# Lauren D. Zarzar

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## Academic Appointments

**The Pennsylvania State University**, University Park, PA
- Professor, Department of Chemistry, Department of Materials Science and Engineering (courtesy) — 2024 - present
- Associate Professor, Department of Chemistry, Department of Materials Science and Engineering (courtesy) — 2022 - 2024
- Assistant Professor, Department of Chemistry — 2016 - 2022
- Assistant Professor, Department of Materials Science and Engineering (courtesy) — 2019 - 2022
- Assistant Professor, Department of Materials Science and Engineering — 2016 - 2018

**University of Pennsylvania**, Philadelphia, PA
- Visiting faculty, Department of Chemical and Biomolecular Engineering — July 2024 - 2025

## Education

**Harvard University**, Cambridge, MA
- Ph.D., Chemistry — 2013
- Advisor: Prof. Joanna Aizenberg
- Dissertation: “Dynamic Hybrid Materials: Hydrogel Actuators and Catalytic Microsystems”

**University of Pennsylvania**, Philadelphia, PA
- B.A., Chemistry from the College of Arts and Sciences — 2008
- B.S., Economics from the Wharton School — 2008

## Honors and Awards

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|---|---|
| Penn State Faculty Scholar Medal | 2025 |
| Presidential Early Career Award for Scientists and Engineers (PECASE) | 2025 |
| Simons Foundation Pivot Fellowship | 2023 |
| Camille Dreyfus Teacher-Scholar Award | 2022 |
| Penn State Eberly College of Science Distinguished Mentoring Award | 2022 |
| American Chemical Society Polymeric Materials Science and Engineering (PMSE) Division Young Investigator Award | 2021 |
| National Science Foundation CAREER Award | 2021 |
| Marion Milligan Mason Award for Women in the Chemical Sciences (AAAS) | 2020 |
| Air Force Office of Scientific Research Young Investigator Program Award | 2020 |
| Sloan Research Fellowship | 2020 |
| Packard Fellowship for Science and Engineering | 2019 |
| Rustum and Della Roy Innovation in Materials Research Award (Penn State) | 2019 |
| American Chemical Society Chemical & Engineering News "Talented 12" Class of 2019 | 2019 |
| Unilever Award, ACS Division of Colloid and Surface Chemistry | 2019 |
| Army Research Office Young Investigator Award | 2018 |
| 3M Non-Tenured Faculty Award | 2018 |
| Gladys Snyder Award (Penn State) | 2018 |
| Virginia S. and Philip L. Walker, Jr. Faculty Fellowship (Penn State) | 2016 |
| NSF and the Japan Society for the Promotion of Science, East Asia and Pacific Summer Institute Fellowship (EAPSI) | 2013 |
| American Chemical Society AkzoNobel Student Award in Applied Polymer Science | 2011 |
| National Defense Science and Engineering Graduate Fellowship (NDSEG) | 2010 |
| National Science Foundation Graduate Research Fellowship (NSF-GRFP) | 2010 |
| American Chemical Society Achievement Award, Philadelphia Section | 2008 |
| National Science Foundation Research Experiences for Undergraduates Fellowship | 2007 |
| Novartis Undergraduate Summer Research Fellowship at Penn | 2006 |

## Other Research Experience

**University of Pennsylvania**, Department of Chemical and Biomolecular Engineering, Philadelphia, PA — 2024-2025
*Simons Foundation Pivot Fellow / sabbatical in Daniel Hammer's laboratory*
Studied intrinsically disordered protein engineering, phase behavior, and non-equilibrium properties

**Massachusetts Institute of Technology**, Department of Chemistry, Cambridge, MA — 2013 – 2016
*Postdoctoral Research Advisor: Prof. Timothy Swager*

Investigated the chemical and physical properties of complex emulsions that dynamically reconfigure between encapsulated and Janus morphologies in response to changes in the balance of interfacial tensions

**University of Tokyo**, Department of Chemistry and Biotechnology, Tokyo, Japan Summer 2013
*Research Advisor: Prof. Takashi Kato*
Explored the self-assembly of functional liquid crystals and liquid crystal polymers within microscale patterned surface confinement

**Harvard University**, Department of Chemistry and Chemical Biology, Cambridge, MA 2008 – 2013
*Graduate Research Advisor: Prof. Joanna Aizenberg*
Investigated bio-inspired, chemo-mechanical actuation systems in which stimuli-responsive hydrogel drives the controlled movement of surface-attached, high-aspect-ratio polymeric microstructures

**Sandia National Laboratories**, Albuquerque, NM Summers 2010 – 2012
*Collaborators: Dr. Bryan Kaehr and. Prof. C. Jeffrey Brinker*
Conducted research in the Advanced Materials Laboratory in a collaboration with the National Institute for Nano Engineering developing methods for multiphoton patterning of responsive hydrogels and metal catalysts as well as exploring their subsequent integration into functional 3D microsystems

**Columbia University**, Nanoscale Science and Engineering Center, New York, NY Summer 2007
*Research Experiences for Undergraduates Advisor: Prof. Shalom Wind*
Studied the selective synthesis of carbon nanotubes by patterned hexabenzocoronene on ruthenium nanodots

**University of Pennsylvania**, Department of Chemistry, Philadelphia, PA 2005 – 2008
*Undergraduate Research Advisor: Prof. So-Jung Park*
Synthesis and properties of gold nanoclusters, fluorescent gold-thiolate complexes, and quantum dot/diblock copolymer assemblies

## Peer-Reviewed Publications

*corresponding, †equal contribution

59. B. Ashfaq, C. Lin, P. S. Cremer, **L. D. Zarzar***, "Water structure within ternary solvents suggests nanophase formation." *Journal of the American Chemical Society* **2026,** accepted
58. Q. Le, K. Kim, B. Kaehr, **L. D. Zarzar***, "History-dependent motility of active droplets." *Matter* **2026**, accepted.
57. L. M. Dueñas, C. Qu, S. Oturak, A. Dang, M. Aizawa, M. Dalal, E. Clark*, I. Dabo*, M. Terrones*, **L. D. Zarzar***, "Laser direct writing of transition metal oxide-supported Pt catalysts for the oxygen reduction reaction." *ChemComm* **2026**, *62*, 15546-15550.
56. N. Sturniolo, Y. Yu, M. Rayes, K. Hirsch, E. Huntley, B. Kaehr, S. Marschner, **L. D. Zarzar***, " Synergistic diffraction and multibounce reflection interference within single iridescent microstructures." *Newton* **2026**, accepted.
55. Y. Wang, B. Ashfaq, **L. D. Zarzar***, "Nanophase structuring in simple ternary solvents mediates reaction kinetics." *Chem* **2026**, *12*, 103039.
54. S. Birrer, S. Mani, B. Kaehr, A, Sen, **L. D. Zarzar***, "Nonequilibrium surfactant partitioning into microdroplets generates local phase inversion conditions and interfacial instability." *Soft Matter* **2026**, *22*, 1008-1019
53. S. Krishna Mani, L. Lazinski; S. Birrer, A. Sapre, **L. D. Zarzar**, Ayusman Sen*, "Droplets as cell models: chemical gradient-induced directional filopodia formation." *Journal of the American Chemical Society* **2025**, *147*, 47942–47953
52. X. Ju, ...**L. D. Zarzar**...*et. al.* "Technology roadmap of micro/nanorobots." *ACS Nano* **2025***,* 19, 24174−24334.
51. K. Hirsch, M. Rayes, N. E. Sturniolo, C. Rider, **L. D. Zarzar***, "Tailoring multi-bounce reflection interference with microscale refractive interfaces." *ACS Applied Optical Materials* **2025**, *3*, 852-860.
50. B. Ashfaq, A. Sen, **L. D. Zarzar***, "Uncovering chemical principles governing nanophase formation in ternary solvents." *Angewandte Chemie* **2025***,* e202421167.
49. M. Rayes, N. E. Sturniolo, K. Hirsch, C. H. Meredith, **L. D. Zarzar***, "Structural color from multi-bounce reflection interference in metalized microstructures." *ACS Applied Optical Materials* **2024**, *2,* 2371-2379.
48. K. E. Kim, R. V. Balaj, **L. D. Zarzar***, "Chemical programming of solubilizing, non-equilibrium active droplets." *Accounts of Chemical Research* **2024**, *57*, 2372–2382.
47. Y. Liu†, R. Kailasham†, P. Moerman, A. Khair*, **L. D. Zarzar***, "Self-organized patterns in non-reciprocal active droplet systems." *Angewandte Chemie* **2024**, *63*, e202409382.
46. R. V. Balaj†, W. Xue†, P. Bayati, S. Mallory, **L. D. Zarzar***, "Dynamic partitioning of surfactants into non-equilibrium emulsion

droplets." *Journal of the American Chemical Society* **2024,** *146*, 26340-26350.

45. K. E. Kim†, W. Xue†, **L. D. Zarzar***, "Liquid-liquid surfactant partitioning drives dewetting of oil from hydrophobic surfaces." *Journal of Colloid and Interface Science* **2024**, *658*, 179–187.

44. S. Krishna Mani, S. Al-Tooqi, J. Song, A. Sapre, **L. D. Zarzar**, A. Sen*, "Dynamic oscillation and motion of oil-in-water emulsion droplets" *Angewandte Chemie* **2024**, *63,* e202316242.

43. A. C. Castonguay, N. N. Nova, L. M. Dueñas, S. McGee, M. J. K. Lodhi, Y. Yang, **L. D. Zarzar***, "Direct laser synthesis and patterning of high entropy oxides from liquid precursors." *Materials Research Express* **2023**, *10*, 115003

42. C. M. Wentworth† Ryan L. Myers†, Paul S. Cremer*, **L. D. Zarzar***, "Investigating oil solubilization into nonionic micelles by Raman multivariate curve resolution", *Aggregate* **2023**, *00*, e385.

41. S. G. Birrer, P. Quinnan, **L. D. Zarzar***, "Ionic liquid-in-water emulsions stabilized by molecular and polymeric surfactants." *Langmuir* **2023***,* 39*,* 10795-10805.

40. K. Hirsch, N. E. Sturniolo, C. H. Meredith, M. S. Rayes, **L. D. Zarzar***, "Tuning structural coloration through evanescent wave absorption at microscale concave interfaces." *ACS Applied Optical Materials* **2023**, *1*, 1377-1386

39. Y. Cheng, L. Li, C. H. Meredith, R. V. Balaj, D. Wang, M. Pan, T. Han, J. Yang, Q. Wang, L. Dong* and **L. D. Zarzar***, "Sensitive, stretchable and healable photoluminescent humidity sensors based on droplet-enabled porous composite gels." *ACS Materials Letters* **2023***, 5,* 2074–2083.

38. S. McGee, A. Fest, C. Chandler, N. N. Nova, Y. Lei, J. Goff, S. B. Sinnott, Ismaila Dabo, M. Terrones*, **L. D. Zarzar***, "Direct laser writing of multimetal bifunctional catalysts for overall water splitting." *ACS Applied Energy Materials* **2023**, *6*, 3756-3768.

37. N. E. Sturniolo, K. Hirsch, C. H. Meredith, B. Beshires, S. Khanna, M. S. Rayes, M. Gallegos, S. McGee, B. Kaehr, **L. D. Zarzar***, "Iridescence from total internal reflection at 3D microscale interfaces: mechanistic insights and spectral analysis." *Advanced Materials* **2023**, *35*, 2210665.

36. M. A. Vratsanos, W. Xue, N. D. Rosenmann, **L. D. Zarzar**, N. C. Gianneschi*, "Ouzo effect examined at the nanoscale via direct observation of droplet nucleation and morphology." *ACS Central Science* **2023**, *9,* 457–465.

35. A. C. Castonguay†, R. Kailasham†, C. M. Wentworth, C. H. Meredith, A. S. Khair*, **L. D. Zarzar***, "Gravitational settling of active droplets." *Physical Review E* **2023**, *107*, 024608.

34. J. Zhao†, N. Yi†, X. Ding, S. Liu, J. Zhu, A. Castonguay, Y. Gao, **L. D. Zarzar**, H. Cheng*, "In situ laser-assisted synthesis and patterning of graphene foam composites as a flexible gas sensing platform." *Chemical Engineering Journal*, **2023**, *456*, 140956.

33. S. Birrer†, S. Cheon†, **L. D. Zarzar***, "We the droplets: a constitutional approach to active emulsions." *Current Opinion in Colloid and Interface Science* **2022***, 61,* 101623.

32. C. M. Wentworth, A. C. Castonguay, P. G. Moerman, C. H. Meredith, R. V. Balaj, S. Cheon, **L. D. Zarzar***, "Chemically tuning attractive and repulsive interactions between solubilizing oil droplets." *Angewandte Chemie* **2022**, *61*, e202204510.

31. A. C. Castonguay†, N. Yi†, J. Zhao, H. Li, Y. Gao, B. Li, **L. D. Zarzar***, H. Cheng*, "Direct laser writing of microscale metal oxide gas sensors from liquid precursors." *ACS Applied Materials and Interfaces* **2022**, *14*, 28163–28173.

30. N. Nova, **L. D. Zarzar***, "Direct laser writing of graphitic carbon from liquid precursors." *Chemistry of Materials* **2022,** *34*, 4602–4612.

29. C. H. Meredith, A. C. Castonguay, Y. Chiu, A. M. Brooks, P. Torab, P. Wong, A. Sen, D. Velegol, **L. D. Zarzar***, "Chemical design of self-propelled Janus droplets." *Matter* **2022**, *5*, 616-633.

28. S. Cheon, L. Silva, A. Khair, **L. D. Zarzar***, "Interfacially-adsorbed particles enhance the self-propulsion of oil droplets in aqueous surfactant." *Soft Matter* **2021**, *17*, 6742 - 6750.

27. S. McGee†, Y. Lei†, J. Goff, C. Wilkinson, N. Nova, C. M. Kindle, F. Zhang, K. Fujisawa, E. Dimitrov, S. Sinnott, I. Dabo, M. Terrones*, **L. D. Zarzar***, "Single-step direct laser writing of multimetal oxygen evolution catalysts from liquid precursors." *ACS Nano* **2021**, *15*, 9796–9807.

26. C. H. Meredith†, P. G. Moerman†, J. Groenewold, Y. Chiu, W. K. Kegel, A. van Blaaderen, **L. D. Zarzar***, "Predator-prey interactions between droplets driven by non-reciprocal oil exchange." *Nature Chemistry* **2020**, *12*, 1136–1142.

25. R. V. Balaj, **L. D. Zarzar***,"Reconfigurable complex droplets: design, properties, and applications." *Chemical Physics Reviews* **2020**, *1*, 281–286.

24. S. Klein, J. Sosa, A. Castonguay, W. Flores, **L. D. Zarzar***, Y. Liu*, "Green synthesis of Zr-based metal-organic framework hydrogel composites and their enhanced adsorptive properties." *Inorganic Chemistry Frontiers* **2020**, *7*, 4813–4821.

23. A. Goodling, S. Nagelberg, M. Kolle, **L. D. Zarzar***, "Tunable and responsive structural color from polymeric microstructured surfaces enabled by interference of totally internally reflected light." *ACS Materials Letters* **2020**, *2*, 754–763.

22. S. Cheon, L. Silva, R. Ditzler, **L. D. Zarzar***, "Particle stabilization of oil – fluorocarbon interfaces and effects on multiphase oil-

in-water complex emulsion morphology and reconfigurability." *Langmuir* **2020**, *36*, 7083–7090.

21. G. Choi, R. Nouri, **L. D. Zarzar**, W. Guan*, "Microfluidic deformability activated cell sorting (DACS)." *Microsystems & Nanoengineering* **2020**, *6,* 1–9.

20. R. V. Balaj, S. Cho, P. Singh, **L. D. Zarzar***, "Polyelectrolyte hydrogel capsules as stabilizers for reconfigurable complex emulsions." *Polymer Chemistry* **2020***, 11*, 281–286. *Invited as part of the themed Emerging Investigators Issue 2020.*

19. C. Kindle, A. Castonguay, S. McGee, J. A. Tomko, P. E. Hopkins, **L. D. Zarzar***, "Direct laser writing from aqueous precursors for nano to microscale topographical control, integration, and synthesis of nanocrystalline mixed metal oxides." *ACS Applied Nano Materials* **2019***, 2,* 2581–2586.

18. A. E. Goodling†, S. Nagelberg†, B. Kaehr, C. H. Meredith, S. Cheon, A. P. Saunders, M. Kolle, **L. D. Zarzar***, "Colouration by total internal reflection and interference at microscale concave interfaces." *Nature* **2019**, *566*, 523–527.

17. **L. D. Zarzar**, J. A. Kalow, X. He, J. J. Walish, T. M. Swager, "Optical visualization and quantification of enzyme activity using dynamic droplet lenses." *Proceedings of the National Academy of Sciences* **2017**, *114*, 3821–3825.

16. A. Sutton, T. Shirman, J. V. I. Timonen, G. T. England, P. Kim, M. Kolle, T. Ferrante, **L. D. Zarzar**, E. Strong, J. Aizenberg, "Photothermally triggered actuation of hybrid materials as a new platform for in vitro cell manipulation." *Nature Communications* **2017**, *8*, 14700.

15. S. Nagelberg, **L. D. Zarzar**, N. Nicolas, K. Subramanian, J. A. Kalow, V. Sresht, D. Blankschtein, G. Barbastathis, M. Kreysing, T. M. Swager, M. Kolle, "Reconfigurable and responsive droplet-based compound micro-lenses." *Nature Communications* **2017**, *8,* 14673.

14. Y. He, S. Savagatrup, **L. D. Zarzar**, T. M. Swager, "Interfacial polymerization on dynamic complex colloids: creating stabilized Janus droplets." *ACS Applied Materials & Interfaces* **2017**, *9*, 7804–7811.

13. **L. D. Zarzar***, B. S. Swartzentruber, B. F. Donovan, P. E. Hopkins, B. Kaehr*, "Using laser-induced thermal voxels to pattern diverse materials at the solid–liquid interface." *ACS Applied Materials & Interfaces* **2016**, *8*, 21134–21139.

12. **L. D. Zarzar**, V. Sresht, E. M. Sletten, J. A. Kalow, D. Blankschtein, T. M. Swager, "Dynamically reconfigurable complex emulsions via tunable interfacial tensions." *Nature* **2015**, *518*, 520–524.

11. B. Hashmi, **L. D. Zarzar**, T. Mammoto, A. Mammoto, A. Jiang, J. Aizenberg, D. E. Ingber, "Developmentally-inspired shrink-wrap polymers for mechanical induction of tissue differentiation." *Advanced Materials* **2014**, *26*, 3253–3257.

10. **L. D. Zarzar**, J. Aizenberg, "Stimuli-responsive chemo-mechanical actuation: a hybrid materials approach." *Accounts of Chemical Research* **2014**, *47*, 530–539.

9. X. He, R. Friedlander, **L. D. Zarzar**, J. Aizenberg, "Chemo-mechanically regulated oscillation of an enzymatic reaction." *Chemistry of Materials* **2013**, *25*, 521–523.

8. **L. D. Zarzar**, Q. Liu, X. He, Y. Hu, Z. Suo, J. Aizenberg, "Multifunctional actuation systems responding to chemical gradients." *Soft Matter* **2012**, *8*, 8289–8293.

7. X. He, M. Aizenberg, O. Kuksenok, **L. D. Zarzar**, A. Shastri, A. Balazs, J. Aizenberg, "Synthetic homeostatic materials with chemo-mechano-chemical self-regulation." *Nature* **2012**, *487*, 214-218.

6. **L. D. Zarzar**, B. S. Swartzentruber, J. Harper, D. Dunphy, C. J. Brinker, J. Aizenberg, B. Kaehr, "Multiphoton lithography of nanocrystalline platinum and palladium for site-specific catalysis in 3D microenvironments." *Journal of the American Chemical Society* **2012**, *134*, 4007–4010.

5. P. Kim, A. K Epstein, M. Khan, **L. D. Zarzar**, D. J. Lipomi, G. M. Whitesides, J. Aizenberg, "Structural transformation by electrodeposition on patterned substrates (STEPS): a new versatile nanofabrication method." *Nano Letters* **2012**, *12*, 527–533.

4. **L. D. Zarzar**, P. Kim, M. Kolle, C. J. Brinker, J. Aizenberg, B. Kaehr, "Direct writing and actuation of 3D-patterned hydrogel pads on micropillar supports." *Angewandte Chemie International Edition* **2011**, *50*, 9356–9360.

3. P. Kim, **L. D. Zarzar**, X. He, A. Grinthal, J. Aizenberg, "Hydrogel-actuated integrated responsive systems (HAIRS): moving towards adaptive materials." *Current Opinion in Solid State & Materials Science* **2011**, *15*, 236–245.

2. **L. D. Zarzar**, P. Kim, J. Aizenberg, "Bio-inspired design of submerged hydrogel-actuated polymer microstructures operating in response to pH." *Advanced Materials* **2011**, *23*, 1442–1446.

1. P. Kim, **L. D. Zarzar**, X. Zhao, A. Sidorenko, J. Aizenberg, "Microbristle in gels: toward all-polymer reconfigurable hybrid surfaces." *Soft Matter* **2010**, *6*, 750–755.

## Non-peer Reviewed Publications and Book Chapters

4. J. Huang, J. Yuan, **L. D. Zarzar**, "Where Do We Go from Here? A Personal Reflection on Accounts of Materials Research in the Age of AI." *Accounts of Materials Research* **2026**, *7,* 117-118. (Perspective)

3. C Maass, S. Michelin, **L. D. Zarzar**, (2024). Self-propelling droplets. *Active Colloids: From Fundamentals to Frontiers.* Royal Society of Chemistry. (Book chapter)

2. "35 challenges in materials science being tackled by PIs under 35(ish) in 2021." *Matter* **2021**, *4*, 3804-3810. (Perspective)

1. N. A. Kotov, L. M. Liz-Marzán, Z. Nie, M. M. Thuo, **L. D. Zarzar**, "The Endless and turbulent frontier of academic entrepreneurship." *ACS Nano* **2021**, *15*, 16947–16952. (Perspective)

## Patents

11. L. Zarzar, N. Sturniolo, K. Hirsch, M. Rayes, "Tailoring multi-bounce reflection interfaace with microscale refractive interfaces." PCT/US2026/017830

10. C. Meredith, K. Hirsch, N. Sturniolo, L. Zarzar, "Manipulation of optical interference from reflective microstructures via evanescent field absorption." Filed 2022, Provisional Patent Application No. 63/434,823.

9. C. Meredith, N. Sturniolo, L. D. Zarzar, "Articles and methods for generating tunable coloration and interference upon reflection of incident electromagnetic radiation." PCT/US2022/053864.

8. C. Meredith, A. Goodling, L. D. Zarzar, "Substrates that exhibit interference patterns upon the reflection of incident electromagnetic radiation and methods of making and using thereof." Filed 2021, U.S. Patent Application No. 17/926,399, PCT/US2021/033171

7. H. Cheng, L. D. Zarzar, "Stretchable, ultrasensitive, room temperature $NO_2$ sensor based on reduced graphene oxide/molybdenum disulfide composite and laser-induced in situ growth of diverse metals oxides for high-resolution planar gas sensors." Filed 2019, U.S. Provisional Patent.

6. L. D. Zarzar, M. Kolle, A. Goodling, S. Nagelberg, "Articles and methods for generation of tunable coloration". Filed 2019, U.S. Patent Application No. 16/543,254, International Application No. PCT/US2019/046910.

5. T. M. Swager, L. D. Zarzar, S. N. Nagelberg, M. Kolle, "Tunable microlenses and related methods." Filed 2017, U.S. Patent Application No. 15/887,863 and International Patent Application No. PCT/US2018/016605.

4. B. J. Kaehr, L. D. Zarzar, "Methods for additive manufacturing in precursors." Filed 2016, U.S. Patent Application No. 15/217,606.

3. T. M. Swager, E. D. Blankschtein, L. D. Zarzar, V. Sresht, E. M. Sletten, J. A. Kalow, "Compositions and methods for arranging colloid phases." Filed 2015, US Patent Application No. 1/929,131 and International Patent Application No. PCT/US2015/058286.

2. T. M. Swager, E. D. Blankschtein, L. D. Zarzar, V. Sresht, E. M. Sletten, J. A. Kalow, "Compositions and methods for forming emulsions." Filed 2015, US Patent Application No. 14/929,117 and International Patent Application No. PCT/US2015/058268.

1. J. Aizenberg, P. Kim, T. Shirman, A. Sutton, L. D. Zarzar, "Environmentally responsive microstructured hybrid actuator assemblies for use in mechanical stimulation of cells." Filed 2013, US Patent Application No. 14/094152.

## Teaching

**Instructor**, The Pennsylvania State University, University Park, PA

- CHEM 110: Chemical Principles — Fall 2017, 2019
- MATSE 202: Introduction to Polymer Materials — Spring 2017-2019
- MATSE 597: Responsive Materials — Fall 2018
- CHEM 497/480: Chemistry and Properties of Polymers — Spring 2020-2024
- CHEM 597: Responsive Materials — Fall 2022, 2023
- CHEM 500: Seminar in Chemistry (2 lectures /yr on creativity) — Spring 2022-2024
- CHEM 500: Seminar in Chemistry — Fall 2025

**Teaching Fellow**, Harvard University, Cambridge, MA

- Science of the Physical Universe 27: Science and Cooking – from Haute Cuisine to Soft Matter Science — 2012
- Applied Physics 235: Chemistry in Materials Science and Engineering — 2010, 2012
- Physical Sciences 1: Chemical Bonding, Energy, and Reactivity: An Introduction to the Physical Sciences — 2009, 2011

**Teaching Assistant**, University of Pennsylvania, Philadelphia, PA

- CHEM 223: Advanced Physical Chemistry Lab — 2008
- CHEM 054: General Chemistry Lab — 2007

## Conference Proceedings

Ashley P. Saunders, Lauren D. Zarzar. "Structural coloration from total internal reflection at microscale concave surfaces and use for sensing in complex droplets." *SPIE Photonics West, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics XIII*, **2020**, 11292, 112920X.

L. D. Zarzar, P. Kim, M. Kolle, C. J. Brinker, J. Aizenberg, B. Kaehr. "Multiphoton writing of 3D pH and temperature-responsive hydrogels integrated with high-aspect-ratio polymer microbristles." *American Chemical Society Division of Polymeric Materials: Science and Engineering* **2011**, *105*, 25.

L. D. Zarzar, J. Aizenberg, B. Kaehr. "Hydrogel micro-muscles with user-defined 3D shapes." *American Chemical Society Division of Polymeric Materials: Science and Engineering* **2011**, *104*, 150.

P. Kim, L. D. Zarzar, M. Khan, M. Aizenberg, J. Aizenberg. "Environmentally responsive active optics based on hydrogel-actuated deformable mirror arrays." *Proceedings of SPIE* **2011**, 792705-792705-7.

L. D. Zarzar, P. Kim, J. Aizenberg. "Patterned, oscillating, pH-responsive actuation of polymeric microstructures in fluid." *American Chemical Society Division of Polymeric Materials: Science and Engineering* **2010**, *103*, 69.

P. Kim, L. D. Zarzar, A. K. Epstein, J. Aizenberg. "Biomimetic, hierarchical, multidimensional patterning of conductive polymers on high-aspect-ratio microstructures." *American Chemical Society Division of Polymeric Materials: Science and Engineering* **2010**, *103*, 58.

## Presentations

**----------Invited----------**

L. D. Zarzar, "Self-organization and memory in collections of active droplets." CINT Annual User Meeting, Santa Fe, NM, September 2026.

L. D. Zarzar, "Direct laser synthesis and patterning of nano/microscale metals and oxides from liquid precursors." ACS National Meeting, Chicago, IL, August 2026.

L. D. Zarzar, "Structural colors from multi-reflection interference in microtextured surfaces." Nature Inspired Surface Engineering Conference, University of Toronto, Canada, August 2026.

L. D. Zarzar, "Self-organization and emergent behaviors of of chasing, active droplets." ACS National Meeting Global Vritual Symposium, March 2026.

L. D. Zarzar, "Direct laser synthesis and patterning of nano/microscale metals and oxides from liquid precursors." TMS Annual Meeting and Exhibition, San Diego, CA, March 2026.

L. D. Zarzar, "Chemical reaction in nanophase structured fluids." Department of Chemistry, UC San Diego, San Diego, CA, March 2026.

L. D. Zarzar, "Chemical processes in nanophase structured fluids." GRC on Colloidal, Macromolecular and Polyelectrolyte Solutions Ventura, CA, February 2026.

L. D. Zarzar, "Non-equilibrium partitioning of polymeric surfactants in emulsions." AIChE Annual Meeting, Boston, MA, November 2025.

L. D. Zarzar, "Color from colorless materials: harnessing multi-reflection interference in microstructures." Gettysburg College, Gettysburg, PA, November 2025.

L. D. Zarzar, "The life and death of far-from-equilibrium droplets." The Society of Rheology 96th Annual Meeting, Santa Fe, NM, October 2025.

L. D. Zarzar, "Chemistry in confining, structured solutions." 27th Solvay Conference in Chemistry, Brussels, Belgium, October 2025.

L. D. Zarzar, "Chemical processes in nano/microphase structured fluids." Department of Chemistry, University of Pennsylvania, Philadelphia, PA, September 2025.

L. D. Zarzar, "Life and death of far-from-equilibrium active droplets." ACS National Meeting, Washington DC, August 2025.

L. D. Zarzar, "Nanophases in ternary solvents and impact on reaction kinetics". University of Regensburg (virtual), July 2025.

L. D. Zarzar, "The life and death of far-from-equilibrium active droplets." BIRS Workshop: Particulates across Scales: Mathematical Modeling,Computation, and Applications, Banff, Canada, July 2025.

L. D. Zarzar, "Self-organization in non-living colloidal matter driven by non-reciprocal interactions." APS Global Physics Summit, Anaheim, CA, March 2025.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." Center for Integrated Nanotechnologies (CINT), Albuquerque, NM, February 2025.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." ACS Science Talks, virtual, February 2025.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." University of Texas at Austin, MRSEC student invited speaker, Austin, TX, December 2024.

L. D. Zarzar: "Non-equilibrium partitioning between oil and water and implications for droplet properties." Fluid Dynamics Seminar Series, University of Pennsylvania, Philadelphia, October 2024.

L. D. Zarzar, "Color from colorless materials: harnessing multi-reflection interference in microstructures." Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, October 2024.

L. D. Zarzar, "Iridescence from total internal reflection at microscale interfaces." Department of Macromolecular Science, Fudan University, Shanghai, China, July 2024.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." Department of Chemistry, Westlake University, Hangzhou, China, July 2024.

L. D. Zarzar, "Active droplets that swim, chase, and organize" and "Color from colorless materials", Chemistry Summer School at Westlake University, Hangzhou, China, July 2024.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." Max Planck Institute of Colloids and Interfaces, Golm, Germany, June 2024.

L. D. Zarzar, "Emergent behaviors of droplet systems with non-reciprocal interactions." GRC on Systems Chemistry, University of Southern Maine, Portland, ME, June 2024.

L. D. Zarzar, "Iridescent structural color from total internal reflection in polymer microstructures." ACS Mid Atlantic Regional Meeting (MARM), Penn State, University Park, PA, June 2024.

L. D. Zarzar, "Self-organization and behavior of non-equilibrium active droplets." Department of Materials Science and Engineering, Cornell University, Ithaca, NY, March 2024.

L. D. Zarzar, "Iridescence from total internal reflection at microscale interfaces." Radboud University, Netherlands, February 2024.

L. D. Zarzar, "Self-organization of non-equilibrium active droplets." Department of Chemistry and Chemical Biology and the School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, November 2023.

L. D. Zarzar, "Iridescent structural color from total internal reflection interference." Japan-US Seminar on Polymer Chemistry, Okinawa, Japan, November 2023.

L. D. Zarzar, "Collective behaviors of active oil droplets." MARSS (International Conference on Manipulation, Automation, and Robotics at Small Scales). NYU Abu Dhabi, UAE October 2023.

L D. Zarzar, "Chemically programmable active oil droplets." Department of Materials Science and Engineering, UC Berkeley, Berkeley, CA, September 2023.

L. D. Zarzar, "Iridescent structural color from total internal reflection in polymer microstructures." ACS National Meeting, San Francisco, CA, August 2023.

L. D. Zarzar, "Chemically-fueled motion and organization of droplets." GRC on Artificial Molecular Switches and Motors, Colby-Sawyer College, New London, NH, June 2023.

L. D. Zarzar, "Gravitational settling of active droplets." *ACS Colloid and Surface Science Symposium,* NC State University, June 2023.

L. D. Zarzar, "Chemically programmable active oil droplets." Soft Matter Seminar Series (virtual), May 2023.

L. D. Zarzar, "Chemotactic droplet interactions and organization fueled by micelle-mediated transport." GRC on Self-Assembly and Supramolecular Chemistry, Les Diablerets, Switzerland, May 2023.

L. D. Zarzar, "The life and death of active droplets." Overbeek Seminar, Departments of Chemistry, Chemical Engineering and Applied Physics, Eindhoven University of Technology, Eindhoven, Netherlands, April 2023.

L. D. Zarzar, "The life and death of active droplets." Department of Chemistry, Radboud University, Nijmegen, Netherlands, April 2023.

L. D. Zarzar, "Chemically programmable active behaviors of oil droplets." Autonomous Matter Symposium, AMOLF, Amsterdam, Netherlands, April 2023.

L. D. Zarzar, "Non-equilibrium partitioning of surfactants into oil droplets." ACS National Meeting, Indianapolis, IN, March 2023.

L. D. Zarzar, "Dynamic partitioning of surfactants into non-equilibrium emulsion droplets." Dow, Technical Community Organization Seminar, Collegeville, PA, February 2023.

L. D. Zarzar, "Chemically programmable active behaviors of oil droplets." Convergence Center for Living Multifunctional Material Systems (LiMC2) e-seminar series, February 2023.

L. D. Zarzar, "Chemically programmable active behaviors of oil droplets." UCSB, Soft Matter Lunch Seminar Series, Santa Barbara, CA, February 2023.

L. D. Zarzar, "The Life and death of active droplets." GRC on Complex Active and Adaptive Materials Systems, Ventura, CA, January 2023.

L. D. Zarzar, "Self-propulsion of oil droplets stabilized by surfactants and nanoparticles." PPC17, Brisbane, Australia, December 2022.

L. D. Zarzar, "Chemically programmable active behaviors of oil droplets," PPC17, Brisbane, Australia, December 2022.

L. D. Zarzar, "Chemically programmable active oil droplets." Department of Chemistry Syracuse University, Syracuse, NY, November 2022.

L. D. Zarzar, "Color from colorless materials." Department of Chemistry, Millersville University, Millersville, PA, November 2022.

L. D. Zarzar, "Chemically programmable active oil droplets: mechanisms and dynamics." Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, October 2022.

L. D. Zarzar, "Chemically programmable active oil droplets: mechanisms and dynamics." Department of Chemistry, Princeton University, September 2022.

L. D. Zarzar, "Active behaviors of oil droplets stabilized by surfactants and particles." ACS Colloid and Surface Science Symposium, Colorado School of Mines, Golden, CO, July 2022.

L. D. Zarzar, "Chemical tunability of droplet motility: interfacial transport mechanisms and dynamics." Gordon Research Seminar on Biointerface Science, Barga, Italy, June 2022. (Keynote)

L. D. Zarzar, "Bioinspired, dynamic and collective behaviors of emulsions." Gordon Research Conference on Bioinspired Materials, Les Diablerets, Switzerland, June 2022.

L. D. Zarzar, "Active droplets that swim, interact, and organize." Eindhoven University of Technology, Eindhoven, Netherlands, May 2022.

L. D. Zarzar, "Chemically programmable active behaviors of oil droplets." AMOLF, Amsterdam, Netherlands, May 2022.

L. D. Zarzar, "Harnessing microstructures for tunable structural color." Photonics and Electromagnetics Research Symposium (PIERS), April 2022.

L. D. Zarzar, "Active droplets that swim, chase, and organize." ACS National Meeting, PMSE Young Investigator Awards Symposium, San Diego, CA, March 2022.

L. D. Zarzar, "Predator-prey interactions between droplets driven by non-reciprocal oil exchange." APS March Meeting, Chicago, IL, March 2022.

L. D. Zarzar, "Color from colorless materials". Department of Chemistry, Muhlenberg College, Allentown, PA, March 2022.

L. D. Zarzar, "Harnessing microstructures for tunable interference color." TMS Annual Meeting, Anaheim, CA, March 2022.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemistry, Purdue University, West Lafayette, IN, February 2022. (student invited speaker)

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemical Engineering, University of Waterloo, February 2022.

L. D. Zarzar, "Harnessing microstructures for tunable structural color." Materials Research Society National Meeting, Boston, MA, December 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." 30th Dutch Soft Matter Meeting, November 2021. (Keynote)

L. D. Zarzar, "Chemical design of active droplets that swim, chase, and interact." Dow's Discussion Group on Interface Science, October 2021.

L. D. Zarzar, "Bioinspired chemical design of active droplets that swim, chase, and interact." Department of Bioengineering, Northwestern University, Evanston, IL, October 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemistry, Brandeis University, Waltham, MA, October 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemistry, Wesleyan University, Middletown, CT, October 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemical and Biological Engineering, University of Colorado Boulder, Boulder, CO, September 2021.

L. D. Zarzar, "Active Janus droplets: cooperativity of chemistry and structure." Out-of-Equilibrium Systems, Emergence, and Life

workshop (Lorentz Center), September 2021.

L. D. Zarzar, "Chemical design of motile Janus droplets." Active Coacervates Workshop, August 2021.

L. D. Zarzar, "Chemical design of swimming Janus oil droplets in water." Systems Chemistry, July 2021.

L. D. Zarzar, "Tunable structural coloration by total internal reflection and interference at microscale concave interfaces." Flat Optics: Components to Systems Conference, part of the OSA Optical Design and Fabrication Congress, July 2021.

L. D. Zarzar, "Color from colorless materials." Penn State NSF REU program, June 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Cornell High Energy Synchrotron Source Soft Matter Far From Equilibrium Workshop, June 2021.

L. D. Zarzar, "Color from colorless materials." US National Chemistry Olympiad Team seminar, June 2021.

L. D. Zarzar, "Structural coloration from microstructured surfaces." iCANX, April 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." ACS National Meeting, April 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." ChemSystemsMeet, March 2021.

L. D. Zarzar, "Tunable structural coloration by cascading total internal reflection and interference at microscale interfaces." Pittcon Conference and Expo, March 2021.

L. D. Zarzar, "Active droplets that swim, chase, and organize." Department of Chemistry, Cornell University, February 2021.

L. D. Zarzar, "Responsive structural color from droplets and use in chemical sensing." Materials Day 2020, Penn State University, November 2020.

L. D. Zarzar, "Predator-prey interactions between droplets driven by nonreciprocal oil exchange." US Army Soldier Center, October 2020.

L. D. Zarzar, "Predator-prey interactions between droplets driven by nonreciprocal oil exchange." Caltech, September 2020.

L. D. Zarzar. "Predator-prey interactions between droplets driven by nonreciprocal oil exchange." Systems Chemistry: Life-like emergent behavior in complex molecules and ensembles, May 2020.

L. D. Zarzar, A. Goodling, S. Nagelberg, B. Kaehr, C. Meredith, S. Cheon, A. Saunders, M. Kolle. "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces." SPIE Photonics West, San Francisco, CA, February 2020.

L. D. Zarzar, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces," Next Generation Smart Materials Conference, Savannah, GA, December 2019.

L. D. Zarzar, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces," Messiah College, Mechanicsburg, PA, November 2019.

L. D. Zarzar, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces," Johns Hopkins University, Baltimore, MD, October 2019.

L. D. Zarzar, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces." Youngstown State University, Youngstown, OH, October 2019.

L. D. Zarzar "ChromaTIR: color shifting coatings." Invent Penn State Venture and IP Conference Tech Tournament, Penn State University, University Park, PA, October 2019. (pitch competition)

L. D. Zarzar, "Tunable and responsive structural coloration by cascading total internal reflection and interference at microscale concave interfaces." UMass Amherst, Amherst, MA, September 2019.

L. D. Zarzar, "Microstructured interfaces for generation of structural coloration via total internal reflection." PPG, Allison Park, PA, September 2019.

L. D. Zarzar, C. Meredith, P. Moerman, Y.-J. Chiu, J. Groenewold, W. Kegel, A. van Blaaderen, “Chemotactic droplet interactions.” ACS National Meeting, San Diego, CA, August 2019.

L. D. Zarzar, "Simple materials, reimagined." ACS National Meeting, Talented 12 Symposium, San Diego, CA, August 2019.

L. D. Zarzar, "Structural color from total internal reflection and interference in microscale concave geometries." Penn State University Research Experiences for Undergraduates program, University Park, PA, July 2019.

L. D. Zarzar, "Direct laser writing of inorganic materials: femtoliter scale synthesis and patterning at the solid–liquid interface." Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, July 2019.

L. D. Zarzar, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces." ACS Colloid and Surface Science Symposium, Unilever Award Lecture, Atlanta, GA, June 2019.

L. D. Zarzar, A. Goodling, S. Nagelberg, B. Kaehr, C. Meredith, S. Cheon, A. Saunders, M. Kolle,"Structural coloration by cascading total internal reflection and interference at microscale concave interfaces." 3M Science and Engineering Faculty Day, Minneapolis, MN, June 2019. (poster)

L. D. Zarzar, "Manipulation of interfacial processes, reactions, and feedback within reconfigurable multiphase fluids." Army ECASE Symposium Adelphi, MD, April 2019.

L. D. Zarzar, “Interdisciplinary science in the academic job market”. American Chemical Society National Meeting, Orlando, FL, April 2019.

L. D. Zarzar, A. Goodling, S. Nagelberg, B. Kaehr, C. Meredith, S. Cheon, A. Saunders, M. Kolle, “Microstructured interfaces for generation of structural coloration via total internal reflection.” UCLA, Los Angeles, CA, February 2019.

L. D. Zarzar, A. Goodling, S. Nagelberg, M. Kolle, “Dynamic structural color in reconfigurable complex droplets.” Soft Matter, Structures, and Devices Seminar Series, MIT, Cambridge, MA, August 2018.

L. D. Zarzar, “Stimuli-responsive, reconfigurable emulsions.” St. Francis University, Loretto, PA, March 23, 2018.

L. D. Zarzar, J. Aizenberg, “Chemistry in motion: hydrogel actuators and catalytic microsystems.” Massachusetts College of Art and Design, Boston, MA, February 2014.

L. D. Zarzar, J. Aizenberg, “Stimuli-responsive chemo-mechanical actuation: a hybrid materials approach.” Columbia University, New York, NY, September 2012.

**----------Contributed----------**

L. D. Zarzar, "Nanophase structuring in simple ternary solvents mediates reaction kinetics." ACS National Meeting, Chicago, IL, August 2026. (Oral)

L. D. Zarzar, "Nanophase structuring in simple ternary solvents mediates reaction kinetics."ACS Colloid and Surface Science Symposium, University of Delaware, Newark, DE, June 2026. (Oral)

L. D. Zarzar, "Self-organization and emergent behaviors of chasing, active droplets."ACS Colloid and Surface Science Symposium, University of Delaware, Newark, DE, June 2026. (Oral)

L. D. Zarzar, "Uncovering chemical principles governing nanophase formation in ternary solvents." ACS National Meeting, Atlanta, GA, March 2026.

R. Balaj, W. Xue, P. Bayati, S. Mallory, L. D. Zarzar, "Dynamic partitioning of surfactants into non-equilibrium emulsion droplets." GRC on Systems Chemistry, University of Southern Maine, Portland, ME, June 2024. (Poster)

C. M. Wentworth, A. C. Castonguay, P. G. Moerman, C. H. Meredith, R. V. Balaj, S. Cheon, L. D. Zarzar, "Chemically tuning attractive and repulsive interactions between solubilizing, active droplets." ACS National Meeting, New Orleans, LA, March 2024. (Oral)

R. Balaj, W. Xue, P. Bayati, S. Mallory, L. D. Zarzar, "Dynamic partitioning of surfactants into non-equilibrium emulsion droplets." APS National Meeting, Minneapolis, MN, March 2024. (Oral)

N. Sturniolo, K. Hirsch, C. Meredith, M. Rayes, M. Gallegos, B. Kaehr, L. D. Zarzar, "Iridescent structural color from total internal reflection interference." Center for Integrated Nanotechnologies (CINT) Annual User Meeting, Santa Fe, NM, September 2023. (Poster, won first place prize)

A. Castonguay R. Kailasham, C. Wentworth, C. Meredith, A. Khair, L. D. Zarzar, "Gravitational settling of active droplets." ACS Colloid and Surface Science Symposium, NC State, Raleigh, NC, June 2023. (Oral)

A. Castonguay R. Kailasham, C. Wentworth, C. Meredith, A. Khair, L. D. Zarzar, "Gravitational settling of active droplets." APS March Meeting, Las Vegas, Nevada, March 2023. (Oral)

L. D. Zarzar, "Coloration by total internal reflection and interference at microscale interfaces." ACS National Meeting, San Diego, CA, March 2022. (Oral)

L. D. Zarzar, "Chemical design of motile Janus drops." APS March Meeting, Chicago, IL, March 2022. (Oral)

L. D. Zarzar, C. Meredith, A. Castonguay, Y-J. Chiu, A. Brooks, P. Moerman, P. Torab, P. K. Wong, A. Sen, D. Velegol, "Chemical design of self-propelled Janus droplets". American Chemical Society National Meeting, Atlanta, GA, August 2021. (Oral)

L. D. Zarzar, C. Meredith, P. Moerman, Y.-J. Chiu, J. Groenewold, W. Kegel, A. van Blaaderen, “Chemotactic droplet interactions.” ACS Colloid and Surface Science Symposium, Atlanta, GA, June 2019. (Oral)

L. D. Zarzar, C. Meredith, P. Moerman, Y.-J. Chiu, J. Groenewold, W. Kegel, A. van Blaaderen, “Chemotactic droplet interactions.” American Chemical Society National Meeting, Orlando, FL, April 2019. (Oral)

L. D. Zarzar, A. Goodling, S. Nagelberg, B. Kaehr, C. Meredith, S. Cheon, A. Saunders, M. Kolle, “Structural coloration by cascading total internal reflection and interference at microscale concave interfaces.” American Chemical Society National Meeting, Orlando, FL,

April 2019. (Oral)

L. D. Zarzar, A. Goodling, S. Nagelberg, B. Kaehr, C. Meredith, S. Cheon, A. Saunders, M. Kolle, "Structural coloration by cascading total internal reflection and interference at microscale concave interfaces." GRC Complex Active and Adaptive Materials Systems, Ventura, CA, January 2019. (Poster)

L. D. Zarzar, A. Goodling, S. Nagelberg, M. Kolle, "Dynamic structural color in reconfigurable complex droplets." American Chemical Society National Meeting, Boston, MA, August 2018. (Oral)

L. D. Zarzar "Complex emulsions as dynamic soft materials." ACS Mid Atlantic Regional Meeting, Bethlehem, PA, June 2018. (Oral)

L. D. Zarzar, B. Kaehr, B. S. Swartzentruber, B. F. Donovan, P. E. Hopkins, "Using laser-induced thermal voxels to pattern diverse inorganic materials at the solid–iquid interface." Materials Research Society Fall National Meeting, Boston, MA, December 2017. (Oral)

L. D. Zarzar, J. Kalow, X. He, J. Walish, T. Swager, "Optical visualization and quantification of enzyme activity using dynamic droplet lenses." American Chemical Society National Meeting, San Francisco, CA, April 2017. (Oral)

L. D. Zarzar, V. Sresht, E. Sletten, J. Kalow, D. Blankschtein, T. Swager, "Dynamically reconfigurable complex droplets via tunable interfacial tensions." American Chemical Society National Meeting, Boston, MA, August 2015. (Oral)

L. D. Zarzar, J. Aizenberg, T. Swager, "Dynamic materials: putting chemistry into motion." American Chemical Society National Meeting, Boston, MA, August 2015. (Poster)

L. D. Zarzar, V. Sresht, E. Sletten, J. Kalow, D. Blankschtein, T. Swager, "Dynamically reconfigurable complex droplets via tunable interfacial tensions." Chemsitry Student Seminar Series, Massachusetts Institute of Technology, Cambridge, MA, April 2015. (Oral)

L. D. Zarzar, N. Schade, A. Marblestone, "Programming matter: smart surfaces, molecular machines, and invisibility cloaks." Science in the News, Harvard University, Cambridge, MA, April 2012. (Oral)

L. D. Zarzar, X. He, Q. Liu, P. Kim, Z. Suo, J. Aizenberg, "Patterned and controllable pH-responsive actuation of polymer microstructures." American Chemical Society National Meeting, San Diego, CA, March 2012. (Poster)

L. D. Zarzar, P. Kim, M. Kolle, C. J. Brinker, J. Aizenberg, B. Kaehr, "Multiphoton writing of 3D pH and temperature-responsive hydrogels integrated with high-aspect-ratio polymer microbristles." American Chemical Society National Meeting, Denver, CO, August 2011. (Invited oral presentation) *Won the AkzoNobel Student Award in Applied Polymer Science*

L. D. Zarzar, P. Kim, J. Aizenberg. "pH-Responsive actuation of polymeric microstructures in fluid." Materials Research Society Fall Meeting, Boston, MA. December 2010. (Oral)

L. D. Zarzar, P. Kim, J. Aizenberg, "Responsive actuation of polymer microstructures in fluid upon pH change." Polydays, Berlin, Germany, October 2010. (Poster)

L. D. Zarzar, P. Kim, J. Aizenberg. "Patterned, oscillating, pH-responsive actuation of polymeric microstructures in fluid." American Chemical Society National Meeting, Boston, MA. August 2010. (Oral)

L. D. Zarzar, P. Kim, X. Zhao, A. Sidorenko, J. Aizenberg. "Hydrogel-actuated high-aspect-ratio polymer nanostructures for reversible pattern generation." Materials Research Society Fall Meeting, Boston, MA. December 2009. (Poster) *Won "Best Poster" award*

## Affiliations & Service

**Member**, American Chemical Society, Materials Research Society, SPIE, AAAS, American Physical Society

**Proposal / Fellowship Reviewer**, Dutch Research Council (NWO), NSF Graduate Research Fellowship Program. National Defense Science and Engineering Graduate Fellowships, NSF (CMMI, DMR, IIP/TIP), DOE, ARO, ACS Petroleum Research Fund, AAAS, Center for Integrated Nanotechnologies (CINT), Novo Nordisk Foundation, Israel Science Foundation

**Journal Reviewer,** ACS Applied Materials and Interfaces, ACS Applied Polymer Materials, ACS Sustainable Chemistry and Engineering, ACS Nano, ACS Sensors, Advanced Materials, Advanced Functional Materials, Advanced Optical Materials, Analytical Chemistry, Angewandte Chemie, Biomacromolecules, Cell Reports Physical Science, Chem, Chemical Science, Chemistry of Materials, Chemistry- A European Journal, ChemSystemsChem, Gels, iScience, Journal of Colloid and Interface Science, Journal of Fluid Mechanics, Journal of Molecular Liquids, Journal of Physical Chemistry Letters, Journal of the American Chemical Society, Langmuir, Matter, Nano Letters, Nature, Nature Chemistry, Nature Communications, Nature Physics, PLOS ONE, PNAS, Polymers, Polymer Chemistry, Reaction Chemistry & Engineering, Reactive and Functional Polymers, Science Advances, Science Bulletin, Sensors, Small, Small Methods, Soft Matter, Trends in Chemistry

**Symposium Co-Oganizer,** "Additive Manufacturing Across Length Scales for Active, Adaptive and Responsive Matter", MRS National Meeting & Exposition, Boston, MA — 2026

**Associate Head for Graduate Education**, Penn State Department of Chemistry — Sept. 2025 - present

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|---|---|
| **LaMer Award Committee,** ACS Division of Colloid and Surface Chemistry | January - April 2026 |
| **Member at Large**, American Physical Society, DSOFT | 2025 - 2028 |
| **Discussion Facilitator**, Industry-Academia Dialogue, ACS National Meeting in New Orleans, LA | March 2024 |
| **Session Chair**, International Conference on Manipulation, Automation, and Robotics at Small Scales (MARSS), Abu Dhabi, UAE | October 2023 |
| **Editorial Board Member**, Journal of the American Chemical Society | 2024 - present |
| **Senior Editor,** Accounts of Materials Research | 2023 - present |
| **Member,** Penn State Chemistry Department Head Search Committee | 2023 - 2024 |
| **Member**, Penn State Chemistry Department Promotion and Tenure sub-committee | 2023 - 2024 |
| **Chair,** Penn State Chemistry Department Graduate Recruiting Committee | 2022 - 2024 |
| **Member,** AAAS Committee on Nominations and Leadership Development (NLDC) | Aug. 2023 - Dec. 2024 |
| **Panelist**, Industry-Academia Dialogue, ACS National Meeting, Indianapolis, IN | March 2023 |
| **Conference Co-Organizer and Discussion Leader,** SysChem 2023 (virtual) | 2023 |
| **Career Panelist,** GRS on Complex Active and Adaptive Material Systems in Ventura, CA | January 2023 |
| **Symposium Co-Organizer,** "Active and Adaptive Matter", ACS Colloid and Surface Science Symposium held at NC State | 2023 |
| **Symposium Co-Organizer**, symposium in honor of Joanna Aizenberg's receipt of the ACS Award in Colloid and Surface Science at the spring National ACS Meeting in Indianapolis, IN | 2022 - 2023 |
| **Next Generation Board Member**, Aggregate, a Wiley journal | 2022 - present |
| **Topic Editor,** Accounts of Materials Research | 2022 - 2023 |
| **Chromatir Technologies LLC**, co-founder | 2021 - present |
| **Advisory Board Member**, ChemTalk (https://chemistrytalk.org/) | 2021 - 2025 |
| **Executive leadership of the ACS Colloid and Surface Chemistry Division**, 4 year elected position with rotation through vice chair, chair elect, chair, past chair. | 2021 - 2024 |
| **ACS Nano Rising Star Board** | 2021 - present |
| **Director**, WISDOM: Women In Science Demonstrating Outstanding Merits. WISDOM is a non-profit dedicated to supporting women and fostering diversity in STEM. https://womenin.science/ | 2017 - 2024 |
| **Symposium Co-Organizer,** "Emulsions, Bubbles, and Foams", ACS Colloid and Surface Science Symposium, Colorado School of Mines | 2021 - 2022 |
| **Newsletter Editor**, Division of Colloid and Surface Chemistry, American Chemical Society | 2017 - 2021 |
| **Session Chair**, Basic Research in Colloids, Surfactants, and Interfaces, ACS Fall 2021 | October 2021 |
| **Participant**, AAAS Strategic Planning Summit | August 2021 |
| **Symposium Co-Organizer**, "Lessons from Nature—From Biology to Bioinspired Materials", MRS National Meeting & Exposition, Boston, MA | 2020 |
| **Session Leader**, SPIE Photonics West, San Francisco, CA | Feb. 2020 |
| **Discussion Leader**, Gordon Research Conference on Bioinspired Materials, Les Diablerets, Switzerland | June 2018 |
| **Technical Session Co-Organizer**, "Bubbles, Emulsions, and Foams," ACS Colloid and Surface Science Symposium, University Park, PA | June 2018 |
| **Symposium Co-Organizer**, "Responsive, Programmable Assembly of Active Colloids for Functional Materials", held at the 254th ACS National Meeting & Exposition, Washington, DC | August 2017 |
| **Discussion Leader**, Gordon Research Seminar on Soft Condensed Matter Physics, New London, NH | August 2017 |
| **Chemistry Dept. Graduate Student and Post-doc Council**, Harvard University, Elected Chair (2010 –2011), Representative (2009 – 2012) | 2009 - 2012 |

## Mentoring and Supervision (Postdoc, Ph.D., M.S.)

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|---|---|---|---|---|---|---|---|---|
| Mia Wasilewski | Ph.D. | current | Malak Rayes | Ph.D. | 2026 | Rebecca Balaj | Ph.D. | 2022 |
| Joel Dougay | Ph.D. | current | Yifei Wang | Postdoc | 2025 | Seong Ik Cheon | Ph.D. | 2022 |
| Tori Li | Ph.D. | current | Samuel Birrer | Ph.D. | 2025 | Caleb Meredith | Ph.D. | 2022 |
| Rayan Bhattacharya | Ph.D. | current | Krista Hirsch | Ph.D. | 2025 | Amy Goodling | Ph.D. | 2021 |
| Yutong Liu | Ph.D. | current | Nathaniel Sturniolo | Ph.D. | 2025 | Gary Love | M.S. | 2021 |
| Quynh Nhu Le | Ph.D. | current | Wangyang Xue | Ph.D. | 2024 | Cody Kindle | M.S. | 2019 |
| Lauren Wilson | Ph.D. | current | Ciera Wentworth | Ph.D. | 2023 | Seung Wook Cho | M.S. | 2018 |
| Hongbo Yuan | Ph.D. | current | Shannon McGee | Ph.D. | 2023 | | | |
| Lauren Dueñas | Ph.D. | 2026 | Alexander Castonguay | Ph.D. | 2023 | | | |
| Binish Ashfaq | Ph.D. | 2026 | Nabila Nabi Nova | Ph.D. | 2022 | | | |