

# Andrea R. Tao

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## EDUCATION

- 2002–2007    Ph.D. in Chemistry  
University of California, Berkeley  
Dissertation Title: “Nanocrystal Assembly for Bottom-Up Plasmonic Materials”  
Research Advisor: Peidong Yang
- 1998-2002    A.B. in Chemistry and Physics, with honors in field  
Harvard University  
Research Advisor: George M. Whitesides

## RESEARCH EXPERIENCE

- 2007-present    *University of California, Santa Barbara – Santa Barbara, CA.*  
**University of California President’s Postdoctoral Fellow.**  
Mentor: Daniel E. Morse, Biomolecular Science & Engineering.
  - Synthesis of hierarchical BaTiO<sub>3</sub> structures for nanoscale device applications
  - Nanostructured polymer/inorganic composites
  - Adaptive photonic devices mimicking squid skin
- 2002-2007    *University of California, Berkeley – Berkeley, CA.*  
**National Science Foundation Graduate Research Fellow.**  
Advisor: Peidong Yang, Dept. of Chemistry, Materials Science Division at Lawrence Berkeley National Laboratory.
  - Large-scale assembly of nanowires
  - Silver nanocrystals for plasmonic materials
  - Nanoparticle and nanowire arrays for surface-enhanced Raman sensing
- 2001-2002    *Harvard University – Cambridge, MA.*  
**Materials Research and Science Engineering Center REU**  
Advisor: George M. Whitesides, Chemistry and Chemical Biology.  
Mesoscale self-assembly of flexible light-emitting diode arrays for display devices.

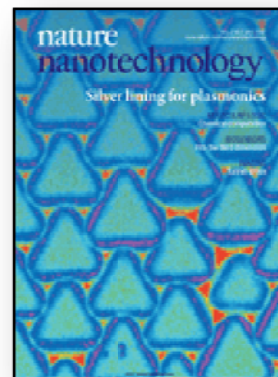
- 2000  
Summer *Center for Integrated Systems, Stanford University – Palo Alto, CA.*  
**NSF, National Nanofabrication Users Network REU.**  
Mentor: James S. Harris, Electrical Engineering.  
Fabrication of buried refractive AlGaAs microlens arrays for vertical-cavity surface-emitting lasers.
- 1999  
Summer *Biosite Diagnostics, Inc. – San Diego, CA.*  
**NSF Research Training Program in Solid-State Chemistry REU.**  
Chemistry researcher, R&D. Surface chemistry of latex microparticles used in fluorescence energy transfer technology for the Cardiac Triage, a blood-based diagnostic device detecting myocardial infarction.
- 1995-1998 *University of California, San Diego – La Jolla, CA.*  
**Southern California Academy of Sciences Research Training Program** and the **Junior Science & Humanities Symposium Research Program.**  
Mentor: Michael J. Sailor, Dept. of Chemistry & Biochemistry.
  - Optical properties of electrochemically etched porous silicon and the effects of oxidation and surface derivatization.
  - Awarded by the American Chemical Society, Society of Materials Engineers, American Vacuum Society, Fred H. Rohr Memorial.
  - Presented at the 1998 AAAS Annual Meeting & Science Innovation Exposition and the 1997 Museum of Science Conference.

#### HONORS & AWARDS

- International Union of Pure & Applied Chemistry, Prize for Young Chemists (2008)
- UC Santa Barbara Materials Research Lab Career Development Series, Panelist (2008)
- University of California President's Postdoctoral Fellowship (2007-2008)
- Tomas A. Hirschfeld Award, Federation of Analytical Chemistry and Spectroscopy Societies (2006)
- Materials Research Society Graduate Student Award, Silver (2006)
- Xerox Technical Minority Scholarship (2006)
- National Science Foundation Graduate Research Fellow (2002-2005)
- Harvard Dean's list (1999-2002)
- Harvard College Scholarship for academic distinction (1999-2002)
- Editor-in-Chief, Journal of Undergraduate Sciences (2000-2002)
- Diversity in Science and Technology Forum panelist, Harvard JFK School of Government (2001)
- International Society for Optical Engineering Scholarship (2001)
- Westinghouse Science & Talent Search Semi-finalist (1998)

## PUBLICATIONS

1. A.R. Tao, S. Habas, and P. Yang. **Invited review:** "Shape control of colloidal metal nanocrystals." *Small*, 4, 310 (2008).
2. M. Mulvihill, A.R. Tao, K. Benjauthrit, J. Arnold, and P. Yang. "Surface-Enhanced Raman Spectroscopy for Trace Arsenic Detection in Contaminated Water." *Angew. Chem. Int. Ed.*, 47, 1, (2008).
3. A.R. Tao, P. Sinsermsuksakul, and P. Yang. "Tunable plasmonic superlattices of silver nanocrystals." *Nature Nanotechnology*, 2, 435 (2007). **Cover image at right.**
4. D.J. Sirbuly, A.R. Tao, M. Law, R. Fan, and P. Yang. "Multi-functional nanowire evanescent wave optical sensors." *Advanced Materials*, 19, 61 (2007).
  - *Nature Photonics*, "Nanoscale optical sensors: Brightness helps," online, 14 December (2006).
5. A.R. Tao, P. Sinsermsuksakul, and P. Yang. "Polyhedral silver nanocrystals with distinct scattering signatures." *Angewandte Chemie International Edition*, 45, 4597 (2006).
  - **"Very Important Paper,"** as chosen by journal referees.
6. J. Huang, A. Tao, S. Connor, P. Yang. "A general method for assembling single nanoparticle lines." *Nano Letters*, 6, 524 (2006).
7. A. Tao\*, J. Huang\*, F. Kim\*, S. Conner, P. Yang, "Dewetting induced formation of ordered nanoparticle stripe patterns." *Nature Materials*, 4, 896 (2005).
8. A.R. Tao, P. Yang. "Polarized surface-enhanced Raman spectroscopy on coupled metallic nanowires." *Journal of Physical Chemistry B*, 109, 15687 (2005).
9. A. Tao\*, F. Kim\*, C. Hess\*, P. Yang et al. "Langmuir-Blodgett silver nanowire monolayers for molecular sensing using surface-enhanced Raman spectroscopy." *Nano Letters*, 3, 1229 (2003).
  - *Nature*, News and Views, "Nanotechnology: Wires on Water," 425, 243 (2003).
  - **Cited by 100+ publications.**
10. H.O. Jacobs, A.R. Tao, A. Schwartz, D.H. Gracias, and G.M. Whitesides. "Fabrication of a cylindrical display by patterned assembly." *Science*, 296, 323 (2002).
  - *Chemical & Engineering News*, **News of the Week**, "Self-Assembly Required," 80, 15 (2002).



\*indicates multiple first authors

### PENDING PUBLICATIONS

1. A.R. Tao. "Nanocrystal Assembly for Bottom-Up Plasmonic Materials & SERS Sensing." *Pure and Applied Chemistry*, in press, 2008.
2. A.R. Tao, D.P. Ceperley, P. Sinsermsuksakul, A. Neureuther, and P. Yang. "Self-Organized Silver Nanoparticles for Three-Dimensional Plasmonic Crystals." *Nano Letters*, in press, 2008.
3. A.R. Tao, J. Huang, and P. Yang. **Invited Review**: "Nanocrystal and Nanowire Langmuir-Blodgett." *Accounts of Chemical Research*, in press.

### INVITED TALKS

1. "From Plasmons to Proteins: Self-Organized Optical Materials." *Columbia University, Chemistry Department Seminar*. New York, NY, December 2008.
2. "From Plasmons to Proteins: Self-Organized Optical Materials." *UC San Diego, NanoEngineering Department Seminar*. San Diego, CA, November 2008.
3. "Plasmonic Lattices." *Gordon Research Conference on Plasmonics: Optics at the Nanoscale*. Tilton, NH, July 2008.
4. "Bio-Inspired Nanofabrication of Metal Oxide Thin Films and Nanoparticles." *NSTI Nanotech Symposium*. Boston, MA, June 2008.
5. "One-dimensional nanostructures as spectroscopic sensing platforms." *33<sup>rd</sup> Federation of Analytical Chemistry and Spectroscopy Societies National Conference*. Orlando, FL, September 2006.
6. "Synthesis and assembly of platonic nanocrystals." *Workshop on designing non-traditional materials based on geometric principles*. Clausthal University of Technology. Hanover, Germany, June 2005.
7. "Silver nanowires for SERS sensing." *31<sup>st</sup> Federation of Analytical Chemistry and Spectroscopy Societies National Conference*. Portland, OR, October 2004.

### PRESENTATIONS

1. Speaker. "Biophotonics: The Adaptive Optical Properties of Squid Skin." *UC Office of the President Postdoctoral Retreat*. Lake Arrowhead, CA, April 2008.
2. Speaker. "Self-Assembly of Polyhedral Ag Nanoparticles to Form a 3-D Plasmonic Crystal." *Materials Research Symposium*. San Francisco, CA, March 2008.

3. Poster . “Bio-Inspired Growth of Low-Dimensional Oxide Structures.” *Biomolecular Materials Contractors’ Meeting*. Sponsored by U.S. Dept. of Energy, Office of Basic Energy Sciences. Warrenton, VA, November 2007.
4. Speaker. “Bottom-up assembly of tunable plasmonic lattices.” *Materials Research Society Fall Meeting*, Boston, MA, November 2006.
5. Poster. “Silver nanocrystals as plasmonic building blocks.” *Gordon Research Conference in Plasmonics*, Keane State, NH, August 2006.
6. Speaker. “Exploring the optical properties of silver polyhedral nanocrystals.” *Materials Research Society Spring Meeting*, Graduate Research Award Symposium, San Francisco, CA, April 2006.
7. Poster. “Polyhedral silver nanocrystal building blocks.” *Berkeley Nanotechnology Forum*, Berkeley, CA, April 2006.
8. Speaker. “Langmuir-Blodgett silver nanowire monolayers for molecular sensing with high sensitivity and specificity.” *227th American Chemical Society National Meeting*. Anaheim, CA, March 2004.
9. Poster. “Langmuir-Blodgett Assembly of Silver Nanowires.” *UC Berkeley Surface Science Symposium*, April, 2003.

#### TEACHING EXPERIENCE

- 2007-2008 *University of California, Santa Barbara.*  
**Research Internships in Science & Engineering Mentor.**  
 Research mentor for one undergraduate in chemical engineering under principal investigator Daniel Morse. Involved 10+ hours per week of overseeing an undergraduate research project.
- 2006-2007 *University of California, Berkeley.*  
**Cal American Chemical Society Mentor.**  
 Academic mentor for undergraduates in science and engineering departments. Geared toward underrepresented groups.
- 2003-2007 *University of California, Berkeley.*  
**Mentored three undergraduate researchers.**  
 Included daily oversight of individual research projects concerning nanoparticle synthesis and electron microscopy.
- 2005 *University of California, Berkeley.*  
**Teaching assistant for Materials Chemistry.**  
 (Instructors: Peidong Yang and Gabor Somorjai)  
 A graduate-level chemistry course offered across disciplines. Wrote biweekly problem sets, two final exams, and guest-lectured for discussion of group theory and band gap construction.

- 2004 *University of California, Berkeley.*  
**Teaching assistant for Inorganic Chemistry.**  
Undergraduate chemistry course. Led class-wide discussion sections and problem-based review sessions for 100+ students.
- 2003 *University of California, Berkeley.*  
**Teaching assistant for General Chemistry for Non-Chemistry Majors.**  
Led weekly discussion and laboratory section for a class of 40. In addition to regular office hours, led a one-hour help session open to all students enrolled in the 300+ class.