

YINING ZHU

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PROFESSIONAL APPOINTMENTS

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|---|-------------------|
| Duke University , Durham, NC | 02/2026 – current |
| • Postdoctoral Associate with <i>Prof. John W. Hickey</i> | |
| Johns Hopkins University , Baltimore, MD | 10/2025 – 01/2026 |
| • Postdoctoral Associate with <i>Prof. Hai-Quan Mao</i> | |

EDUCATION

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|---|-------------------|
| Johns Hopkins University , Baltimore, MD | 07/2021 – 09/2025 |
| • Ph.D. in Biomedical Engineering | |
| Duke University , Durham, NC | 08/2024 – 09/2024 |
| • Visiting Research Scholar in Biomedical Engineering | |
| Johns Hopkins University , Baltimore, MD | 08/2019 – 05/2021 |
| • M.S.E. in Biomedical Engineering | |
| Sichuan University , China | 09/2015 – 06/2019 |
| • B.S. in Pharmacy | |

AWARDS & HONORS

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|---|------------------|
| Forbes 30 Under 30 honoree in Science, US | 2026 |
| Siebel Scholar, Siebel foundation, US | 2025 |
| Student Travel Achievement Recognition (STAR) award, Society for Biomaterials, US | 2025 |
| Meritorious Abstract Travel Award, American Society of Gene & Cell Therapy, US | 2024 |
| The Hans J. Prochaska Research Award, Johns Hopkins University, US | 2024 |
| Student Travel Achievement Recognition (STAR) award, Society for Biomaterials, US | 2023 |
| Outstanding Graduates Award in Sichuan Province, Sichuan Province, China | 2019 |
| 'Tang Lixin' Scholarship, Sichuan University, China | 2018 |
| Top 100 Students Award, Sichuan University, China | 2017 |
| Outstanding Chairman of the Student Union, Sichuan University, China | 2017 |
| National Scholarship, Ministry of Education of China | 2016; 2017; 2018 |

PUBLICATIONS

† Denotes equal contribution * Denotes corresponding author

(32 peer-reviewed journal publications in total; [Google Scholar](#))

First author publications:

12. **Y Zhu†, C Wei†, et al., HQ Mao***. Engineering age-adaptive mRNA lipid nanoparticle cancer vaccines via reprogramming systemic gene expression. (*Nature Biomedical Engineering*, under review)
11. **J Lin†, Y Zhu†, et al., HQ Mao***. Imidazolium lipid-based nanoparticles enable effective mRNA delivery and cellular immune response. (*Materials Today*, in revision)
10. **C Wei†, Y Zhu†*, et al., SC Murphy*, HQ Mao***. Systemic trafficking of mRNA lipid nanoparticle vaccine following intramuscular injection generates potent tissue-specific T cell response. *Nature Biomedical Engineering*. (2026). (in press)
9. **X Liu†, Y Zhu†, et al., HQ Mao***. Crosslinking of lipid nanoparticles enhances the delivery efficiency and efficacy of mRNA vaccines. *Nature Chemical Engineering*, (2026). (in press)
8. **Y Zhu†, ZC Y†, S L†, et al., HQ Mao***. An mRNA lipid nanoparticle-incorporated nanofiber-hydrogel composite for cancer immunotherapy. *Nature Communications*, 16(1):5707, (2025).
7. **X Lu†, Y Zhu†, et al., HQ Mao***. A multi-step platform identifies spleen-tropic lipid nanoparticles for in vivo T cell-targeted delivery of gene editing proteins. *Science Advances*, 11(43):eady5579, (2025).
6. **Y Zhu, et al., SC Murphy*, HQ Mao***. Screening for lipid nanoparticles that modulate the immune activity of helper T cells towards enhanced antitumour activity. *Nature Biomedical Engineering*, 8 (5), 544-560, (2024).
5. **Y Zhu†, S Cai†, et al., KW Leong*, HQ Mao***. Optimization of lipid nanoparticles for gene editing of the

- liver via intraduodenal delivery. *Biomaterials*, 308:122559, (2024).
4. J Ma†, Y Zhu†, et al., SX Sun*, HQ Mao*. Tuning extracellular fluid viscosity for enhanced transfection efficiency in genetic cell engineering. *Nature Chemical Engineering*, 1(9): 576-587, (2024).
 3. Y Zhu, et al., SC Murphy*, HQ Mao*. Multi-step screening of DNA/lipid nanoparticles and co-delivery with siRNA to enhance and prolong gene expression. *Nature Communications*, 13 (1), 4282, (2022).
 2. Y Hu†, Y Zhu†, et al., HQ Mao*. Size-controlled and shelf-stable DNA particles for production of lentiviral vectors. *Nano Letters*, 21 (13), 5697-5705, (2021).
 1. Y Zhu, et al., X Sun*. Albumin-biomineralized nanoparticles to synergize phototherapy and immunotherapy against melanoma. *Journal of Controlled Release*, 322, 300-311, (2020).

Selective collaborative publications:

- B Torkzaban, Y Zhu, et al., J Coller*. Use of poly adenosine tail mimetics to enhance mRNA expression from genes associated with haploinsufficiency disorders. *Molecular Therapy Nucleic Acids*, 36 (1), 102453, (2025).
- L Cheng, Y Zhu, et al., HQ Mao*. Machine learning elucidates design features of plasmid deoxyribonucleic acid lipid nanoparticles for cell type-preferential transfection. *ACS nano*, 18 (42), 28735-28747, (2024).
- W Chen, Y Zhu, et al., J He*. Potentiating the systemic immunity by bacteria-delivered STING activation in a tumor microenvironment. *Advanced Functional Materials*, 33 (52), 2307001, (2023).
- Z Guo, Y Zhu, et al., X Sun*. Rapid development of a subunit nano-vaccine against drug-resistant *Pseudomonas aeruginosa* with effective cross-protection. *Nano Today*, 43, 101398, (2022).
- J Xue, Y Zhu, et al., X Sun*. Nanoparticles with rough surface improve the therapeutic effect of photothermal immunotherapy against melanoma. *Acta Pharmaceutica Sinica B*, 12 (6), 2934-2949, (2022).
- ZC Yao, YH Yang, J Kong, Y Zhu, et al., HQ Mao*. Biostimulatory micro-fragmented nanofiber-hydrogel composite improves mesenchymal stem cell delivery and soft tissue remodeling. *Small*, 18 (36), 2202309, (2022).
- S Bai, H Jiang, Y Song, Y Zhu, et al., X Sun*. Aluminum nanoparticles deliver a dual-epitope peptide for enhanced anti-tumor immunotherapy. *Journal of Controlled Release*, 344, 134-146, (2022).
- W Chen, Z Guo, Y Zhu, et al., X Sun*. Combination of bacterial-photothermal therapy with an anti-PD-1 peptide depot for enhanced immunity against advanced cancer. *Advanced Functional Materials*, 30 (1), 1906623, (2020).

Reviews:

- W Chen, Y Zhu, et al., X Sun*. Path towards mRNA delivery for cancer immunotherapy from bench to bedside. *Theranostics*, 14 (1), 96, (2024).
- W Chen, Y Zhu, et al., X Sun*. Advances in *Salmonella Typhimurium*-based drug delivery system for cancer therapy. *Advanced Drug Delivery Reviews*, 185, 114295, (2022).
- S Huang, Y Zhu, et al., Z Zhang*. Recent advances in delivery systems for genetic and other novel vaccines. *Advanced Materials*, 34 (46), 2107946, (2022).

PATENTS

1. Y Zhu, X Liu, H Mao. Compositions and methods of preparing RNA lipid nanoparticles with enhanced stability and transfection efficiency. US Provisional Patent Application; Filed 7/19/2025.
2. Y Zhu, C Wei, H Mao. Lipid nanoparticles with integrated glycolipid adjuvant to promote tissue-specific cellular immunity. US Provisional Patent Application; Filed 2/18/2025.
3. Y Zhu, C Wei, D Yu, H Mao. Lipid nanoparticle formulations capable of migrating to systemic organs following intramuscular administration. US Provisional Patent Application; Filed 1/28/2025.
4. Y Zhu, X Lu, H Mao. Composition screening of lipid nanoparticle for intracellular delivery of gene-editing proteins. PCT/US2025/023531; Filed 4/7/2025.
5. Y Zhu, C Wei, J Ma, H Mao, et al. A mRNA lipid nanoparticle incorporated nanofiber-hydrogel composite to generate a local immunostimulatory niche for immunotherapy. PCT/US2025/023530; Filed 4/7/2025.
6. Y Zhu, J Ma, H Mao, et al. Composition of media with defined fluid viscosity for enhancing intracellular delivery of nanoparticles and viral vectors, and methods of use. PCT/US2024/039036; Filed 7/22/2024.
7. Y Zhu, H Mao, et al. Compositions of Lipid Nanoparticles for Plasmid DNA Delivery to the Liver and Methods for Preparing the Same. PCT/US2023/016938; Filed 3/30/2023.
8. Y Zhu, Y Hu, H Mao. Methods for preparation of plasmid DNA/lipid particles with defined size for in vitro and in vivo transfection. PCT/US2023/18/546,221; Filed 8/11/2023.

9. **Y Zhu**, Y Hu, H Mao. Composition of shelf-stable plasmid DNA/PEI particles with defined sizes for virus production and method for preparation of the same. PCT/US2023, 18/546,222, Filed 8/11/2023.
10. **Y Zhu**, Y Hu, H Mao. Methods for preparation of shelf-stable plasmid DNA/polycation particles with defined sizes for cell transfection. PCT/US2022, 18/261,944; Filed 7/18/2023.

CONFERENCE PRESENTATIONS

1. **Zhu Y**, Ma J, *et al.*, Mao HQ. Enhancing Cell Transfection Efficiency via Modulation of Extracellular Fluid Viscosity. *Society of Biomaterials Annual Meeting and Exposition*. 2025. **Oral Presentation**.
2. **Zhu Y**, Yao Z-C, Li S, *et al.*, Mao HQ. mRNA lipid nanoparticle-incorporated nanofiber-hydrogel composite generates a local immunostimulatory niche for cancer immunotherapy. *Society of Biomaterials Annual Meeting and Exposition*. 2025. **Oral Presentation & Student Travel Achievement Recognition (STAR) award**.
3. **Zhu Y**, Yao Z-C, Li S, *et al.*, Mao HQ. Engineering A Biomaterials-based Lymphoid Niche for mRNA Lipid Nanoparticle Cancer Vaccines. *Biomedical Engineering Society Annual Meeting*. 2024. **Oral Presentation**.
4. **Zhu Y**, Yao Z-C, Li S, *et al.*, Mao HQ. A mRNA lipid nanoparticle incorporated nanofiber-hydrogel composite generates a local immunostimulatory niche for cancer immunotherapy. *American Society of Gene & Cell Therapy Annual Meeting*. 2024. **Oral Presentation & Meritorious Abstract Travel Award**.
5. **Zhu Y**, Ma J, Shen R, Vuong I, Mao HQ. Lipid Nanoparticle Composition Shapes Immune Response to mRNA Vaccine and Potency of Anticancer Immunity. *Society of Biomaterials Annual Meeting and Exposition*. 2023. **Oral Presentation & Student Travel Achievement Recognition (STAR) award**.
6. **Zhu Y**, Ma J, Shen R, Vuong I, Mao HQ. Compositional Optimization of mRNA Lipid Nanoparticles to Modulate Th1/Th2 Immune Activation Profile and Potentiate Anticancer Immunity. *American Society of Gene & Cell Therapy Annual Meeting*. 2023. **Poster Presentation**.
7. **Zhu Y**, Shen R, Vuong I, Hu Y, Mao HQ. Multi-step Screening and Composition Optimization of Lipid Nanoparticles for Liver-targeted Plasmid DNA Delivery. *Society of Biomaterials Annual Meeting and Exposition*. 2022. **Oral Presentation**.

PROFESSIONAL MEMBERSHIPS

- **Society for Biomaterials** 2021 – Present
- **American Society of Gene & Cell Therapy** 2021 – Present
- **Biomedical Engineering Society** 2024 – Present

TEACHING EXPERIENCE

- **EN.580.109.12 | Introduction to Nanomedicine** 01/2023, 01/2024
JHU Intersession Course Instructor
Introduced and offered a comprehensive view of nanomedicine, including the physical and chemical basis of biomaterials in the nano-size range, bio-interactions governing efficacy and side effects, conventional and advanced design strategies to overcome biological barriers, and examples in diverse applications.
- **EN.580.453 | Immunoengineering: Principles and Applications** 09/2024 – 12/2024
JHU Teaching Assistant
Offered insightful explanations and practical demonstrations in class, fostering a collaborative learning environment that supported students in mastering the fundamental principles of immunoengineering.
- **EN.580.642 | Tissue Engineering** 09/2022 – 12/2022
JHU Teaching Assistant
Provided insightful explanations and practical demonstrations in classes. Helped create a collaborative learning environment to assist students in learning the fundamental principles in tissue engineering.

LEADERSHIP & PROFESSIONAL SERVICES

- **Lab Manager**, Mao Laboratory, Johns Hopkins University 2021/09 – Present
- **Peer Health Navigators**, Johns Hopkins University 2023/09 – 2024/09
- **Intern Pharmacist**, West China Hospital, Sichuan University 2018/07 – 2018/08
- **President, Student Union of West China School of Pharmacy**, Sichuan University 2015/05 – 2018/05
- **Journal Reviewer**
 - Serve as reviewers for *Biomaterials*, *Journal of Controlled Release*, *Cancer Nanotechnology*, *iScience*, *Pharmaceutical Research*, *Bioengineering & Translational Medicine*, *Journal of Drug Delivery Science and Technology*, *Journal of Liposome Research*, *Scientific Reports*, *Discover Chemistry*, *Journal of Nanobiotechnology*.