

Jimin Yao

302 W. Locust St. #2 • Urbana, IL 61801 • (217) 299-7362 • jyao2@illinois.edu • jimin.yao@gmail.com

PROFESSIONAL PROFILE

- Strong chemistry background for applications in materials science & engineering
- Expertise in fabrication of nanomaterials and thin films of polymers, metals, semiconductors, and oxides
- 8 years experience in material surface analysis and characterization using a full scope of instruments
- 5 years experience in biochemical sensing and imaging along with computational modeling using FDTD

EDUCATION

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, IL

Ph.D. in Materials Science and Engineering (GPA 3.9/4.0) 2004 - present

Thesis: *Functional nanostructured plasmonic materials for biochemical imaging and sensing applications*

Thesis Advisor: Prof. Ralph G. Nuzzo

JILIN UNIVERSITY, China

M.S. in Polymer Chemistry and Physics (GPA 3.8/4.0) 2004

B.S. in Chemistry (GPA 3.9/4.0) 2001

RESEARCH EXPERIENCE

Department of Materials Science and Engineering, UIUC **Graduate Researcher** 2004 - present

- Led a team for inventing an analytical tool with sub-monolayer sensitivity using SPR technology;
- Simulated the electromagnetic field distributions of optical sensors using FDTD methods;
- Developed independently a reproducible optical sensor stabilized in extreme conditions and used for gas chromatography applications;
- Explored novel applications of SPR sensor for imaging and sensing of thin film systems including proteins, antibodies, cells and bacteria;
- Studied the plasmon effects in thin film crystalline silicon solar cell system;

College of Chemistry, JILIN **Undergrad & Graduate Researcher** 2000-2004

- Designed and constructed a home-made photolithography setup to realize the photolithography;
- Invented methods of fabricating colloidal crystals with controllable crystal lattices in large area;
- Studied the wetting of liquids on structured surfaces, especially the self-cleaning capability;
- Mentored an undergraduate with her graduation project of self-assembly of functional colloids;

TECHNICAL SKILLS

Chemistry: Direct experience with polymers and biomaterials, colloidal synthesis, atom transfer radical polymerization, self-assembly techniques, layer-by-layer deposition, surface properties control, microfluidics

Microscopy: AFM, SEM, TEM and optical microscopes

Spectroscopy: IR, UV-Vis Spectroscopy, SERS, X-ray photoelectron spectroscopy

Materials Fabrication: Clean room experience, soft lithography, photolithography, microtoming, ion milling, thermal/ E-beam/ sputtering depositions, atomic layer deposition, wet etching, RIE, PECVD, profilometry, ellipsometry

Simulation: FDTD, MatLab, FORTRAN, openDX, Gnuplot, Turing cluster

SELECTED PUBLICATIONS (9 OF 13) AND PATENT APPLICATIONS (4)

1. J. Yao, A. Le, S. K. Gray, J. S. Moore, J. A. Rogers, R. G. Nuzzo, "Functional Nanostructured Plasmonic Materials", *Adv. Mater.* 2009, accepted.
2. M. E. Stewart*, J. Yao*, J. Maria, S. K. Gray, J. A. Rogers, R. G. Nuzzo, "Multispectral Thin Film Sensing Using 3D Plasmonic Crystals", *Anal. Chem.* 2009, *81*, 5980–5989. **Accelerated Articles, Highlighted by Anal. Chem.** (* Contributed Equally)
3. T. T. Truong, J. Maria, J. Yao, M. E. Stewart, T-W. Lee, S. K. Gray, R. G. Nuzzo, J. A. Rogers, "Nanopost plasmonic crystals", *Nanotechnol.* 2009, *20*, published online.
4. J. Maria, T. T. Truong, J. Yao, T-W. Lee, R. G. Nuzzo, S. Leyffer, S. K. Gray, J. A. Rogers, "Optimization of 3D Plasmonic Crystal Structures for Refractive Index Sensing", *J. Phys. Chem. C*, 2009, *113*, 10493–10499.
5. J. Yao, M. E. Stewart, J. Maria, T-W. Lee, S. K. Gray, J. A. Rogers, R. G. Nuzzo, "Seeing Molecules by Eye: Surface Plasmon Resonance Imaging at Visible Wavelengths with High Spatial Resolution and Submonolayer Sensitivity", *Angew. Chem. Int. Ed.* 2008, *47*, 5013-5017. **Featured in C&EN News. Patent**, Publication No. **US-2008-0212102-A1**.
6. M. N. Stewart, M. A. Motala, J. Yao, L.B. Thompson, R. G. Nuzzo, "Unconventional Methods for Forming Nanopatterns," *J. Nanoengineering Nanosystems* 2007, *220*, 81-138.
7. X. Yan, J. Yao, G. Lu, J. Zhang, B. Yang, "Fabrication of Non-Close-Packed Arrays of Colloidal Spheres by Soft Lithography", *J. Am. Chem. Soc.* 2005, *127*, 7688 - 7689. **Patent**, China, Publication No. **1654311**.
8. J. Yao, X. Yan, G. Lu, K. Zhang, X. Chen, L. Jiang, B. Yang, "Patterning Colloidal Crystals by Lift-up Soft Lithography", *Adv. Mater.* 2004, *16*, 81-84. **Patent**, China, Publication No. **1544308**.
9. X. Yan, J. Yao, G. Lu, X. Chen, K. Zhang, B. Yang, "Microcontact Printing of Colloidal Crystals", *J. Am. Chem. Soc.* 2004, *126*, 10510-10511. **Patent**, China, Publication No. **1597335**.

PRESENTATIONS

- "Functional Nanostructured Plasmonic Materials", Programmable Functional Materials Workshop 05/2009
- "Seeing Molecules by Eye", oral presentation, Pittcon Conference, Chicago 03/2009

PEER REVIEW JOURNAL REFEREE

- **Langmuir** (ISI Impact Factor **4.097**)
- **Optics Express** (ISI Impact Factor **3.71**)
- **Optics Letters** (ISI Impact Factor **3.71**)

RELATIVE COURSES

Statistical Thermodynamics of Materials	Intro to Polymer Synthesis	Polymer Physics
Electron Microscopy	Experimental Spectroscopy	Surfaces and Colloids
IC Device Theory & Fabrication	Solid State Electronic Devices	
Applied Mathematics in CHBE	Introductory Biochemistry	Advanced Academic Writing

HONORS AND ACTIVITIES

- NSF Summer School Fellowships 2009
- Racheff-Intel Award Finalist 2009
- Krannert Center Volunteer 2008-2009