

# Lindsey Hanson

Trinity College, Department of Chemistry  
300 Summit Street  
Hartford, CT 06106

[lindsey.hanson@trincoll.edu](mailto:lindsey.hanson@trincoll.edu)  
860-297-5267

## **EDUCATION**

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**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**

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**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**

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**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**

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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

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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

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1. K. Anika Harkins, Jonas Boettner, **Lindsey A. Hanson**. Limits of pseudoelasticity in gold nanocrystals. *The Journal of Physical Chemistry C*, 2021, 125(50), 27747-27752.
2. 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.
3. 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
4. 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.
5. 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
6. 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.
7. **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.
8. 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.
9. **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.
10. Yasuko Osakada, **Lindsey Hanson**, Bianxiao Cui. Diarylethene doped biocompatible polymer dots for fluorescence switching. *Chemical Communications*, 2012, 48, 3285-3287.
11. Chong Xie\*, Ziliang Lin\*, **Lindsey Hanson**, Yi Cui, Bianxiao Cui. Intracellular recording of action potentials by nanopillar electroporation. *Nature Nanotechnology*, 2012, 7, 185-190.
12. **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.
13. 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
14. 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)**

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Samuel Salas Sanabria, '25	Spring 2022 – present
Jonas Boettner, '24	Spring 2021 – present
Ayana Tabo, '23	Summer 2020 – present
Ihsan Uyan, '23	Spring 2020 – present
Kamila Zygadlo, '23	Spring 2020 – present
Huayue Alice Ai, '21	Summer 2018 – Spring 2021
Kieren Anika Harkins, '21	Spring 2018 – Spring 2021
Ashlee Wisniewski, '18	Spring 2018
Zhenghua Calvin Chen, '18	Spring 2018

## **POSTERS AND PRESENTATIONS**

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### ***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

### ***Contributed presentations at conferences***

Research at High Pressure Gordon Research Conference	July 2022
Noble Metal Nanoparticle Gordon Research Conference	June 2022
American Chemical Society National Meeting	March 2022
Materials Research Society National Meeting	December 2021
American Chemical Society National Meeting	March 2018
American Chemical Society National Meeting	August 2014
Biophysical Society Meeting	February 2014
Biophysical Society Meeting	February 2013
Biophysical Society Meeting	February 2012
Biophysical Society Meeting	February 2011
Biophysical Society Meeting	February 2010

### ***Presentations by students***

Gulf Coast Undergraduate Symposium at Rice University (2 students)	October 2022
American Chemical Society National Meeting (2 students)	March 2022
Gulf Coast Undergraduate Symposium at Rice University	October 2020

## **TEACHING EXPERIENCE**

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### ***At Trinity College***

**Biophysical Chemistry**, Lecture & Lab, Spring 2018, Spring 2020, Spring 2022

**Introduction to Chemistry II**, Spring 2018

**Physical Chemistry I**, Lecture & Lab, Fall 2017, Fall 2018, Fall 2019, Fall 2021, Fall 2022

**Physical Chemistry II**, Spring 2020, Spring 2022

**The Creative Brain First-Year Seminar**, Fall 2022

### ***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 a 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