

Dustin P. Kleckner, Ph. D.



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EDUCATION **University of California – Santa Barbara**, Santa Barbara, California USA
Ph.D., Physics, March 2010
M.A., Physics, September 2006
California Nanosystems Institute (CNSI) Fellowship, 2004 – 2006

University of Minnesota – Twin Cities, Minneapolis, Minnesota USA
B.A., Physics and Art, 2004
Graduation with Honors, Summa Cum Laude

ACADEMIC WORK EXPERIENCE **University of California – Merced**, Merced, California USA **July 2015 – Present**
Assistant Professor

University of Chicago, Chicago, Illinois USA
Post-Doctoral Researcher **January 2011 – June 2015**
Kadanoff-Rice Fellow **January 2013 – January 2014**
Topic: Topology and Geometry in Fluid Dynamics and Soft Matter Physics
Advisers: William T. M. Irvine and Sidney Nagel

University of California – Santa Barbara, Santa Barbara, California USA
Graduate Student Researcher **2004 – March 2010**
Post-Doctoral Researcher **April – December 2010**
Topic: Quantum Micro-optomechanical Systems (Theory and Experiment)
Adviser: Dirk Bouwmeester

Teaching Assistant **Fall 2009**
Physics 250, Graduate Level Quantum Optics

University of Minnesota – Twin Cities, Minneapolis, Minnesota USA **2003 – 2004**
Undergraduate Student Researcher
Topic: Radio-emission from Cosmic Rays
Adviser: Michael DuVernois

Teaching Assistant **Fall 2002 – Spring 2004**
Undergraduate Physics Discussion Sections and Labs

PUBLICATIONS **Google Scholar Page:** scholar.google.com/citations?user=SR3nIfoAAAAJ

“Stretching Behavior of Knotted and Unknotted Flow Fields,” S. Faaland, D. Tapia Silva, and D. Kleckner, *arXiv:2306.17393* (2023).

“High-speed two-color scanning volumetric laser-induced fluorescence,” D. Tapia Silva, C. Cooper, T. L. Mandel, S. Khatri and D. Kleckner, *Research Square Preprint*. DOI:

10.21203/rs.3.rs-2977609/v1 (2023).

“Dynamics of Acoustically Bound Particles,” N. St. Clair, D. J. Davenport, A. D. Kim and D. Kleckner, *Physical Review Research* **5**, 013051 (2023).

“Formation of colloidal chains and driven clusters with optical binding,” D. J. Davenport and D. Kleckner, *Soft Matter* **18**, 4464 (2022).

“Retention of rising droplets in density stratification,” T. Mandel, De Zhen Zhou, L. Waldrop, M. Theillard, D. Kleckner and S. Khatri, *Physical Review Fluids* **5**, 124803 (2020).

“Helicity in superfluids: Existence and the classical limit,” H. Kedia, D. Kleckner, M. W. Scheeler and W. T. M. Irvine, *Physical Review Fluids* **3**, 104702 (2018).

“Self-organization in dipolar cube fluids constrained by competing anisotropies,” L. Rossi, J. G. Donaldson, J. -M. Meijer, Andrei V. Petukhov, D. Kleckner, S. S. Kantorovich, W. T. M. Irvine, A. P. Philipse and S. Sacanna. *Soft Matter* **14**, 1080 (2018).

“Complete measurement of helicity and its dynamics in vortex tubes,” M. W. Scheeler, W. M. van Rees, H. Kedia, D. Kleckner and W. T. M. Irvine, *Science* **357**, 487 (2017).

“How superfluid vortex knots untie,” D. Kleckner, L. H. Kauffman and W. T. M. Irvine, *Nature Physics*, advanced online publication: doi:10.1038/nphys3679 (2016).

“Topological mechanics of gyroscopic metamaterials,” L. Nash, D. Kleckner, A. Read, V. Vitelli, A. M. Turner and W. T. M. Irvine, *Proceedings of the National Academy of Sciences* **121**, 14495 (2015).

“Helicity conservation by flow across scales in reconnecting vortex links and knots,” D. Kleckner, M. W. Scheeler, D. Proment, G. L. Kindlmann, and W. T. M. Irvine, *Proceedings of the National Academy of Sciences* **111**, 15350 (2014).

“The life of a vortex knot,” D. Kleckner, M. W. Scheeler, and W. T. M. Irvine, *Physics of Fluids* **26**, 091105 (2014). [accompanying movie: [arXiv 1310.3321](https://arxiv.org/abs/1310.3321)]

“Liquid crystals: Tangled loops and knots (News and Views),” W. T. M. Irvine and D. Kleckner, *Nature Materials* **13**, 229 (2014).

“Creation and dynamics of knotted vortices,” D. Kleckner and W. T. M. Irvine, *Nature Physics* **9**, 253 (2013).

“Optomechanical trampoline resonators,” D. Kleckner, B. Pepper, E. Jeffrey, P. Sonin, S. M. Thon, and D. Bouwmeester, *Optics Express* **19**, 19708 (2011).

“Fiber-connectorized micropillar cavities,” F. Haupt, S. S. R. Oemrawsingh, S. M. Thon, H. Kim, D. Kleckner, D. Ding, D. J. Suntrup III, P. M. Petroff, and D. Bouwmeester, *Applied Physics Letters* **97**, 131113 (2010).

“Polychromatic Photonic Quasicrystal Cavities,” S. M. Thon, W. T. M. Irvine, D. Kleckner and D. Bouwmeester, *Physical Review Letters* **104**, 243901 (2010).

“Micro-optomechanical systems for quantum optics,” D. Kleckner, University of California Doctoral Thesis, March 2010.

"Diffraction limited high finesse optical cavities," D. Kleckner, W. T. M. Irvine, S. S. R. Oemrawsingh and D. Bouwmeester, *Physical Review A* **81**, 043814 (2010).

"Creating and verifying a quantum superposition in a micro-optomechanical system," D. Kleckner, I. Pikovski, E. Jeffrey, L. Ament, E. Eliel, J. van den Brink and D. Bouwmeester, *New Journal of Physics* **10**, 095020 (2008).

"Sub-kelvin optical cooling of a micromechanical resonator," D. Kleckner and D. Bouwmeester, *Nature* **444**, 75 (2006).

"High Finesse Opto-Mechanical Cavity with a Movable Thirty-Micron-Size Mirror," D. Kleckner, W. Marshall, M. J. A. de Dood, K. N. Dinyari, B.-J. Pors, W. T. M. Irvine, and D. Bouwmeester, *Physical Review Letters* **96**, 173901 (2006).

RESEARCH GRANTS **UC Merced Academic Senate Committee on Research Research Grant: Fluid Dynamics of Low Reynolds Number Wings**, \$7,381 (2023)

NSR Career Award: Self-Organization of Micro-Particles with Light and Sound, \$546,675 (2021–present)

UC Merced Academic Senate Faculty Research Grant: Droplet Cloud Interactions in Stratification Trapped Oil Plumes, \$10,000 (2020, co-PI with Dr. Shilpa Khatri)

Army Research Office DURIP Grant: Multiscale Ultrafast Volumetric Imaging Lab, \$690,668 (2018-19, co-PI with Dr. Shilpa Khatri and Dr. Bin Liu)

Hellman Foundation Fellowship: Self-Assembly of Optically Bound Colloidal Materials, \$20,000 (2017-18)

RECENT
CONFERENCES,
TALKS, AND
PRESENTATIONS

Syracuse University Soft Matter and Biological Physics Seminar
Invited Talk: "Self Organization with Light and Sound" **April 4, 2023**

Emory University Physics Colloquium
Invited Talk: "Vortex mechanics: the shape of fluid flows" **March 21, 2023**

American Physical Society March Meeting 2023
Contributed Talk: "Non-reciprocal forces in optically bound colloids" **March 6, 2023**

UC Davis Condensed Matter Seminar
Invited Talk: "Self Organization with Light and Sound" **February 9, 2023**

University of Chicago Computations in Science Seminar
Invited Talk: "Self Organization with Light and Sound" **December 7, 2022**

Annual Meeting of the APS Division of Fluid Dynamics 2022
Contributed Talk: "Understanding Flows with Vortex Geometry" **November 20, 2022**

Northwestern University Complex Systems Seminar
Invited Talk: "Self Organization with Light and Sound" **November 17, 2022**

UC Merced Active Matter Symposium
Invited Talk: "Optically bound colloids: an accidental active matter system" **October 5, 2022**

American Physical Society March Meeting 2022

Contributed Talk: "Directing Particle Assembly with Light and Sound" **March 16, 2022**

Annual Meeting of the APS Division of Fluid Dynamics 2021

Contributed Talk: "Why are Knotted Vortices Unstable?" **November 21, 2021**

Emory University Physics Colloquium

Invited Talk: "Self-Assembly with Light and Sound" **October 20, 2020**

UC Merced Calteach Webinar

Invited Talk: **July 15, 2020**
"Knots in Fluids (and other places you wouldn't expect them)"

American Physical Society March Meeting 2020

Contributed Talk: **March 6, 2020**
"What kinds of forces does optical binding produce?" (originally scheduled for March 3, 2020, but delivered at UCM instead due to COVID)

IUTAM 2019 Symposium on Vortex Dynamics 2019

Contributed Talk: **June 26, 2019**
"Exploring Vortex Unknotting with Superfluid Models"

American Physical Society March Meeting 2019

Contributed Talk: **March 7, 2019**
"Controlling Colloidal Assembly through Optical Binding"

IN THE MEDIA

Nova Online Video

Knotty Thrills **July 17, 2014**
<http://www.pbs.org/wgbh/nova/physics/knotty-thrills.html>

National Public Radio: Science Friday

Tying Water in a Knot **March 15, 2013**
<http://www.sciencefriday.com/video/03/15/2013/tying-water-in-a-knot.html>

Nature Podcast

Interview **November 2, 2006**
<http://www.nature.com/nature/podcast/v444/n7115/nature-2006-11-02.html>