

Stacy M. Copp

University of California-Santa Barbara
Department of Physics
Broida Hall, Santa Barbara, CA 93106

Phone: (505) 250-8658
Email: shiffler.at.physics.ucsb.edu
Website: web.physics.ucsb.edu/~shiffler/

Education

Ph.D. Physics, University of California-Santa Barbara, expected November 2016.

M.A. Physics, University of California-Santa Barbara, December 2013.

B.S. Physics with Honors and B.S. Mathematics, University of Arizona, May 2011, *summa cum laude*.

Publications

1. **Stacy M. Copp**, D. Schultz, A. Faris, S. Swasey, and E. Gwinn. Cluster Plasmonics: Dielectric and Shape Effects on DNA-Stabilized Silver Clusters. *Nano Lett.*, **16**, 3594-3599 (2016).
2. **Stacy M. Copp**, A. Faris, S. Swasey, and E. Gwinn. Heterogeneous Solvatochromism of Fluorescent DNA-Stabilized Silver Clusters Precludes Use of Simple Onsager-Based Stokes Shift Models. *J. Phys. Chem. Lett.*, **7**, 698-703 (2016).
3. E. Gwinn, D. Schultz, **Stacy M. Copp**, and S. Swasey. DNA-Protected Silver Clusters for Nanophotonics. *Nanotechnology*, **5**, 180-207 (2015).
4. **Stacy M. Copp**, D. Schultz, S. Swasey, and E. Gwinn. Atomically Precise Arrays of Fluorescent Silver Clusters: a Modular Approach for Photonics on DNA Nanostructures. *ACS Nano*, **9**, 2303-2310 (2015).
5. **Stacy M. Copp**, P. Bogdanov, M. Debord, A. Singh, and E. Gwinn. Base Motif Recognition and Design of DNA Templates for Fluorescent Silver Clusters by Machine Learning. *Adv. Mater.* **26**, 5839-5845 (2014).
6. **Stacy M. Copp**, D. Schultz, S. M. Swasey, J. Pavlovich, M. Debord, A. Chiu, K. Olsson, and E. Gwinn. Magic Numbers in DNA-Stabilized Fluorescent Silver Clusters Lead to Magic Colors. *J. Phys. Chem. Lett.* **5**, 959-963 (2014).
7. D. Schultz, **Stacy M. Copp**, N. Markešević, K. Gardner, S.S.R. Oemrawsingh, D. Bouwmeester, and E. Gwinn. Dual-Color Nanoscale Assemblies of Structurally Stable, Few-Atom Silver Clusters, as Reported by Fluorescence Resonance Energy Transfer. *ACS Nano* **7**, 9798-9807 (2013).
8. **Stacy Shiffler**, P. Polynkin, and J. Moloney. Self-focusing of femtosecond diffraction-resistant vortex beams in water. *Opt. Lett.* **36**, 3834-3836 (2011).

Invited talks

Fluorophores by design: DNA-stabilized silver clusters for sensing and nanophotonics. Wyss Institute, Boston MA, June 2016.

Optical materials with a "genome:" nanophotonics with DNA-stabilized silver clusters. Wyss Institute, Boston MA, Aug. 2015.

Optical materials with a "genome:" nanophotonics with DNA-stabilized silver clusters. ITST Condensed Matter Seminar Series, Santa Barbara CA, May 2015.

DNA templates silver nanoclusters with magic sizes and magic colors for multi-cluster fluorescent assemblies. APS March Meeting, San Antonio TX, Mar. 2015.

Using machine learning techniques to predict DNA template sequences for silver-DNA nano-optical materials. Collaborative Conference on Materials Research, Incheon/Seoul, South Korea, Jun. 2014.

Contributed conference talks and posters

Cluster Plasmonics: Dielectric and Shape Effects on DNA-Stabilized Silver Clusters. **Talk.** International Symposium on Small Particles and Inorganic Clusters XVIII, Jyväskylä, Finland, Aug. 2016.

Positioning Atomically Precise DNA-Stabilized Silver Clusters with Nanoscale Separations on a DNA Breadboard. **Talk.** MRS Fall Meeting, Boston, MA, Dec. 2015. (*Award for best student talk in symposium)

Optical materials with a "genome:" using DNA to self-assemble metal clusters on the nanoscale. **Poster.** Gordon Research Conference: Soft Condensed Matter Physics, New London, NH, Aug. 2015.

Atomically precise arrays of fluorescent silver clusters: a modular approach for metal cluster photonics on DNA nanostructures. **Poster.** Foundations of Nanoscience: Self-Assembled Architectures and Devices, Snowbird, UT, Apr. 2015.

Programming and assembling nanoscale arrays of fluorescent silver clusters on DNA. **Poster.** 12th Annual Advanced Imaging Methods Workshop, Berkeley, CA, Feb. 2015.

Fluorescent silver clusters: DNA templating and nanoscale arrangement. **Poster.** Gordon Research Conference: Noble Metal Nanoparticles, Mount Holyoke College, MA, Jun. 2014.

Motif-based design of DNA templates for fluorescent silver clusters. **Poster.** Foundations of Nanoscience: Self-Assembled Architectures and Devices, Snowbird Cliff Lodge, Snowbird, UT, Apr. 2014.

DNA-templated silver nanoclusters: magic numbers lead to magic fluorescence colors. **Poster.** Foundations of Nanoscience: Self-Assembled Architectures and Devices, Snowbird, UT, Apr. 2014.

Nanoscale assemblies of few-atom silver cluster pairs, as reported by resonance energy transfer. **Talk.** APS March Meeting, Denver CO, Mar. 2014.

Dual-color assemblies of few-atom fluorescent silver clusters at nanoscale proximity on DNA. **Poster.** Gordon Research Conference: Clusters, Nanocrystals & Nanostructures, Mount Holyoke College, MA, Aug. 2013.

Evidence for rod-shaped DNA-stabilized silver nanocluster emitters. **Poster.** Gordon Research Conference: Clusters, Nanocrystals & Nanostructures, Mount Holyoke College, MA, Aug. 2013.

Bringing distinct, few-atom silver clusters into nanoscale proximity on a DNA construct. **Poster.** Foundations of Nanoscience: Self-Assembled Architectures and Devices, Snowbird, UT, Apr. 2013.

Selected Honors

Materials Research Society Graduate Student Silver Award, Fall 2015

Materials Research Society Arthur Nowick Graduate Student Award: for particular promise as a future teacher and mentor, Fall 2015

Best Student Talk in MRS Meeting Symposium E: Engineering and Application of Bioinspired Materials, Fall 2015

Selected participant in the 65th Lindau Nobel Laureate Meeting, 2015

Fiona Goodchild Award: UCSB campus-wide award for excellence as a mentor of undergraduate research, 2015

Chair's Outstanding Service Award for exceptional service to UCSB Physics Dept., 2015.

Chair's Appreciation Award for service to the UCSB Physics Dept., 2013.

NSF Graduate Research Fellowship, 2011-2016

UCSB Chancellor's Fellowship, 2011-2016

Yzurdiaga Graduate Student Fellowship, 2011-2012

Goldwater Scholar 2010

Research experience

Ph.D. research, UCSB Dept. of Physics, 2012-current

Optical properties, data-driven design, and nanoscale assembly of few-atom fluorescent silver clusters stabilized by DNA (Publications 1-7). Directed by Elisabeth Gwinn.

Undergraduate research, University of Arizona College of Optical Sciences, 2010-2011

Filamentation of ultrafast higher order Bessel beams in condensed media (Publication 8), directed by Pavel Polynkin and Jerome Moloney.

Summer internship, Los Alamos National Laboratory, 2010 & 2011

AFM studies of chlorosome structure in green sulfur bacteria, directed by Gabriel A. Montaño and supported by a 2010 SULI fellowship. 2010 Student Symposium poster winner, biosciences division.

Internship, Sandia National Laboratory, 2009-2010

TIRF studies of TLR-4 protein dimerization and cellulose film digestion, directed by Michael Kent. Summer intern and continuing telecommuting intern during academic year.

Undergraduate physics honors thesis, University of Arizona Dept. of Physics, 2008-2010

Properties of tetra-cysteine binding arsenic-based dyes and single molecule TIRF microscopy on a home-built system. Directed by Koen Visscher.

Summer internship, Sandia National Laboratory, 2008.

Background gamma and alpha radiation detection in granite and Yucca Mountain radiation level analysis. Directed by Patrick McDaniel.

Technical Skills

Microscopy

Total internal reflection fluorescence (TIRF) microscopy
Confocal microscopy
Atomic force microscopy (AFM) in air and fluid media
Super-resolution optical microscopy
Transmission electron microscopy (TEM)

Programming and numerical analysis

MATLAB, including programming and image analysis
Igor Pro
C programming language
pattern recognition
select machine learning techniques

Laboratory skills

UV-Vis spectroscopy
DNA nanostructure assembly
robotic microplate liquid handling
optical system design and alignment
cleanroom CMOS fabrication
wide-angle xray scattering

Teaching & mentorship

School for Scientific Thought Instructor for high school outreach program through UCSB's California NanoSystems Institute. Taught a five-session class on light-matter interactions. Designed course, wrote all lectures, prepared hands-on activities and demos. Spring 2015

Substitute Lecturer for introductory physics classes. Spring 2015

Undergraduate Teaching Assistant for introductory mechanics course for physics majors. Led discussion sections, held office hours, and acted as substitute lecturer. Fall 2014

Guest Lecturer for physics classes about opportunities for undergraduate research. 2012 - 2015

Research Mentor to 10 undergraduates in the Gwinn Group at UCSB, directing both experimental and computational projects; coauthored journal articles with four of these students. 2012 - present

Research Mentor as part of program for underprivileged students at Los Alamos National Laboratory. 2011

Professional development & service

Peer reviewer for Nature Communications, 2015.

UCSB Physics Symposium for Summer Undergraduate Research. Founded annual event in 2014. Organized and chaired symposium, solicited donors, provided training and support to students as they prepared talks, 2014-2016.

UCSB Women in Physics. Improved recruitment of outstanding female graduate students through additional visit day, organized meetings with visiting speakers about career paths, and provided outreach events for undergraduates. Performed the group's fundraising for three years, 2012-2015.

UCSB Physics Curriculum Committee. Served on department curriculum committee to initiate creation of a computational methods course for physics undergraduates in response to comments from undergraduate mentees, 2014.

Guest speaker for Women in STEM Mixer. Hosted by UCSB Associated Students for undergraduate women in STEM fields, 2014.

Family Ultimate Science Experience (FUSE) volunteer. An outreach program for middle school students through UCSB's California NanoSystems Institute, 2014.

Co-authored winning NSF grant: Cracking the color code of DNA-stabilized metal nanoclusters, 2013.

Physics Circus volunteer. An outreach program for K-12 students run by the UCSB Physics Department, 2012.

Physics outreach volunteer at the University of Arizona, 2008-2010.