

Jerome Fung

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Education

Ph.D., Physics, Harvard University, November 2013.

A.M., Physics, Harvard University, March 2008.

B.A. with high honors, Physics, Swarthmore College, May 2006.

Professional Appointments

Assistant Professor
Ithaca College, 2018 – present.

Lecturer in Physics
Wellesley College, 2015 – 2018.

Postdoctoral Associate
Brandeis University, 2013 – 2015.

Honors and Awards

Teaching Certificate, Derek Bok Center for Teaching and Learning, Harvard University, May 2013.

Harold T. White Prize for excellence in physics teaching, Department of Physics, Harvard University, April 2013.

Undergraduate poster award, 47th Meeting of the APS-Division of Plasma Physics, 2005.

Teaching Experience

Ithaca College

Physics 218, "Principles of Physics IV: Modern Physics" (Spring 2019)

Taught course introducing special relativity and quantum mechanics to physics majors and minors.

Physics 117, "Principles of Physics I: Mechanics" (Fall 2018)

Taught introductory mechanics course for physics and other quantitative science majors.

Physics 470, "Selected Topics in Advanced Topics" (Fall 2018)

Designed and taught upper-division seminar course on soft condensed matter.

Wellesley College

Physics 106, "Fundamentals of Electricity, Magnetism, & Optics" (Fall 2016, Spring 2017, Spring 2018)

Taught second semester of introductory sequence for pre-medical students and other nonmajors.

Physics 107, "Principles & Applications of Mechanics" (Fall 2015, Spring 2016, Fall 2017)

Assisted in redesign of introductory mechanics course for potential physics majors into blended classroom/laboratory format.

Physics 202 laboratory, "Introduction to Quantum Mechanics & Thermodynamics" (Fall 2016)

Taught and developed new experiments for sophomore-level thermal and modern physics laboratory with emphasis on fitting models to data.

Physics 310, "Experimental Physics" (Spring 2017, Spring 2018)

In collaboration with James Battat, taught advanced laboratory course including an introduction to analog electronics.

Brandeis University

Project instructor, Quantitative Biology Research Community (Spring 2015)

Designed, and mentored students in, a research project on measuring the stiffness of bacterial flagella as part of a new interdisciplinary program for undergraduates interested in molecular biology, biochemistry, and biophysics.

Harvard University

Teaching Fellow, Physics 15b, "Introductory Electromagnetism" (Fall 2012, Fall 2007)

Led weekly discussion sections and assisted with the writing and grading of examinations in course based on E. M. Purcell's *Electricity & Magnetism*.

Teaching Fellow, Physics 15c Laboratory, "Wave Phenomena" (Spring 2012)

Taught sophomore-level waves laboratory and assisted with development of new open-ended final projects.

L^AT_EX Workshop Instructor (January 2011)

Developed and taught an introductory workshop on the use of L^AT_EX for departmental undergraduates, graduate students, and staff.

Research Experience

Brandeis University, 2013–2015.

Advisor: Zvonimir Dogic

Explored structure and dynamics of colloidal membranes self-assembled from filamentous *fd* viruses.

Harvard University, 2007–2013.

Advisor: Vinothan N. Manoharan

Developed new analytical techniques based on electromagnetic scattering solutions for digital holographic microscopy, enabling rapid 3D imaging of dilute colloidal suspensions with nanometer precision.

Swarthmore College, May–August 2003 and 2005–2006.

Advisor: Michael R. Brown

Assisted with design and construction of an ion doppler spectrometer for rapid measurements of plasma flow and ion temperature in the Swarthmore Spheromak Experiment.

University of Iowa, May–July 2004.
Advisor: John A. Goree

Tested a new method for measuring the charge on a particle in an rf dusty plasma, based on dust particle response to modulation of the rf voltage.

Publications

J. Fung and S. Hoang, "Computational assessment of an effective-sphere model for characterizing colloidal fractal aggregates with holographic microscopy." *J. Quant. Spectrosc. Radiat. Transfer*, in press.

M. Siavashpouri, P. Sharma, **J. Fung**, and Z. Dogic, "Structure, dynamics and phase behavior of short rod inclusions dissolved in a colloidal membrane." *Soft Matter*, in press.

S. Barkley, T. G. Dimiduk, **J. Fung**, D. M. Kaz, V. N. Manoharan, R. McGorty, R. W. Perry, and A. Wang, "Holographic microscopy with Python and HoloPy." *Computing in Science & Engineering*, in press.

J. Fung and S. Hoang, "Assessing the use of digital holographic microscopy to measure the fractal dimension of colloidal aggregates." *OSA Biophotonics Congress: Optics in the Life Sciences 2019 Proceedings*, paper JT4A.19.

J. Fung and L. Wardell, "Introducing students to nonlinear model fitting with Jupyter notebooks through a quantitative diffraction experiment." *2018 Conference on Laboratory Instruction Beyond the First Year of College Proceedings*. (2018).

T. G. Dimiduk, R. W. Perry, **J. Fung**, and V. N. Manoharan, "Random-subset fitting of digital holograms for fast three-dimensional particle tracking." *Appl. Opt.* **53**, G177–G183 (2014).

A. Wang, T. G. Dimiduk, **J. Fung**, S. Razavi, I. Kretzschmar, K. Chaudhary, and V. N. Manoharan, "Using the discrete dipole approximation and holographic microscopy to measure rotational dynamics of non-spherical colloidal particles." *J. Quant. Spectrosc. Radiat. Transfer* **146**, 499–509 (2014).

A. Small, **J. Fung**, and V. N. Manoharan, "Generalization of the optical theorem for light scattering from a particle at a planar interface." *J. Opt. Soc. Am. A* **30**, 2519–2525 (2013).

J. Fung and V. N. Manoharan, "Holographic measurements of anisotropic three-dimensional diffusion of colloidal clusters." *Phys. Rev. E* **88**, 020302(R) (2013).

R. W. Perry, G. Meng, T. G. Dimiduk, **J. Fung**, and V. N. Manoharan, "Real-space studies of the structure and dynamics of self-assembled colloidal clusters." *Faraday Discuss.* **159**, 211–234 (2012).

J. Fung, R. W. Perry, T. G. Dimiduk, and V. N. Manoharan, "Imaging multiple colloidal particles by fitting electromagnetic scattering solutions to digital holograms." *J. Quant. Spectrosc. Radiat. Transfer* **113**, 2482–2489 (2012).

J. Fung, K. E. Martin, R. W. Perry, D. M. Kaz, R. McGorty, and V. N. Manoharan, "Measuring translational, rotational, and vibrational dynamics in colloids with digital holographic microscopy." *Optics Exp.* **19**, 8051–8065 (2011).

R. McGorty, **J. Fung**, D. Kaz, and V. N. Manoharan, "Colloidal self-assembly at an interface." *Materials Today* **13**, 34–42 (2010).

A. Perro, G. Meng, **J. Fung**, and V. N. Manoharan, "Design and synthesis of model transparent aqueous colloids with optimal scattering properties." *Langmuir* **25**, 11295–11298 (2009).

R. McGorty, **J. Fung**, D. Kaz, S. Ahn, and V. N. Manoharan, "Measuring dynamics and interactions of colloidal particles with digital holographic microscopy." *Digital Holography and Three-Dimensional Imaging Proceedings*, OSA Technical Digest (CD), paper DTuB1, (2008).

M. R. Brown, C. D. Cothran, **J. Fung**, M. Chang, J. Horwitz, M. J. Schaffer, J. Leuer, and E. V. Belova, "Dipole trapped spheromak in a prolate flux conserver." *Phys. Plasmas* **13**, 102503 (2006).

C. D. Cothran, **J. Fung**, M. R. Brown, and M. J. Schaffer, "Fast, high resolution echelle spectroscopy of a laboratory plasma." *Rev. Sci. Inst.* **77**, 063504 (2006).

M. R. Brown, C. D. Cothran, and **J. Fung**, "Two fluid effects on three-dimensional reconnection in the Swarthmore Spheromak Experiment with comparisons to space data." *Phys. Plasmas* **13**, 056503 (2006).

Invited Talks

"Quantitative Analysis of Diffraction Patterns: Model Fitting and Optics," Third Conference on Laboratory Instruction Beyond the First Year of College, Loyola University Maryland, July 2018.

"Learning About Colloidal Self-Assembly with Microscopy," Ithaca College, December 2017.

"Seeing is Believing: Looking at Colloidal Clusters in 3D with Digital Holographic Microscopy," Rhode Island College, March 2015.

"Measuring the 3D Dynamics of Multiple Colloidal Particles with Digital Holographic Microscopy and Electromagnetic Scattering Solutions," Woods Hole Marine Biological Laboratory, February 2014.

"Measuring the 3D Dynamics of Multiple Colloidal Particles with Digital Holographic Microscopy and Electromagnetic Scattering Solutions," Brandeis University MRSEC seminar, January 2014.

"Measuring 3D Dynamics of Colloids with Digital Holographic Microscopy," New York University, Center for Soft Matter Research seminar, May 2013.

Contributed Conference Presentations

J. Fung and L. Wardell, "Quantitative analysis of Fraunhofer diffraction patterns: an exercise in model fitting, optics, and electronics." Workshop presented at the Third Conference on Laboratory Instruction Beyond the First Year of College, Loyola University Maryland, July 2018.

J. Fung and Z. Dogic, "Exploring fluctuations in colloidal membranes with optical microscopy." Poster presentation delivered at the Joint Fall Meeting of the APS and AAPT New England Sections, Hanover, NH, November 2015.

J. Fung, S. J. DeCamp, T. Harden, C. F. Kelley, J. Miller, L. Tetone, A. S. Canelli, D. Langenthal, and J. Kondev, "The Quantitative Biology Research Community (QBReC) at Brandeis." Oral presentation delivered at AAPT Summer Meeting, College Park, MD, July 2015.

J. Fung and Z. Dogic, "Formation and fluctuations of domains at the edges of membranes self-assembled from bidisperse filamentous phages." Oral presentation delivered at APS March Meeting, San Antonio, TX, March 2015.

- J. Fung**, T. G. Dimiduk, R. W. Perry, and V. N. Manoharan, "Measurements of anisotropic Brownian motion of colloidal clusters." Oral presentation delivered at APS March Meeting, Baltimore, MD, March 2013.
- J. Fung**, M. Greiner, V. N. Manoharan, and J. Peidle, "Teaching Fourier Optics Through Inquiry with Spatial Light Modulators." Poster presentation delivered at AAPT Winter Meeting, New Orleans, LA, January 2013.
- J. Fung**, R. W. Perry, T. G. Dimiduk, and V. N. Manoharan, "3D structure and dynamics of colloidal particles on emulsion droplets." Oral presentation delivered at MRS Fall Meeting, Boston, MA, November 2012.
- J. Fung**, R. W. Perry, T. G. Dimiduk, and V. N. Manoharan, "Studying colloidal particles on an emulsion droplet with digital holographic microscopy." Oral presentation delivered at APS March Meeting, Boston, MA, February 2012.
- J. Fung**, R. W. Perry, D. M. Kaz, R. McGorty, and V. N. Manoharan, "Studying the dynamics of colloidal particles with digital holographic microscopy and electromagnetic scattering solutions." Oral presentation delivered at Electromagnetic and Light Scattering XIII, Taormina, Sicily, September 2011.
- J. Fung**, K. E. Martin, R. McGorty, D. M. Kaz, R. W. Perry, J. A. Keller, G. Meng, and V. N. Manoharan, "Measuring the translational and rotational diffusion of colloidal clusters with digital holographic microscopy." Oral presentation delivered at APS March Meeting, Dallas, TX, March 2011.
- J. Fung**, D. Kaz, R. McGorty, G. Meng, K. E. Martin, and V. N. Manoharan, "Measuring colloid interactions and dynamics with digital holographic microscopy and multi-particle scattering theory." Oral presentation delivered at APS March Meeting, Portland, OR, March 2010.
- J. Fung**, R. J. McGorty, and V. N. Manoharan, "Structures formed by colloidal particles on a droplet at small particle number." Oral presentation delivered at APS March Meeting, Pittsburgh, PA, March 2009.
- J. Fung**, R. J. McGorty, and V. N. Manoharan, "Studies of colloids on spherical interfaces using digital holographic microscopy." Oral presentation delivered at APS March Meeting, New Orleans, LA, March 2008.
- J. Fung**, S. C. Chang, J. Horwitz, B. Coellner, C. D. Cothran, M.R. Brown, and M. J. Schaffer, "Spectroscopic measurements of flow and ion temperature at SSX." Poster presentation delivered at the 47th Annual Meeting of the APS-Division of Plasma Physics, Denver, CO, October 2005.
- J. Fung**, B. Liu, J. Goree, and V. Nosenko, "Measuring particle charge in an rf dusty plasma." Poster presentation delivered at the 46th Annual Meeting of the APS-Division of Plasma Physics, Savannah, GA, November 2004.

Student Research Mentoring

Christopher Weil (June 2019 – present), undergraduate at Ithaca College

Thy Doan Mai Le (May 2019 – present), undergraduate at Ithaca College

Oscar Lopez (January 2019 – present), undergraduate at Ithaca College

James VanDeventer (September 2018 – May 2019), senior project at Ithaca College.

Wyatt Vigilante (September 2018 – present), undergraduate at Ithaca College.

Caroline Martin (September 2017 – May 2018), senior thesis writer at Wellesley College.
Amy Li (January 2017 – December 2017), undergraduate at Wellesley College.
Samantha Hoang (May 2017 – December 2017), undergraduate at Wellesley College.
Kamile Lukosiute (January – May 2017), co-advised undergraduate at Wellesley College.
Alexandra Boehmke (January – May 2017), undergraduate at Wellesley College.
Lily Orth-Smith (January – May 2017), undergraduate at Wellesley College.
Sonja Cwik (May – December 2016), undergraduate at Wellesley College.
Chunlong Hong (Summer 2015), co-advised undergraduate at Bunker Hill Community College.
Tarik Phillips (Summer 2015), co-advised undergraduate at the University of Florida.
John Keller (Summer 2010), undergraduate at Eastern Nazarene College.
Kristopher Eric Martin (Summer 2009), undergraduate at the University of California, Santa Barbara.
Kamila Kaczor (Summer 2008), undergraduate at Harvard College.

Professional Service

Referee, *Applied Physics B*, *Soft Matter*, *Langmuir*, *Journal of Physical Chemistry*, and *Optics Express*.

Outreach Activities

Adult Lab Activities Coordinator, Self-Assembly Science Week
Harvard University, Department of Physics, April 2012

In collaboration with other graduate students, designed and led hands-on lab activities for non-scientist adults on structural color and DNA-based colloidal assembly during public science expo.

Professional Associations

American Physical Society
American Association of Physics Teachers
Optical Society of America