Zoey S. Davidson

School of Engineering and Applied Sciences
Harvard University
Cambridge, Massachusetts, USA

Email: zoey@zsdavidson.com
Web: http://zsdavidson.com
Phone: +1-267-713-9639

EDUCATION

Ph.D. Physics, University of Pennsylvania, Philadelphia, 2017
Dissertation: *Assembly, Elasticity, and Structure of Lyotropic Chromonic Liquid Crystals and Disordered Colloids*
Committee: T.C. Lubensky (chair), A.G. Yodh (advisor), P.J. Collings, D. Durian, J.S. Karp

M.S. Physics, University of Pennsylvania, Philadelphia, 2013

B.A. Physics, University of Pennsylvania, Philadelphia, 2010

ACADEMIC APPOINTMENTS

2019– Postdoctoral Fellow, John A. Paulson School of Engineering and Applied Science, Harvard University, Cambridge

2017–19 Postdoctoral Scholar & Alexander von Humboldt Visiting Scientist, Department of Physical Intelligence, Max Planck Institute for Intelligent Systems, Stuttgart

2012–17 Research Assistant, Yodh Soft Matter Lab, Department of Physics, University of Pennsylvania, Philadelphia

2010–11 Research Assistant, Physics and Instrumentation Group, Perelman School of Medicine, University of Pennsylvania, Philadelphia

RESEARCH INTERESTS

Soft matter physics, fundamentals and applications –
Materials science, polymers, artificial muscles, and sustainability.
Traditional and modern fabrication methods, machining and 3D printing.

FELLOWSHIPS AND AWARDS

2017 Postdoctoral Research Fellowship, A.v. Humboldt Foundation

2013 Chair's Teaching Award, Department of Physics & Astronomy University of Pennsylvania

2011 Valentin T. Jordanov Radiation Instrumentation Travel Grant, IEEE NSS-MIC

PUBLICATIONS (* indicates equal contribution, † indicates corresponding author)

Peer Reviewed Publications

2020 **Z.S. Davidson**†, et al., "Twisting and untwisting of twisted nematic elastomers." Accepted, *Phys. Rev. Mater.* – available on request.

H. Shahsavan, ... , **Z.S. Davidson**, et al. "Bioinspired underwater locomotion of light-driven liquid crystal gels." *Proc. Natl. Acad. Sci. U. S. A.* 117, 10, p5125-5133.

2019 Y. Guo, H. Shahsavan, **Z.S. Davidson***, M. Sitti, "Precise Control of Lyotropic Chromonic Liquid Crystals Alignment through Surface Topography." *ACS Applied Materials & Interfaces*, vol. 11, no. 39, p. 36110

2019 **Z.S. Davidson**†, et al., "Monolithic shape-programmable dielectric liquid crystal elastomer actuators." *Science Advances*, In Press. Preprint: https://arxiv.org/abs/1904.09606

2019 Xiaoguang Ma, **Z.S. Davidson***, et al., "Heterogeneous activation, local structure, and softness in supercooled colloidal liquids", *Phys. Rev. Lett.*, vol. 112, no. 2, p. 028001

2017 **Z.S. Davidson**, Y. Huang, A. Gross, *et al.*, "Deposition and drying dynamics of liquid crystal droplets," *Nat. Commun.*, vol. 8, no. 15642

2017 E.D. Cubuk, R.J.S. Ivancic, S.S. Schoenholz, D.J. Strickland, A. Basu, **Z.S. Davidson**, *et al.*, "Structure-property relationships from universal signatures of plasticity in disordered solids," *Science*, vol. 358, pp. 1033-1037

2016 M.D. Gratale, X. Ma, **Z.S. Davidson**, *et al.*, "Vibrational properties of quasi-two-dimensional colloidal glasses with varying interparticle attraction," *Phys. Rev. E.*, vol. 94, no. 4, p. 042606

2016 M.D. Gratale, T. Still, C. Matyas, **Z.S. Davidson**, *et al.*, "Tunable depletion potentials driven by shape variation of surfactant micelles," *Phys. Rev. E.*, vol. 93, no. 3, p. 050601

2015 T. Still, P.J. Yunker, K. Hanson, **Z.S. Davidson**, *et al.*, "Temperature-Sensitive Hydrogel-Particle Films from Evaporating Drops," *Adv. Mater. Interfaces*, vol. 2, no. 1500371

2015 **Z.S. Davidson***, L. Kang, J. Jeong, *et al.*, "Chiral structures and defects of lyotropic chromonic liquid crystals induced by saddle-splay elasticity," *Phys. Rev. E.*, vol. 91, p. 050501

2015 J. Jeong, L. Kang, **Z.S. Davidson**, *et al.*, "Chiral structures from achiral liquid crystals in cylindrical capillaries," *PNAS*, vol. 112, pp. E1837-1844

2014 M.A. Lohr, T. Still, R. Ganti, M.D. Gratale, **Z.S. Davidson**, *et al.*, "Vibrational and structural signatures of the crossover between dense glassy and sparse gel-like attractive colloidal packings," *Phys. Rev. E.*, vol. 91, p. 050501

2014 J. Jeong, **Z.S. Davidson**, *et al.*, "Chiral symmetry breaking and surface faceting in chromonic liquid crystal droplets with giant elastic anisotropy ," *PNAS*, vol. 111, pp. 1742-1747

2012 W. Ashmanskas, **Z.S. Davidson**, *et al.*, "Combined analog/digital approach to performance optimization for the LAPET whole-body TOF PET scanner," *2012 IEEE Nuclear Science Symposium and Medical Imaging Conference*, pp. 3496-3500

2011 **Z.S. Davidson**, R. Wiener, *et al.*, "High voltage photodetector calibration for improved timing resolution with scintillation detectors for TOF-PET imaging," *2011 IEEE Nuclear Science Symposium and Medical Imaging Conference*, pp. 2338-2341

Press Coverage

2017 *Penn physicists discover why drying liquid crystal drops leave unusual 'coffee rings'*
`https://www.eurekalert.org/pub_releases/2017-05/uop-ppd053017.php`

CONFERENCE PRESENTATIONS

2019 **Z.S. Davidson**, Selected participant in *Lindau Nobel Laureate Meeting*

2019 **Z.S. Davidson**, *et al.*, "Electromechanical Actuation of Liquid Crystal Elastomer Muscles," *German Liquid*

Crystal Conference

2019 **Z.S. Davidson**, *et al.*, "Electromechanical Actuation of Dielectric Liquid Crystal Elastomers of Complex Patterns," *Gordon Research Seminar - Complex Active and Adaptive Material Systems*

2016 **Z.S. Davidson**, *et al.*, "Rearrangement dynamics in colloidal particle packings identified through local structure and machine-learning," *APS March Meeting*

2015 **Z.S. Davidson**, *et al.*, "Experimental and theoretical studies of lyotropic chromonic liquid crystals confined in cylinders," *89th ACS Colloid and Surface Science Symposium*

2015 **Z.S. Davidson**, *et al.*, "Planar Anchoring of Achiral Nematic Liquid Crystals in Capillaries–with a Twist," *APS March Meeting*

2014 **Z.S. Davidson**, *et al.*, "Lyotropic Chromonic Liquid Crystal Droplets, Faceted and Squeezed," *APS March Meeting*

2013 **Z.S. Davidson**, *et al.*, "Phase and Topological Behavior of Lyotropic Chromonic Liquid Crystals in Double Emulsions," *APS March Meeting*

2013-16 Biannual short presentations in *Mid Atlantic Soft Matter* series.

2013-19 Biennial attendance at Liquid Crystal Gordon Research Conference.

SERVICE

Reviewer: *Physical Review Letters*, *Langmuir*, *Soft Matter*, *MRS Communications*, *Physical Review Research*, *Science Advances*

Chair, Liquid Crystals Gordon-Kennan Research Seminar 2015

Exhibitor and Outreach at Philly Materials Day and Philadelphia Science Festival, 2012-2016
Organized demonstrations for public audiences from elementary school to adult.

University of Puerto Rico Summer High School Lecture and Lab
NSF Partnership for Research and Education in Materials, 2016

TEACHING AND MENTORING EXPERIENCE

Mentored 9 students: 2 Ph.D., 2 M.S., 3 B.A. and 2 high school students.

Teaching at University of Pennsylvania:

2015 CTL Teaching Certificate, Center For Teaching & Learning, University of Pennsylvania, 2015

2015F Classical Mechanics

2014S Modern Physics, Lab TA

2012F Laboratory Electronics for Physicists, Lab TA (and 2014F)

2011-2 Physics for Architects (and 2013-4)

2011F Physics for Engineers, Lab TA

2009F Introduction to Computer Architecture