

## CURRICULUM VITAE

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### Kerui Wu

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### **Employment History**

08/2023-Current	Assistant Professor	Nanoscience Department The Joint School of Nanoscience and Nanoengineering University of North Carolina Greensboro, USA
08/2024-Current	Founder and CTO	TKW TECHNOLOGY LLC, USA
04/2023-7/2023	T32 Fellow	The Department of Cancer Biology Wake Forest University School of Medicine, USA
05/2017-03/2023	Research Fellow	The Department of Cancer Biology Wake Forest University School of Medicine, USA
10/2014-05/2017	Research Assistant	The Department of Cancer Biology Wake Forest University School of Medicine, USA
08/2012- 09/2014	Research Assistant	The Department of Biochemistry University of Mississippi Medical Center, USA
07/2011-06/2012	Medical Intern	Clinical Medicine No. 2 Affiliated Hospital of Nanjing Medical University, China

### **Education and Training**

2017	Ph.D.	Wake Forest University	Cancer Biology
2014	Ph.D. (Transferred)	The University of Mississippi Medical Center	Biochemistry
2012	B.S.	Nanjing Medical University	Clinical Medicine

### **External Funding**

Title: Engineering a Macrophage-Targeted Magnesium Nano-Nourisher for Anti-Inflammatory Wound Healing and Scar Prevention

Award Number: NCI-001330

Role: Principal Investigator

Project Period: 02/2026 – 01/2028

Source of Support: NCInnovation (North Carolina. US)

Title: Screening of Natural Foods Rich in Chlorogenic Acid to Combat Bone Metastasis in ER-Positive Breast Cancer

Award Number: 2025-67018-44991

Role: Principal Investigator

Project Period: 09/2025 – 08/2027

Source of Support: United States Department of Agriculture (Washington, D.C. US)

Title: ERI: Bioengineering Synthetic Antigen-Presenting Cells for Controlled Immune Modulation  
Award Number: 2501889  
Role: Principal Investigator  
Project Period: 07/2025 – 06/2027  
Source of Support: National Science Foundation (Virginia, US)

Title: In Situ DC Engineering via Localized Nanovesicle Delivery Platform  
Role: Principal Investigator  
Project Period: 07/2025 – 06/2026  
Source of Support: Houston Methodist Research Institute (Texas, US)

Title: Engineering Osteoclasts for the Treatment of ER-Positive Breast Cancer Bone Metastasis  
Role: Principal Investigator  
Project Period: 03/2025 – 02/2026  
Source of Support: Houston Methodist Research Institute (Texas, US)

Title: Designing Intelligent Nanovesicles for Artificial Antigen Presentation in Lung Cancer Immunotherapy  
Award Number: 1192550  
Role: Principal Investigator  
Project Period: 01/2024 – 06/2025  
Source of Support: Lung Cancer Initiative (North Carolina, US)

Title: Engineering a smart nanovesicle for active antigen presentation independent of antigen-presenting cells  
Award Number: HT9425-24-1-0043  
Role: Principal Investigator  
Project Period: 01/2024 – 12/2025  
Source of Support: U.S. Army Medical Research Acquisition Activity (Maryland, US)

Title: DOD HBCUMI Instrumentation: Acquisition of a 3D Super-Resolution Live Cell Imaging Microscope for Interdisciplinary Graduate Research and Educational Training  
Award Number: W911NF2410283  
Role: Co-Investigator  
Project Period: 09/2024 – 09/2025  
Source of Support: US Department of Defense (Washington, D.C. US)

Title: Engineering a SMART Nanovesicle for Dendritic Cell-Deficient Cancer Treatment  
Award Number: 2024-FLG-0078  
Role: Principal Investigator  
Project Period: 09/2024 – 08/2025  
Source of Support: North Carolina Biotechnology Center (North Carolina, US)

Title: Designing Intelligent Nanovesicles for Artificial Antigen Presentation in Lung Cancer Immunotherapy  
Award Number: 1192550  
Role: Principal Investigator  
Project Period: 01/2024 – 06/2025  
Source of Support: Lung Cancer Initiative (North Carolina, US)

Title: Engineering Osteoclasts for the Treatment of ER-Positive Breast Cancer Bone Metastasis  
Award Number: 2024-FLG-0066  
Role: Principal Investigator

Project Period: 04/2024 – 03/2025

Source of Support: North Carolina Biotechnology Center (North Carolina, US)

### Honors and Awards

2024	Vicky Amidon Innovation in Lung Cancer Research Award	Lung Cancer Initiative
2024	Excellence in Innovation	UNC Greensboro
2024	Internal Research Award	UNC Greensboro
2023	Comprehensive Cancer Center Fellows Cancer Center Research Symposium Best Presentation Award	Atrium Health Wake Forest Baptist Comprehensive Cancer Center
2023	T32 Postdoctoral Research Fellowship	National Institutes of Health
2023	Top-10 Women's Health Research	Wake Forest University
2021	Director's Excellence in Cancer Research Award	Wake Forest University

### Professional and Synergistic Activities

Professional Membership	American Association for Cancer Research American Association of Immunologists Biomedical Engineering Society
Grant Reviewer Panelist	National Institutes of Health NanoSIMST K-12 Teacher's Workshop NNCI NTEC Workshop
Advisor	Draelos Science Scholars Program SENIC Undergraduate Internship in Nanotechnology Semi-BELLS Undergraduate Internship Program
Journal Reviewer 20+ journals Selected examples	Journal of Experimental & Clinical Cancer Research Breast Cancer Research Oncotarget

### Research Focuses

- **Programmable synthetic cells and chemical interfaces** I develop synthetic cell-like platforms by engineering interfacial chemistry, membrane composition, and reaction-driven assembly to control how biomolecular signals are organized and presented. These chemically defined systems are used to interrogate and regulate fundamental cell-cell communication and immune signaling, creating a general framework for translating structure-property relationships into biological function.
- **Nanomaterials for controlled delivery and signal regulation** I design nanomaterial systems in which composition, surface functionalization, and stimulus-responsive chemistry govern transport, stability, and intracellular signal delivery. By integrating soft-matter design with bioorthogonal and bioconjugation reactions, my lab builds targeted platforms that improve precision modulation of biological pathways in complex environments, with applications spanning inflammation, cancer, and regenerative contexts.
- **Investigating Cell-Cell Communication in the Immune Regulation** My research explores how cell-to-cell communication shapes immune responses, both in maintaining health and in driving disease processes, particularly within the immune system.
- **Tumor Microenvironment and Metastasis:** My lab explores the role of the tumor microenvironment in promoting cancer progression and metastasis, aiming to identify key mechanisms that could be targeted to prevent cancer spread and improve treatment outcomes

### **Selected Products**

1. Li Wang, Zhuo Yan, Sindhu Yalavarthi, Yusif Abdul-Rashid, Kiki Parker, Kyle Nowlin, Ethan Li, Jordan Mack, Josephine Wei, Hunter Vu, Zhenquan Jia, Jianjun Wei, Jilong Wang, Kerui Wu. "Macrophage-Targeted Magnesium Ion-Nourisher for NLRP3 Inflammasome Inhibition to Enhance Liver Inflammatory Disease Treatment." *Advanced Science* (2026): e13798.
2. Shih-Ying Wu, Abhishek Tyagi, Kerui Wu, Eleanor C. Smith, Qianqian Song, Sambad Sharma, Lance D. Miller, Wei Zhang, Bo-Syong Pan, Hui-Kuan Lin, Jung-Shun Lee, Ashok Pullikuth, Fei Xing, Ravindra Pramod Deshpande, Dan Zhao, Yin Liu, Jee Won Kim, Michael H Soike, Jimmy Ruiz, Michael Chan, Jeff Chou, Alexandra Parson, Kounosuke Watabe. "MyD88-mediated chimaeric antigen receptor macrophages suppress brain metastasis using target-specific phagocytosis." *Nature Biomedical Engineering* (2026): 1-19.
3. Kerui Wu. Provisional Patent, U.S. Application No. 63/880,935, Macrophage-Targeted Magnesium Nano-Nourisher for Anti-Inflammatory Therapy. 2025 September.
4. Kerui Wu, Kounosuke Watabe. WIPO Patent WO2024215711: Modified Mammalian Vesicles and Compositions and Methods Related Thereto. 2024 October.
5. Sindhu Yalavarthi, Li Wang, Yusif-Abdul Rashid, Kiki Parker, I'yanah Gunter, Ethan Li, Emily Ca<sup>#</sup>, Jianjun Wei, Zhenquan Jia, Kounosuke Watabe, Kerui Wu, "Engineering an artificial antigen presenting system: A novel immunotherapeutic strategy for lung cancer." *Cancer Research* 85, no. 8\_Supplement\_1 (2025): 3549-3549.
6. Kerui Wu, Li Wang, Sindhu Yalavarthi, Yusif Abdul-Rashid, Zhiheng He, Zhenquan Jia, Targeted magnesium ion delivery to macrophages via efferocytosis-mimicking nanoparticles for anti-inflammatory regulation 4167, *The Journal of Immunology*, Volume 214, Issue Supplement\_1, November 2025, vkaf283.1881
7. Kerui Wu, Feng Lyu, Shih-Ying Wu, Sambad Sharma, Ravindra Pramod Deshpande, Abhishek Tyagi, Dan Zhao, Fei Xing, Ravi Singh, and Kounosuke Watabe. "Engineering an active immunotherapy for personalized cancer treatment and prevention of recurrence." *Science Advances* 9, no. 17 (2023): eade0625.
8. Feng Lyu<sup>1</sup>, Kerui Wu<sup>1</sup>, Shih-Ying Wu, Ravindra Pramod Deshpande, Abhishek Tyagi, Isabella Ruiz<sup>#</sup>, and Kounosuke Watabe. " Functional evaluation of dendritic cells and extracellular vesicles as immunotherapy for breast cancer." *Oncogene*. 2024 Jan;43(5):319-327. (<sup>1</sup>co-first author)
9. Kerui Wu, Jiamei Feng, Feng Lyu, Fei Xing, Sambad Sharma, Yin Liu, Shih-Ying Wu, Dan Zhao, Abhishek Tyagi, Ravindra Pramod Deshpande, Xinhong Pei, Marco Gabriel Ruiz, Hiroyuki Takahashi, Shunsuke Tsuzuki, Takahiro Kimura, Yin-yuan Mo, Yusuke Shiozawa, Ravi Singh and Kounosuke Watabe (2021). Exosomal miR-19a and IBSP cooperate to induce osteolytic bone metastasis of estrogen receptor-positive breast cancer. *Nature Communications* 12, no. 1 (2021): 5196
10. Dan Zhao<sup>1</sup>, Kerui Wu<sup>1</sup>, Sambad Sharma, Fei Xing, Shih-Ying Wu, Abhishek Tyagi, Ravindra Deshpande, Ravi Singh, Martin Wabitsch, Yin-Yuan Mo, Kounosuke Watabe. "Exosomal miR-1304-3p promotes breast cancer progression in African Americans by activating cancer-associated adipocytes." *Nature Communications* 13, no. 1 (2022): 7734. (<sup>1</sup>co-first author)
11. Kerui Wu, Koji Fukuda, Fei Xing, Yingyu Zhang, Sambad Sharma, Yin Liu, Michael D Chan, Xiaobo Zhou, Shadi A Qasem, Radhika Pochampally, Yin-Yuan Mo, Kounosuke Watabe. "Roles of the cyclooxygenase 2 matrix metalloproteinase 1 pathway in brain metastasis of breast cancer." *Journal of Biological Chemistry* 290, no. 15 (2015): 9842-9854.

### **Complete List of Published Work in MyBibliography**

<https://www.ncbi.nlm.nih.gov/myncbi/kerui.wu.1/bibliography/public/>