

Janet Sheung

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Education

Ph.D in Physics <i>University of Illinois, Urbana-Champaign</i>	2017
MS in Physics <i>University of Illinois, Urbana-Champaign</i>	2010
BS in Physics <i>California Institute of Technology</i>	2007

Teaching Experience

W. M. Keck Science Department, Claremont McKenna, Pitzer, Scripps Colleges **Claremont, CA**
Assistant Professor of Physics *Jul 2019 – present*

- Courses taught: Classical Mechanics, Introductory Mechanics, Electronics Laboratory.

Physics and Astronomy Department, Vassar College **Poughkeepsie, NY**
Visiting Assistant Professor of Physics *Aug 2017 – June 2019*

- Courses taught: biophysics, upper-division lab, intro mechanics, and intro E&M.
- Faculty co-adviser to Society of Physics Students Chapter.
- Biophysics curriculum development: improve advising of students going into medical physics or biophysics, possibly with an explicit new graduation pathway.

Physics Department, University of Illinois at Urbana-Champaign **Urbana, IL**
Lecturer *Jan 2017 – July 2017*

- Responsible for transitioning biophysics-themed lab course from being taught on research equipment to department-owned equipment.
- Coordinate with related faculty members to develop new labs aligned with new lower budget, with goal of increasing the number of student slots.
- Develop, build, and teach new two week lecture + lab module on optical trapping with budget \$25k.
- Develop and build inexpensive super-resolution microscope with budget \$25k.
- Communicate results with peer institutions through presentations or publications.

PHY402 Light, Lab Instructor *Aug 2013 – Dec 2015*

- Topics taught included but not limited to: fiber optics, holography, interferometers, diffraction, spectroscopy, telescopes, microscopes.
- Developed and implemented experiments, maintained equipment, graded student reports.
- Rated Excellent and Outstanding by student evaluation for Spring and Fall 2015 semesters.

PHYS 212 University Physics: Electricity and Magnetism, Teaching Assistant *May 2013 – Aug 2013*

PHYS 140 How Things Work, Teaching Assistant

Jan 2012–May 2013

PHYS 211 University Physics: Mechanics, Teaching Assistant

Aug 2008–Dec 2008

Work and Research Experience

Marine Biological Laboratory

Whitman Center Early Career Fellow

Woods Hole, MA

Jun 2018 – Aug 2018

- ▶ Investigated state-space of *Stentor coeruleus* cellular regeneration following osmotic shock.
- ▶ Mentored one undergraduate researcher as participant of Vassar College Undergraduate Research Summer Institute

Argonne National Laboratory

Visiting Scholar

Graduate Student Researcher supervised by Dr. Lahsen Assoufid

Argonne, IL

Feb 2017 – present

Aug 2016 – Dec 2016

- ▶ Expand the Long Trace Profiler at the Advanced Photon Source to add the capability to measure diffraction gratings.
- ▶ Prototyped the needed optomechanics for additional 3 degrees of freedom and certified system for characterization of 4 mission-critical diffraction gratings.
- ▶ Reported progress to both business and academic collaborators in role as point of contact.
- ▶ Responsible for sharing results with broader community by first-authoring international collaboration publication and presenting at SPIE

Inprentus, Inc.

Metrologist

Champaign, IL

Dec 2015 – Dec 2016

- ▶ Performed metrology on 15+ scientific grade diffraction gratings and optical substrates for quality control.
- ▶ Developed quality control procedure using Fizeau interferometer and diffractometer.
- ▶ Improved sensitivity of in-house diffractometer 3x.
- ▶ Coordinated with contractors when external measurements are necessary for proper characterization.
- ▶ Worked as part of interdisciplinary team to improve and debug the manufacturing process.
- ▶ Automated data analysis workflow by writing MATLAB scripts, resulting in 5x increase in speed.

Department of Physics, University of Illinois at Urbana-Champaign

Graduate Research Assistant, PhD Candidate advised by Prof. Paul Selvin

Urbana, IL

Jan 2008 – present

- ▶ Designed, built, and operated Fluorescence Correlation Spectroscopy system to perform size measurement of bioconjugated quantum dots, attaining 1nm accuracy.
- ▶ Built 3D super-resolution microscope with multiple laser lines, auto-focus system, and optical tweezer capability, attaining 20nm resolution in the axial dimension.

California Institute of Technology

Undergraduate Senior Thesis in Physics advised by Prof. Nai-Chang Yeh

Pasadena, CA

Jan 2006 – Jun 2007

- Deposition of organic semiconductor thin-films through evaporation and pulsed-laser deposition, sample characterization using AFM.

Summer Undergraduate Research Fellow mentored by Prof. Chris Martin May 2005 - Aug 2005

- Tested back-lit EMCCDs using a novel high voltage read-out scheme.

Summer Undergraduate Research Fellow mentored by Prof. Andrew Lange May 2004 - Aug 2004

- Designed a frequency chopped temperature source for testing of BICEP1 detector.

Lawrence Berkeley National Laboratory

Berkeley, CA

High School Student Intern advised by Dr. Hakeem Oluseyi

Jun 2003 – Aug 2003

- Computational modeling of solar transition region plasma loop structures and comparison against previous data.

High School Student Intern co-advised by Dr. Robert Cahn and Dr. Rollie Otto Jun 2002 – Aug 2002

- Beta test muon lifetime demo using portable scintillator.
- Wrote up an explanation of the results using special relativity theory suitable for general public.

Publications

M. Otsuka, A. Lin, E. Burns, M. Melo, M. Patel, **J.Y. Sheung**. Progressive recovery of motility in regenerating *S. coeruleus*. (In progress)

Kirsty Y. Wan, Sylvia K. Hürlimann, Aidan M. Fenix, Rebecca M. McGillivray, Tatyana Makushok, Evan Burns*, **Janet Y. Sheung** and Wallace F. Marshall. 2019. Reorganization of complex ciliary flows around regenerating *Stentor coeruleus*. *Phil. Trans. R. Soc. B* 375: 20190167.

Sheung, J., Ge, P., Lim, S. J., Lee, S. H., Smith, A., Selvin, P. R. Structural Contributions to Hydrodynamic Diameter for Quantum Dots Optimized for Live-Cell Single-Molecule Tracking. *J. Phys. Chem. C* 122, 30, 17406-17412.

J. Sheung, J. Qian, M. Thomasset, J. Manton, S. Bean, P. Takacs, J. Dvorak, and L. Assoufid, Metrology of Variable-Line-Spacing X-ray Gratings using the APS Long Trace Profiler. *Proceedings of SPIE Optics + Photonics 2017, Advances in Metrology for X-Ray and EUV Optics VII*.

S. Gleason, J. Manton, **J. Sheung** et. al., Intrinsic Resolving Power of XUV Diffraction Gratings Measured with Fizeau Interferometry. *Proceedings of SPIE Optics + Photonics 2017, Advances in Metrology for X-Ray and EUV Optics VII*.

Wang, Y., Cai, E., **Sheung, J.**, Lee, S. H., Teng, K. W., Selvin, P. R. Fluorescence Imaging with One-nanometer Accuracy (FIONA). *J. Vis. Exp.* (91), e51774, doi:10.3791/51774 (2014).

DeBerg, H. A., Blehm, B. H., **Sheung, J.**, Thompson, A. R., Bookwalter, C. S., Torabi, S. F., Selvin, P. R. Motor domain phosphorylation modulates kinesin-1 transport. *The Journal of Biological Chemistry*, 288(45), 32612–21. (2013).

Slabodnick, M., Prevo, B., Gross, P., **Sheung, J.**, Marshall, W. Visualizing Cytoplasmic Flow During Single-cell

Wound Healing in *Stentor coeruleus*. *J. Vis. Exp.* (82), e50848, doi:10.3791/50848 (2013).

Hoffman, M. T., **Sheung, J.**, Selvin, P. R. "Fluorescence Imaging with One Nanometer Accuracy: In Vitro and In Vivo Studies of Molecular Motors." Eds. Gregory Mashanov; Christopher Batters. Humana Press, 33-56. (2011)

Morrissey, P., Kaye, S., Martin, C., **Sheung, J.**, Nikzad, S., Jones, T., Blacksberg, J., Hoenk, M., Bell, L. D. A novel low-voltage electron-bombarded CCD readout, *Proc. SPIE*, 6266, 626610, *Space Telescopes and Instrumentation II: Ultraviolet to Gamma Ray*; Martin J. Turner, Günther Hasinger; Eds. (2006)

Oluseyi, HM, Carpio M, **Sheung, J.**, Implausibility of Hydrostatic Funnels Constituting the Sun's Upper Transition Region, *Solar Physics*, 245(1) :69-85. (2007)

Community Teaching and Outreach Experience

Center for the Physics of Living Cells
K-12 Outreach Fellow

Urbana, IL
Oct 2010 – Aug 2012

- Built relationship with teachers in community through organization of workshops and other events.
- Developed and taught lessons in elementary, middle, and high school classrooms.

Lawrence Berkeley National Laboratory
Writing Coach and Mentor

Berkeley, CA
Jun 2007 – Aug 2007

- Worked with senior staff at the center to add a technical abstract to list of deliverables for pre-existing research internship program for high school students.
- Gave presentations on how to write abstracts, met with students (~30) individually and edited multiple drafts for each.

Professional Service

Scripps College Institutional Review Board 2020 – present

W.M. Keck Science Department Research Reopening Task Force Summer 2020

Reviewer: The Biophysicist 2019 – present

Scripps - Pitzer Science Building: shepherd for physics laboratory space Fall 2019 –

Journal of Young Investigators **www.jyi.org**
A web-based, peer-reviewed research journal run entirely by undergraduates, for undergraduates.

Editor-in-Chief and acting Managing Editor 2006 – 2007

- Directed a staff of over 50 consisting of students at institutions across the country. Responsible for final edits of all published material, for formatting the articles and getting them onto our website on time.
- Involved in decisions about our investment portfolio, interviewed candidates for various positions, and wrote letters of recommendation for staff members.

Research Editor in Physical Sciences, Mathematics, and Engineering Sciences 2005 – 2006

Honors and Awards

<i>Marine Biological Laboratory Whitman Early Career Fellowship</i>	<i>Summer 2018</i>
<i>Vassar College Research Committee Award for project “Flow Patterns of the Regenerating Stentor Coeruleus Oral Apparatus”</i>	<i>Spring 2018</i>
<i>Vassar College Faculty Conversations Grant for development of interdisciplinary biophysics course</i>	<i>Fall 2017</i>
<i>Excellent Teacher as rated by students, PHY402</i>	<i>Fall 2015</i>
<i>Outstanding Teacher as rated by students, PHY402</i>	<i>Spring 2015</i>
<i>Outstanding Teacher as rated by students, PHY212</i>	<i>Summer 2013</i>
<i>Pfizer Endowed Scholarship</i>	<i>Summer 2012</i>
<i>SURGE Fellow, University of Illinois at Urbana-Champaign</i>	<i>Aug 2007 – May 2012</i>

Presentations

University of Arizona Optics Winter School, January 2020. M. Patel*, J. Qian, J. Sullivan, J.Y. Sheung, L. Assoufid. Predicting CCD-based Metrological Uncertainty of the Long Trace Profiler. (Poster)

Teaching at a Liberal Arts College. University of Illinois Department of Physics Career Seminar, January 2020 (Invited talk)

“State Space Reconstruction of Stentor coeruleus Anatomy and Regeneration,” invited seminar at Marine Biological Laboratory. 2018

“Inquiry-Driven Instruction in Advanced Lab Course” contributed poster at American Association of Physics Teachers Winter Meeting, 2018.

“An Inquiry-Driven Optical Tweezer Experiment for Upper Division Physics Lab” contributed poster at American Society of Cell Biology Annual Meeting 2017.

“Metrology of Variable-Line-Spacing X-Ray Gratings Using the APS Long Trace Profiler,” contributed talk at SPIE Optics and Photonics, 2017.

“From Motors to Proteins,” contributed talk at American Association of Physics Teachers Winter Meeting. 2012

“Three Dimensional Single Molecule Tracking of Full Length Myosin Conformation Change,” contributed poster at Biophysical Society Annual Meeting, 2012.

“Morphology Influenced Properties in Organic Semi-conducting Thin Films for Spin-Valves,” contributed talk at the March 2007 Meeting of the American Physical Society, 2007.

Skills

Hardware: Custom machined optomechanics, broad range of off-the-shelf optomechanics, light detectors (avalanche photodiodes, CCDs, single photon detection modules), basic electronics (soldering, oscilloscopes, LEDs), lasers, experience with scientific grade and student grade optics of all kinds, machine shop trained.

Software: MATLAB, LabVIEW (was National Instruments Certified Associate Developer back in 2010), ImageJ, Origin Pro, some experience in SolidWorks, IDL, Mathematica, Python.

Other: Dynamic Light Scattering, cryogenic and vacuum systems, experience with microfluidics, AFM, basic bacterial culture.