

BIOGRAPHICAL SKETCH

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NAME: Xiao, Zhen

eRA COMMONS USER NAME (credential, e.g., agency login): ZHEN.XIAO

POSITION TITLE: Postdoctoral Researcher

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Beihang University, China	B.S.	06/2017	Chemistry
Brown University, RI	Ph.D.	05/2022	Chemistry
Stanford University, CA	Postdoc		Chemistry

A. Personal Statement

I am a dedicated researcher with more than eight years of experience synthesizing and characterizing nanomaterials, and over five years applying them in environmental and biomedical contexts. My passion lies in advancing in vivo imaging of tumors and pathogens using nanotechnology. As a positive and proactive problem-solver, I excel in collaborative environments and consistently strive for innovation in my work. I am driven by a longstanding passion for advancing cancer diagnosis and treatment through the creative applications of magnetic nanomaterials. My goal is to build a dynamic research program that integrates the synthesis of novel magnetic nanoparticles, magnetic resonance imaging and magnetic particle imaging, magnetic hyperthermia, and image-guided therapy to address the challenges of modern cancer care.

B. Positions, Scientific Appointments, and Honors**Positions and Employment**

Postdoctoral Scholar, 2022 - Present

Stanford University, School of Medicine, Molecular Imaging Program at Stanford. California, USA

Advisor: Prof. Jianghong Rao

- Applying magnetic nanomaterials for cancer imaging using magnetic resonance imaging (MRI), magnetic particle imaging (MPI), and magnetically targeted drug delivery for cancer treatment
- Developing smart MPI probes for various biological activity monitoring, including granzyme B activity in tumor response to cancer immunotherapy
- Conjugating bacteriophage with magnetic nanoparticles for highly sensitive and rapid Mycobacterium tuberculosis detection in small volumes of biological samples
- Utilizing surface-enhanced Raman scattering (SERS) technology and gold nanoparticles to enable multiplexed analysis and simultaneous identification of multiple drug-resistant bacterial strains
- Exploring new formulations of lipid nanoparticles that deplete the mitochondrial copper in the tumor cells for efficient and safe cancer treatment
- Studying cell death mechanisms using electron microscopy

Doctor of Philosophy in Chemistry, 2017 - 2022

Brown University, Department of Chemistry. Rhode Island, USA

Advisor: Prof. Vicki L. Colvin

Thesis: Magnetic nanocrystal clusters: understanding, shaping, and exploiting their giant susceptibility

- Achieved systematic synthesis of magnetic nanoclusters with ten times higher magnetic susceptibility than conventional magnetic nanoparticles. Also demonstrated that these nanoclusters have excellent magnetic separation and heating efficiency
- Developed sulfonated copolymers as coatings for these nanoclusters and achieved high colloidal stability, making them useful as MRI T2 contrast agents and photonic crystals
- Explored the potential of magnetic nanoclusters for drug delivery, cancer treatment, and in vivo imaging
- Synthesized manganese-doped iron oxide nanoclusters with higher magnetic susceptibilities and applied them for magnetothermal degradation of environmental contaminants
- Prepared hierarchical magnetic assemblies of one-dimensional chains with controlled length, which can affect rapid mixing as nanoscale stir bars

Bachelor of Science in Chemistry, 2013 - 2017

Beihang University (BUAA), School of Chemistry and Environment, Beijing, China

Advisor: Prof. Ying Zhu

Thesis: Plant derived cobalt doped carbon nanomaterial as an efficient electrocatalysts for oxygen reduction reaction

- Synthesized porous carbon nanomaterials derived from biomass as efficient electrocatalysts

Conference Presentations

World Molecular Imaging Congress, 2024, Montréal, QC, Canada,

- Activatable MPI Nanoprobe as Molecular Sensing Platforms for Biological Targets (Oral presentation)

American Chemical Society, March 2022, Poster presentation - Virtual

- Highly Responsive Manganese Ferrite Clusters toward Efficient Magnetic Heating using Battery-operated Inductive Heaters

Pharma R&D, February 2022, San Francisco, CA

- Highly Responsive Magnetic Nanoclusters for Biomedical Applications (Oral presentation)

American Chemical Society, 2020 National Meeting, Philadelphia, PA

- Magnetic Multicore Iron Oxide Nanoparticles with Tunable Dimensions and their Biomedical Applications (Poster presentation - Virtual)

TechConnect World Innovation, July 2019, Boston, MA

- Magnetic Multicore Iron Oxide Nanoparticles with Tunable Dimensions and their Biomedical Applications (Poster presentation)

Northeast Bioengineering Conference, March 2019, New Brunswick, NJ

- Forming Libraries of Magnetic Multicore Nanoparticles with Tunable Dimensions and their Biomedical Applications (Oral presentation)

Honors

WMIC Student Travel Award, World Molecular Imaging Congress, 2024

Bio-X program 10 Rank 1 poster award, Stanford Bio-X Interdisciplinary Initiatives Seed Grants Program, 2024

Outstanding Student Poster Award, ACS Division of Colloid and Surface Chemistry, 2022

Philip A. Smith '26 Chemistry Fellowship, Brown University, 2018

Shenyuan Medal, Beihang University, 2017 (The highest honor for undergraduate students)

Outstanding Award in Baosteel Education Fund, 2016 (Only five among 14,000 undergraduate students)

Nano Research Paper of the Month Award, Tsinghua University Press, 2016

C. Contributions to Science

Publications

1. Copper Chelation Induces Morphology Change in Mitochondria of Triple-Negative Breast Cancer. Lee, C.H., **Xiao, Z.**, Lim, I., Wang, T., Aghaei, P., Burke, P. J., Rao, J. *JACS Au*, 2025
2. Endothelial Cu Uptake Transporter CTR1 Senses Disturbed Flow to Promote Atherosclerosis through Cuproptosis. Sudhakar, V., **Xiao, Z.**, Das, A., Ash, D., Yadav, S., Matier, Ushio-Fukai, M., Fukai, T., et al. *bioRxiv*, 2025
3. Light-Controlled Intracellular Synthesis of Poly(luciferin) Polymers Induces Cell Paraptosis. Dai, S. Y., **Xiao, Z.**, Rao, J., et al. *Journal of the American Chemical Society*, 2025

4. Culture-independent multiplexed detection of drug-resistant bacteria using surface-enhanced Raman scattering. Dai, T., **Xiao, Z.** (co-first), Rao, J., et al. *ACS Sensors*, 2023
5. Sensitive T2 MRI Contrast Agents from the Rational Design of Iron Oxide Nanoparticle Surface Coatings. Cho, M., Villanova, J., Ines, D. M., Chen, J., Lee, S. S., **Xiao, Z.**, Colvin, V. L., et al. *The Journal of Physical Chemistry C*, 2023
6. Multifunctional Magnetic Nanoclusters Can Induce Immunogenic Cell Death and Suppress Tumor Recurrence and Metastasis. Zhang, L., Zhang, Q., Hinojosa, D. T., Jiang, K., Pham, Q. K., **Xiao, Z.**, Bao, G., et al. *ACS Nano*, 2022
7. Increasing the antioxidant capacity of ceria nanoparticles with catechol-grafted poly (ethylene glycol). Hu, Y., Zhang, Q., Garcia-Rojas, D., Ling, V., Masterson, Q., **Xiao, Z.**, Colvin, V. L., et al. *Journal of Materials Chemistry B*, 2022
8. Stable Aqueous Suspensions of Manganese Ferrite Clusters with Tunable Nanoscale Dimension and Composition. Effman, S., Avidan, S., **Xiao, Z.** (co-first), Colvin, V. L. *Journal of Visualized Experiments*, 2022
9. When function is biological: Discerning how silver nanoparticle structure dictates antimicrobial activity. Zhang, Q., Hu, Y., Masterson, C. M., Jang, W., **Xiao, Z.**, Bohloul, A., Colvin, V. L., et al. *Science*, 2022
10. Sub-second Multi-channel Magnetic Control of Select Neural Circuits in Behaving Flies. Sebesta, C., Torres Hinojosa, D., Wang, B., Asfour, J., Li, Z., Duret, G., Jiang, K., **Xiao, Z.**, Zhang, L., Zhang, Q., Colvin, V.L., et al. *Nature Materials*, 2022
11. Synthesis and Application of Magnetic Nanocrystal Clusters. **Xiao, Z.**, Zhang, L., Colvin, V. L., Zhang, Q., Bao, G. *Industrial & Engineering Chemistry Research*, 2022
12. Controlled oxidation and surface modification increase heating capacity of magnetic iron oxide nanoparticles. Jiang, K., Zhang, Q., Hinojosa, D.T., Zhang, L., **Xiao, Z.**, Yin, Y., Tong, S., Colvin, V.L., Bao, G. *Applied Physics Reviews*, 2021
13. Nanoparticle-Catalyzed Green Chemistry Synthesis of Polybenzoxazole. Shen, M., Yu, C., Guan, H., Dong, X., Harris, C., Xiao, Z., Sun, S., et al. *Journal of the American Chemical Society*, 2021
14. 2D Gadolinium Oxide Nanoplates as T1 Magnetic Resonance Imaging Contrast Agents. Stinnett, G., Taheri, N., Villanova, J., Bohloul, A., Guo, X., Esposito, E. P., **Xiao, Z.**, Colvin, V. L., et al. *Advanced Healthcare Materials*, 2021
15. Magnetic nanoparticles in biology and medicine: past, present, and future trends. Stueber, D. D., Villanova, J., Aponte, I., **Xiao, Z.**, Colvin, V. L. *Pharmaceutics*, 2021
16. Forming Libraries of Uniform Magnetic Multicore Nanoparticles with Tunable Dimensions and their Applications. **Xiao, Z.**, Zhang, Q., Guo, X., Villanova, J., Hu, Y., Külaots, I., Colvin, V. L., et al. *ACS Applied Materials & Interfaces*, 2020
17. Homogeneously Dispersed Co₉S₈ Anchored on Nitrogen and Sulfur Co-Doped Carbon Derived from Soybean as Bifunctional Oxygen Electrocatalysts and Supercapacitors. **Xiao, Z.**, Xiao, G., Shi, M., Zhu, Y. *ACS Applied Materials & Interfaces*, 2018
18. Natural tea-leaf-derived, ternary-doped 3D porous carbon as a high-performance electrocatalyst for the oxygen reduction reaction. Guo, Z., **Xiao, Z.** (co-first), Ren, G., Xiao, G., Zhu, Y., Dai, L., Jiang, L. *Nano Research*, 2016
19. China rose-derived tri-heteroatom co-doped porous carbon as an efficient electrocatalysts for oxygen reduction reaction. **Xiao, Z.**, Gao, X., Shi, M., Ren, G., Xiao, G., Zhu, Y., Jiang, L. *RSC Advances*, 2016

Editorial Experience

Invited Guest Editor of Special Issue "Semiconductor Nanomaterials for Energy Conversion and Environmental Applications" in *Crystal* (ISSN: 2073-4352), MDPI, 2022

- Invited to curate and oversee a special issue focused on the latest advancements in semiconductor nanomaterials and their applications in energy conversion and environmental sustainability.
- Collaborating with authors and reviewers to ensure the publication of high-quality research articles that contribute to the field.
- Engaging with the scientific community to promote innovative research and foster discussions on emerging trends in nanomaterials.

Manuscript Reviewer:

- Reviewed numerous scientific papers for various reputable journals, including:

Materials	Nano-Structures & Nano-Objects
Diagnostics	Applied Sciences
Gels	ChemEngineering
Crystals	International Journal of Molecular Sciences
Molecules	Pharmaceutics
Micro	Nanoscale Advances
RSC Advances	Universal Journal of Carbon Research
Polymers	Journal of Functional Biomaterials
Coatings	Magnetochemistry
Medicina	

- Provided constructive feedback and recommendations to authors, enhancing the clarity and impact of their work.
- Engaged with the academic community to support the peer review process and uphold high standards in scientific publishing, contributing to the integrity and quality of published research.