Stanford

Zhen Xiao

Postdoctoral Scholar, Molecular Imaging Program at Stanford

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Bio

BIO

Zhen Xiao is a postdoctoral scholar at Stanford University School of Medicine, where his research focuses on developing magnetic nanomaterial–based platforms for biomedical imaging, diagnostics, and cancer theranostics. His current work in the laboratory of Prof. Jianghong Rao centers on the detection and imaging of pathogens and tumors using nanotechnology, with particular emphasis on magnetic particle imaging (MPI) and translational diagnostic strategies.

Zhen received his Ph.D. in Chemistry from Brown University, where he worked with Prof. Vicki L. Colvin on the design and synthesis of magnetic nanocrystal clusters. During his doctoral research, he developed systematic synthetic approaches to iron oxide nanoclusters and demonstrated their superior magnetic properties compared to conventional single-core nanoparticles. Through multidisciplinary collaborations, he applied these materials in a range of in vitro and in vivo studies, including magnetic cell separation, targeted drug delivery, magnetic hyperthermia, and imaging contrast enhancement.

By integrating materials chemistry, magnetic technologies, and molecular imaging, Zhen's research aims to advance clinically translatable nanotechnologies for precision diagnostics and therapy monitoring in cancer and infectious diseases.

HONORS AND AWARDS

- ACS Division of Colloid and Surface Chemistry Outstanding Student Poster Award, American Chemical Society (2022)
- Philip A. Smith '26 Chemistry Fellowship, Brown University (2018)
- Shenyuan Medal, the Highest Undergraduate Honor, Beihang University (2017)
- Nano Research Paper of the Month Award, Tsinghua University Press (2016)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Guest Editor, Special Issue "Semiconductor Nanomaterials for Energy Conversion and Environmental Applications" in Crystal, MDPI (2022 - 2022)

STANFORD ADVISORS

- Jianghong Rao, Postdoctoral Faculty Sponsor

LINKS

- My Google Scholar: https://scholar.google.com/citations?user=gJdK1kcAAAAJ&hl=en
- Linkedin: www.linkedin.com/in/zhen-xiao-594094157
- ORCID: https://orcid.org/0000-0002-3740-3546

- My personal site: https://zhen-xiao.lovable.app/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Applying magnetic nanomaterials for bioimaging and cancer treatment

LAB AFFILIATIONS

- Jianghong Rao (6/15/2022)

Publications

PUBLICATIONS

- **Imaging of Staphylococcus aureus Infections and Biofilms Using a Selective Covalent Probe for the Unique Serine Hydrolase FphE.** *Angewandte Chemie (International ed. in English)*
  Woods, E. C., Upadhyay, T., Park, K. W., Su, S. P., Xiao, Z., Rao, J., Valdez, T. A., Jo, J., Bogyo, M.
  2026: e9575966
- **Mycobacteriophage Functionalized Magnetic Nanocrystal Clusters for Highly Sensitive and Rapid Detection of Mycobacterium tuberculosis.** *JACS Au*
  Xiao, Z., Yen, C., Wang, T., Ibrahim, J., Fu, Q., Dai, S. Y., Hajfathalian, M., Murugesan, K., Banaei, N., Bogyo, M., Rao, J.
  2025; 5 (12): 6100-6111
- **Mechanistic Insight into Disturbed Flow-Induced Mitochondrial Copper Overload and Cuproptosis in Atherosclerosis**
  Varadarajan, S., Xiao, Z., Das, A., Ash, D., Yadav, S., Spears, S., Lee, J., Jo, H., Chang, C., Rao, J., Kaplan, J., Ushio-Fukai, M., Fukai, et al
  LIPPINCOTT WILLIAMS & WILKINS.2025
- **Quantifying the Antioxidant Capacity of Inorganic Nanoparticles: Challenges and Analytical Solutions.** *Antioxidants (Basel, Switzerland)*
  Hu, Y., Zhang, Q., Xiao, Z., Guo, X., Ling, V., Bi, Y., Colvin, V. L.
  2025; 14 (10)
- **Copper Chelation Induces Morphology Change in Mitochondria of Triple-Negative Breast Cancer.** *JACS Au*
  Lee, C., Xiao, Z., Lim, I., Wang, T., Aghaei, P., Burke, P. J., Rao, J.
  2025; 5 (5): 2102-2113
- **Endothelial Cu Uptake Transporter CTR1 Senses Disturbed Flow to Promote Atherosclerosis through Cuproptosis.** *bioRxiv : the preprint server for biology*
  Sudhahar, V., Xiao, Z., Das, A., Ash, D., Yadav, S., Matier, C. D., Pezacki, A. T., Chatterjee, B., Antipova, O. A., Vogt, S., McMenamin, M., Kelley, S., Csanyi, et al
  2025
- **Light-Controlled Intracellular Synthesis of Poly(luciferin) Polymers Induces Cell Paraptosis.** *Journal of the American Chemical Society*
  Dai, S., Xiao, Z., Shen, F., Lim, I., Rao, J.
  2025
- **Culture-Independent Multiplexed Detection of Drug-Resistant Bacteria Using Surface-Enhanced Raman Scattering.** *ACS sensors*
  Dai, T., Xiao, Z., Shan, D., Moreno, A., Li, H., Prakash, M., Banaei, N., Rao, J.
  2023
- **Sensitive T2 MRI Contrast Agents from the Rational Design of Iron Oxide Nanoparticle Surface Coatings** *JOURNAL OF PHYSICAL CHEMISTRY C*
  Cho, M., Villanova, J., Ines, D. M., Chen, J., Lee, S., Xiao, Z., Guo, X., Dunn, J. A., Stueber, D. D., Decuzzi, P., Colvin, V. L.
  2023; 127 (2): 1057-1070
- **Multifunctional Magnetic Nanoclusters Can Induce Immunogenic Cell Death and Suppress Tumor Recurrence and Metastasis.** *ACS nano*
  Zhang, L., Zhang, Q., Hinojosa, D. T., Jiang, K., Pham, Q. K., Xiao, Z., Colvin, V. L., Bao, G.
  2022

- **Increasing the antioxidant capacity of ceria nanoparticles with catechol-grafted poly(ethylene glycol).** *Journal of materials chemistry. B*
  Hu, Y., Zhang, Q., Garcia-Rojas, D., Ling, V., Masterson, C. M., Bi, Y., Xiao, Z., Guo, X., Villanova, J., Dunn, J., Colvin, V. L.
  2022
- **When function is biological: Discerning how silver nanoparticle structure dictates antimicrobial activity.** *iScience*
  Zhang, Q., Hu, Y., Masterson, C. M., Jang, W., Xiao, Z., Bohloul, A., Garcia-Rojas, D., Puppala, H. L., Bennett, G., Colvin, V. L.
  2022; 25 (7): 104475
- **Subsecond multichannel magnetic control of select neural circuits in freely moving flies.** *Nature materials*
  Sebesta, C., Torres Hinojosa, D., Wang, B., Asfouri, J., Li, Z., Duret, G., Jiang, K., Xiao, Z., Zhang, L., Zhang, Q., Colvin, V. L., Goetz, S. M., Peterchev, et al
  2022
- **Synthesis and Application of Magnetic Nanocrystal Clusters** *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*
  Xiao, Z., Zhang, L., Colvin, V. L., Zhang, Q., Bao, G.
  2022; 61 (22): 7613-7625
- **Stable Aqueous Suspensions of Manganese Ferrite Clusters with Tunable Nanoscale Dimension and Composition** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
  Effman, S., Avidan, S., Xiao, Z., Colvin, V.
  2022
- **Controlled oxidation and surface modification increase heating capacity of magnetic iron oxide nanoparticles** *APPLIED PHYSICS REVIEWS*
  Jiang, K., Zhang, Q., Hinojosa, D., Zhang, L., Xiao, Z., Yin, Y., Tong, S., Colvin, V. L., Bao, G.
  2021; 8 (3)
- **Magnetic Nanoparticles in Biology and Medicine: Past, Present, and Future Trends** *PHARMACEUTICS*
  Stueber, D. D., Villanova, J., Aponte, I., Xiao, Z., Colvin, V. L.
  2021; 13 (7)
- **2D Gadolinium Oxide Nanoplates as T-1 Magnetic Resonance Imaging Contrast Agents** *ADVANCED HEALTHCARE MATERIALS*
  Stinnett, G., Taheri, N., Villanova, J., Bohloul, A., Guo, X., Esposito, E. P., Xiao, Z., Stueber, D., Avendano, C., Decuzzi, P., Pautler, R. G., Colvin, V. L.
  2021; 10 (11): e2001780
- **Nanoparticle-Catalyzed Green Chemistry Synthesis of Polybenzoxazole** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Shen, M., Yu, C., Guan, H., Dong, X., Harris, C., Xiao, Z., Yin, Z., Muzzio, M., Lin, H., Robinson, J. R., Colvin, V. L., Sun, S.
  2021; 143 (4): 2115-2122
- **Libraries of Uniform Magnetic Multicore Nanoparticles with Tunable Dimensions for Biomedical and Photonic Applications** *ACS APPLIED MATERIALS & INTERFACES*
  Xiao, Z., Zhang, Q., Guo, X., Villanova, J., Hu, Y., Kulaots, I., Garcia-Rojas, D., Guo, W., Colvin, V. L.
  2020; 12 (37): 41932-41941
- **Homogeneously Dispersed Co9S8 Anchored on Nitrogen and Sulfur Co-Doped Carbon Derived from Soybean as Bifunctional Oxygen Electrocatalysts and Supercapacitors** *ACS APPLIED MATERIALS & INTERFACES*
  Xiao, Z., Xiao, G., Shi, M., Zhu, Y.
  2018; 10 (19): 16436-16448
- **Natural tea-leaf-derived, ternary-doped 3D porous carbon as a high-performance electrocatalyst for the oxygen reduction reaction** *NANO RESEARCH*
  Guo, Z., Xiao, Z., Ren, G., Xiao, G., Zhu, Y., Dai, L., Jiang, L.
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- **China rose-derived tri-heteroatom co-doped porous carbon as an efficient electrocatalysts for oxygen reduction reaction** *RSC ADVANCES*
  Xiao, Z., Gao, X., Shi, M., Ren, G., Xiao, G., Zhu, Y., Jiang, L.
  2016; 6 (89): 86401-86409