

Lindsey Hanson

Trinity College, Department of Chemistry
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EDUCATION

- Stanford University**, Stanford, California September 2008 – June 2014
PhD in Chemistry
- Duke University**, Durham, North Carolina August 2003 – May 2007
Bachelor of Science with Distinction in Chemistry, minor in Slavic Languages and Literature

PROFESSIONAL APPOINTMENTS

- Assistant Professor of Chemistry**, Trinity College, Hartford, CT July 2017 – Present
- Postdoctoral Scholar**, Lawrence Berkeley National Laboratory September 2014 – June 2017
- Postdoctoral Scholar**, Stanford University July 2014 – August 2014

RESEARCH EXPERIENCE

- Postdoctoral Research**, Lawrence Berkeley National Laboratory September 2014 – June 2017
Adviser: Professor A. Paul Alivisatos
Investigated the effect of pressure on optical properties of fluorescent nanoparticles.
- Graduate Research**, Stanford University. September 2008 – August 2014
Adviser: Professor Bianxiao Cui
Explored the response of living cells to vertically aligned nanopillars and the use of those nanostructures as optical, electrical, and mechanical probes to manipulate and study cellular function.
- Research Assistant**, Johns Hopkins University. August 2007 – August 2008
Supervisor: Dr. Daniel Judge.
Investigated patterns of inheritance in arrhythmogenic right ventricular dysplasia (ARVD).
- Undergraduate Thesis**, Gordon Research Fellowship, Duke University . January 2006 – May 2007
Adviser: Professor David Beratan
Performed molecular dynamics simulations of the human SRY protein-DNA complex.

RESEARCH INTERESTS

My research interests lie at the intersection of physical chemistry, biophysics and materials science. In my research group, we investigate the effect of mechanical forces on the optical properties of nanoscale materials. We then use materials that are capable of converting mechanical forces into optical signals to study the effect of nanoscale forces and topography on biological systems.

GRANTS AND AWARDS

National Science Foundation, 'RUI: Optical studies of pseudoelastic nanoparticle deformation' DMR- 2004867, \$201,100, 2020-2023

NASA Connecticut Space Grant, Faculty Research Grant, \$10,000, 2019-2020

Linus Pauling Teaching Award, Stanford University, 2013

Centennial Teaching Award, Stanford University, 2012

PUBLICATIONS

1. Abhinav Parakh, Sangryun Lee, K. Anika Harkins, Mehrdad T. Kiani, David Doan, Martin Kunz, Andrew Doran, **Lindsey A. Hanson**, Seunghwa Ryu, X. Wendy Gu. Nucleation of dislocations in 3.9 nm nanocrystals at high pressure. *Physical Review Letters*, 2020, 124, 106104.
2. Xun Wendy Gu*, **Lindsey A. Hanson***, Carissa N. Eisler, Matthew Koc, A. Paul Alivisatos. Pseudoelasticity at large strains in Au nanocrystals. *Physical Review Letters*, 2018, 121, 056102. *Indicates equal contributions
3. Wenting Zhao, **Lindsey Hanson**, Hsin-Ya Lou, Matthew Akamatsu, Praveen D. Chowdary, Francesca Santoro, Jessica R. Marks, Alexandre Grassart, David G. Drubin, Yi Cui, Bianxiao Cui. Nanoscale manipulation of membrane curvature for probing endocytosis in live cells. *Nature Nanotechnology*, 2017, 12, 750-756.
4. Matthew Koc*, Shilpa N. Raja*, **Lindsey A. Hanson**, Son C. Nguyen, Nicholas J. Borys, Alexander S. Powers, Siva Wu, Kaori Takano, Joseph K. Swabeck, Jacob H. Olshansky, Liwei Lin, Robert O. Ritchie, A. Paul Alivisatos. Characterizing photon reabsorption in quantum dot-polymer composites for use as displacement sensors. *ACS Nano*, 2017, 11, 2075-2084. *Indicates equal contributions
5. Hsin-Ya Lou, Wenting Zhao, **Lindsey Hanson**, Connie Zeng, Yi Cui, Bianxiao Cui. Lipid bilayer as dual functional lipid coating for nanopillar-based capture of circulating tumor cells with high purity and efficiency. *Langmuir*, 2017, 33, 1097-1104.
6. **Lindsey Hanson**, Wenting Zhao, Hsin-Ya Lou, Ziliang Carter Lin, Seok Woo Lee, Praveen Chowdary, Yi Cui, Bianxiao Cui. Vertical nanopillars for *in situ* probing of nuclear mechanics in adherent cells. *Nature Nanotechnology*, 2015, 10, 554-562.
7. Yasuko Osakada, Guillem Pratx, **Lindsey Hanson**, Paige Elana Solomon, Lei Xing, Bianxiao Cui. X-ray excitable luminescent polymer dots doped with an iridium(III) complex. *Chemical Communications*, 2013, 49, 4319-4321.
8. **Lindsey Hanson**, Ziliang Carter Lin, Chong Xie, Yi Cui, Bianxiao Cui. Characterization of the cell-nanopillar interface by transmission electron microscopy. *Nano Letters*, 2012, 12, 5815-5820.
9. Yasuko Osakada, **Lindsey Hanson**, Bianxiao Cui. Diarylethene doped biocompatible polymer dots for fluorescence switching. *Chemical Communications*, 2012, 48, 3285-3287.
10. Chong Xie*, Ziliang Lin*, **Lindsey Hanson**, Yi Cui, Bianxiao Cui. Intracellular recording of action potentials by nanopillar electroporation. *Nature Nanotechnology*, 2012, 7, 185-190.
11. **Lindsey Hanson**, Lifeng Cui, Chong Xie, Bianxiao Cui. A microfluidic positioning chamber for long-term live-cell imaging. *Microscopy Research and Technique*, 2011, 74, 496-501.
12. Chong Xie*, **Lindsey Hanson***, Yi Cui, Bianxiao Cui. Vertical nanopillars for highly localized fluorescence imaging. *Proceedings of the National Academy of Sciences*, 2011, 108, 3894-3899. *Equal Contributions
13. Chong Xie, **Lindsey Hanson**, Wenjun Xie, Ziliang Lin, Bianxiao Cui, Yi Cui. Noninvasive neuron pinning with nanopillar arrays. *Nano Letters*, 2010, 10, 4020-4024.

Undergraduate authors names are underlined.

STUDENT RESEARCH COLLABORATORS (at Trinity College)

Ayana Tabo, '23	Summer 2020 – present
Ihsan Uyan, '23	Spring 2020 – present
Kamila Zygadlo, '23	Spring 2020 – present
Huayue Alice Ai, '21	Summer 2018 – present
Kieren Anika Harkins, '21	Spring 2018 – present
Ashlee Wisniewski, '18	Spring 2018
Zhenghua Calvin Chen, '18	Spring 2018

POSTERS AND PRESENTATIONS

Invited Talks

“Seeing the force: Designing and understanding optomechanical sensors,” Williams College, 2020

“Tension in tiny treasure troves: Understanding the response of gold nanoparticles to mechanical forces,” Connecticut College, 2020

Conference Presentations

Lindsey Hanson, Christina Li, A. Paul Alivisatos. Pressure dependence of excited state dynamics in CdSe/CdS heterostructure nanocrystals. American Chemical Society National Meeting, 2018. (*Oral Presentation*)

Lindsey Hanson, Xun Wendy Gu, Carissa Eisler, Matthew Koc, A. Paul Alivisatos. Size-dependent pseudo-elasticity in gold nanocrystals. American Chemical Society National Meeting, 2018. (*Oral Presentation*)

Lindsey Hanson, Xun Wendy Gu, Carissa Eisler, Matthew Koc, A. Paul Alivisatos. Size-dependent pseudo-elasticity in gold nanocrystals. American Chemical Society National Meeting, 2018. (*Poster, Sci-Mix*)

Lindsey Hanson, Wenting Zhao, Ziliang Lin, Yi Cui, Bianxiao Cui. Vertical Nanopillars for Probing Cell Nuclear Mechanics. American Chemical Society National Meeting, 2014. (*Oral Presentation*)

Lindsey Hanson, Wenting Zhao, Ziliang Lin, Yi Cui, Bianxiao Cui. Probing the Mechanical Coupling of the Cell Membrane to the Nucleus with Vertical Nanopillar Arrays. Biophysical Society Meeting, 2014. (*Platform Presentation*)

Lindsey Hanson, Javier Urzay, Ziliang Lin, Wenting Zhao, Manu Prakash, Bianxiao Cui. Probing the Mechanical Coupling of the Cell Membrane to the Nucleus with Vertical Nanopillar Arrays. Biophysical Society Meeting, 2013. (*Platform Presentation*)

Lindsey Hanson, Ziliang Carter Lin, Chong Xie, Yi Cui, Bianxiao Cui. Understanding the Nano-Bio Interface Through Transmission Electron Microscopy. Biophysical Society Meeting, 2012. (*Poster Presentation*)

Lindsey Hanson, Chong Xie, Ziliang Lin, Yi Cui, Bianxiao Cui. Vertical Nanopillar for Biointerface: Cell Interactions with Inorganic Nanostructures. Biophysical Society Meeting, 2011. (*Poster Presentation*)

Lindsey Hanson, Chong Xie, Yi Cui, Bianxiao Cui. Nanocandles: Developing Optical Probes for the Cell Interior. Biophysical Society Meeting, 2010. (*Poster Presentation*)

TEACHING EXPERIENCE

At Trinity College

Biophysical Chemistry, Lecture & Lab, Spring 2018 and Spring 2020

Introduction to Chemistry II, Spring 2018

Physical Chemistry I, Lecture & Lab, Fall 2017, Fall 2018 and Fall 2019

Physical Chemistry II, Spring 2020

Before Trinity College

Research Mentor, University of California, Berkeley September 2014 – June 2017

- Mentored two graduate students in their dissertations.
- Mentored an undergraduate student in an independent research project.

Research Mentor, Stanford University December 2012 – August 2014

- Mentored a beginning graduate student in his dissertation.

Research Assistant for Curriculum Development, Stanford University March 2012 – September 2012

- Worked closely with the lead instructor for the inaugural Leland Scholars Program. The program is geared toward providing extra preparation in science and problem-solving tools for incoming first-year students who are the first in their families to attend college.
- Designed two-week science curriculum for this new bridge program, including in-class activities, laboratory experiments, and scientific debates.

Center for Teaching and Learning Liaison, Stanford University Autumn 2010 – Spring 2012

- Coordinated educational resources and teaching evaluations between the Center for Teaching and Learning and the Chemistry department at Stanford.
- Worked with liaisons from other departments to develop and publicize resources to support the professional development of teachers and teaching assistants.

Teaching Assistant, Problem Solving in Science, Stanford University Winter 2011

- Designed and implemented classroom activities for the first year of a new general chemistry companion course for struggling students.
- Led large outreach sessions for the main lecture course.

Mentor in Teaching Fellow, Stanford University Autumn 2009 – Spring 2011

- Supervised and mentored teaching assistants in the Chemistry department.
- Ran classroom observations and teaching evaluations and guided teaching assistants in turning that feedback into actionable improvements in the classroom.

Head TA Trainer, Chemistry Department, Stanford University Summer 2010

- Lead a team of ten graduate students to run a week-long training for incoming first-year graduate students who will be teaching assistants in Chemistry.

Mentor for RISE (Raising Interest in Science and Engineering), Stanford University Summer 2010

- Mentored a high school student in an independent research project.

TA Trainer, Chemistry Department, Stanford University, Summer 2009

Teaching Assistant, Organic Chemistry Laboratory, Stanford University Spring 2009

Teaching Assistant, General Chemistry, Stanford University Autumn 2008 – Winter 2009

Teaching Assistant, General Chemistry, Duke University Autumn 2005 – Spring 2007