Aytug, T.; Meyer, H.; Nawaz, K. *Desiccant-Coated Metal Foam for Moisture Management.* ACS Meetings & Expositions 2025, Washington, DC, USA, Aug. 2025.
2. Aytug, T.; Li, K.; Yoon, M.; McGuire, M.; Jiang, H.; Lupini, A.; List, F.; Haynes, J. *Carbon Nanomaterial-Enabled Ultra-Conductive Cu Composites.* University of North Texas, Denton, TX, USA, Apr. 2025.
3. Li, K.; Aytug, T.; Bowland, C.; Lara-Curzio, E.; Haynes, J.; Jiang, H.; List, F.; Lupini, A.; McGuire, M.; Nawaz, K.; Naskar, A.; Paranthaman, P.; Yoon, M. *Ultraconductive Copper–Carbon Nanotube Composite for Advanced Conductors.* TMS Annual Meeting & Exhibition 2025, Las Vegas, NV, USA, Mar. 2025.
4. Jiang, H.; Graham, D. E.; Hollander, A.; Paranthaman, M. P.; Muneeshwaran, M.; Liu, X.; Theodore, M.; Aytug, T.; Li, K.; Nawaz, K. *Quaternary Ammonium Salt-Coated Air Filter for Bioaerosol Removal from Building Indoor Air.* ORNL Research Symposium, Oak Ridge, TN, USA, July 2025.
5. Li, K.; Nawaz, K.; Kesler, M.; McGuire, M. A.; Jiang, H.; Aytug, T.; Zhang, M.; Lara-Curzio, E.; Sholl, D.; Thompson, M. *Magnetic Nanoparticle-Induced Sorbent Regeneration for Direct Air Capture.* ACS Spring Meeting 2024, New Orleans, LA, USA, Mar. 2024.
6. Li, K.; McGuire, M.; Jiang, H.; Yoon, M.; Srivilliputhur, K.; Lupini, A.; List, F.; Ozpineci, B.; Haynes, J.; Nawaz, K.; Aytug, T. *Ultraconductive Copper–Carbon Nanotube Composite for Advanced Conductors.* TMS Annual Meeting & Exhibition 2024, Orlando, FL, USA, Mar. 2024.
7. Jiang, H.; Li, K.; Cooke, L.; Nawaz, K.; Aytug, T. *Ultra-Conductive Copper–Carbon Nanomaterial Composites through Brush Coating.* ORNL Research Symposium, Oak Ridge, TN, USA, July 2024.
8. Jiang, H.; Li, K.; Srivilliputhur, K.; Cooke, L.; McGuire, M. A.; Nawaz, K.; Aytug, T. *Ultraconductive Copper–Carbon Nanotube Composite for Advanced Conductors.* ACS Fall Meeting, San Francisco, CA, USA, Aug. 2023.
9. *The 25th Annual Meeting of the Japan Society of Sonochemistry.* Toyama, Japan, Oct. 2016.
10. *Pacific Rim Joint Meeting.* Nagaoka, Japan, 2015.
11. *The 4th International GIGAKU Conference.* Nagaoka, Japan, June 2015.
12. *The 2nd Asia–Oceania Sonochemical Society Conference.* Kuala Lumpur, Malaysia, 2015.
13. *63rd Annual Meeting of the Society of Polymer Science, Japan.* Toyama, Japan, 2014.
14. *International Forum on Biomedical Textile Materials & Annual Meeting.* Shanghai, China, 2013.

Professional Memberships, Leadership, and Honors

1. R&D 100 Award; MF-SSLC: Metal foam–based separate sensible and latent cooling technology (2025)

2. Presenter at the U.S. Congress-- Antimicrobial air filters: your indoor guardian (2025)
3. President of Oak Ridge Postdoctoral Association Executive Committee (ORPEX) (2024-2025)
4. 1st Place: Your Science in a Nutshell Competition (2024)

Service to Professional Organizations

1. Presider, Oak Ridge National Laboratory Research Symposium, 2025, Oak Ridge, TN.
2. Presider, Oak Ridge National Laboratory Research Symposium, 2024, Oak Ridge, TN.
3. Presider, ACS Fall National Meeting & Exposition, 2023, San Francisco, CA.

Service to the Community

1. Assistant Leader and Committee member in Boy Scout American, Pack 59 (2023-2025).
2. Committee Chair in Boy Scout American, Pack 59 (2025-present).
3. Volunteer for Tennessee Science Bowl (2025)
4. Presented high school STEM career talks through SAGE. (2025)
5. Contributed to an international staff buddy program, assisting with relocation and workplace integration. (2024, 2025)
6. Volunteered in rebuilding efforts following Hurricane Helene. (2025)