

**Dr. Xiao-Min Lin**

Scientist

Theme: Electronic and Magnetic Materials & Devices

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**Research Summary:**

The main focus of my research program is to understand the synthesis and self-assembly of colloidal nanoparticles, and to explore a broad range of novel physical and chemical properties of nanocrystal based materials. We focus on engineering the properties on single particles, tune the interaction between nanoparticles to unique architectures, and explore the collective phenomena resulting from the coupling between nanoparticles and other molecular species.

**Selected Recent Publications:**

- 1) Zhang Jiang, Xiao-Min Lin, Michael Sprung, Suresh Narayanan, Jin Wang, Capturing the crystalline phase of two-dimensional nanocrystal superlattices in action, *Nano Lett.* 10, 799, (2010).
- 2) Quy Khac Ong, Alexander Wei and Xiao-Min Lin, Exchange bias in Fe@Fe<sub>3</sub>O<sub>4</sub> core-shell magnetic nanoparticles mediated by frozen interfacial spins, *Phys. Rev. B.*, 80, 134418 (2009).
- 3) Klara E. Mueggenburg, Xiao-Min Lin, Rodney H. Goldsmith, Heinrich M. Jaeger, Elastic Properties of Close-packed, Free-standing Nanoparticles Arrays, *Nature Materials*, 6, 656-660, (2007)
- 4) Xiao-Min Lin, Helmut Claus, Ulrich Welp, Igor S. Beloborodov, Wai-Kwong Kwok, George W. Crabtree, Heinrich M. Jaeger, Growth and Properties of Superconducting Anisotropic Lead Nanoprisms, *J. Phys. Chem. C. (Letter)*, 111, 3548-3550, (2007).
- 5) Anna C.S. Samia, John A. Schlueter, J. Samuel Jiang, Samuel D. Bader , Chang-Jin Qin, Xiao-Min Lin, The Effect of Ligand-Metal Interactions on the Growth of Transition Metal and Alloy Nanoparticles, *Chem. Mater.* 18, 5203-5212, (2006).
- 6) Xiao-Min Lin, Anna.C.S. Samia, Synthesis, Assembly and Physical Properties of Magnetic Nanoparticles [Topic Review], *J. Mag. Mag. Mater.*, 306, 100-109, (2006)

- 7) Terry .P. Bigioni, Xiao-Min Lin, Toan T. Nguyen, Eric I. Corwin, Thomas A. Witten, Heinrich M. Jaeger, Kinetically-Driven Self Assembly of Highly-Ordered Nanoparticle Monolayers, *Nature Materials*, 5, 265, (2006).
- 8) T. B. Tran, I.S. Beloborodov, X.M. Lin, V. M. Vinokur, H.M. Jaeger, Multiple Cotunneling in Large Quantum Dot Arrays, *Phys. Rev. Lett.* 95, 076806, (2005).
- 9) Sang-Kee Eah, Heinrich M. Jaeger, Norbert F. Scherer, Gary P. Wiederrecht, Xiao-Min Lin, Plasmon Scattering from a Single Gold Nanoparticle Collected through an Optical Fiber, *Appl. Phys. Lett.* 86, 031902 (2005).
- 10) Sang-Kee Eah, Heinrich M. Jaeger, Norbert F. Scherer, Gary P. Wiederrecht, Xiao-Min Lin, Scattered Light Interference from a Single Metal Nanoparticle and its Mirror Image, *J. Phys. Chem. B. (Letter)*, 109, 11858, (2005).
- 11) Suresh Narayanan, Jin Wang, X.M. Lin, Dynamical Self-assembly of Nanocrystal Superlattices during Colloidal Droplet Evaporation by *in situ* Small Angle X-ray Scattering, *Phys. Rev. Lett.* 93, 135503, (2004).
- 12) Anna.C.S. Samia, Kylee Hyzee, John Schlueter, Chang-Jin Qin, J. Samuel Jiang, Samual D. Bader, Xiao-Min Lin, Ligand Effect on the Growth and the Digestion of Co Nanocrystals. *J. Am. Chem. Soc. (Communications)* 127 (12): 4126, (2005)
- 13) R. Parthasarathy, X.M. Lin, K. Elteto, T.F. Rosenbaum, H.M. Jaeger, Finite Temperature Electron Transport in Metal Nanocrystal Arrays. *Phys. Rev. Lett.*, 92(7), 076801, (2004).
- 14) X.M. Lin, H.M. Jaeger, C.M. Sorensen, K.J. Klabunde, Formation of Long-Range- Ordered Nanocrystal Superlattices on Silicon Nitride Substrates, *J. Phys. Chem. B* 105, 3353 (2001).