

Wenlin Zhang

Dartmouth College
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Education

B.S. in Chemical Engineering, University of Minnesota, 2009-2012

Ph.D. in Chemical Engineering, Pennsylvania State University, 2012-2017

Professional Experience

2020–present Assistant Professor of Chemistry, Dartmouth College

2017–2020 Post-doctoral Research Fellow, University of Michigan (advisor: Ronald Larson)

2012-2017 Graduate Research Assistant (advisors: Scott Milner and Enrique Gomez)

Honors and Awards

PMSE Early Investigator Award, American Chemical Society, 2026

NSF CAREER Award, 2025-2029

Petroleum Research Fund: Doctoral New Investigator Grant, American Chemical Society, 2021

Walter and Constance Burke Research Initiation Award, Dartmouth College, 2020

Finalist, Frank J. Padden Jr. Award, American Physical Society, 2017

Finalist, Excellence in Graduate Polymer Research, American Institute of Chemical Engineers, 2015

Student Awards

Graduate students

Lingyi Zou, Frank J. Padden Jr. Award Finalist, American Physical Society, 2025

Undergraduate students

Elaine Jiao, Outstanding Undergraduate Research in Computational Science (Honorable Mention), Neukom Institute, Dartmouth College, 2024

Caleb Liu, Outstanding Undergraduate Research in Computational Science (2nd Prize), Neukom Institute, Dartmouth College, 2024

Caleb Liu, Barry Goldwater scholar, 2024

Professional activities

Departmental Service

Chair of Graduate Student Entrance Committee (2022-2025)
Member of Safety Committee (member 2022-2023)
Member of Curriculum Committee (2021-2022)
Member of Faculty Search Committee (2021-2022 and 2024-2025)
Member of Safety Committee (member 2022-2023)
Member of Graduate Student Entrance Committee (2020-2021, 2025-present)
Member of Seminar Committee (2020-2021)
Departmental Meeting Scribe (2020-2021, 2025-present)
Member of DEI Committee (2025-present)

Conferences

Organized and chaired the invited session "Recent Advances in Polymer Recycling, Upcycling, and Sustainability" at Annual March Meeting of the American Physical Society (2024)
Initiated and chaired focus sessions on "Polymer Recycling and Upcycling" at Annual March Meetings of the American Physical Society (2022 – 2025)
Co-chaired sessions "Polymer Simulations: Methods and Applications " and "Polymer Simulations: Structure and Fundamental Insights" at the Annual meeting of the American Institute of Chemical Engineers (2022)
Invited co-chair for session "Sustainable and Recyclable Polymers" at Annual Meeting of the Society of Rheology (2022)

Referee Service

Reviewer for the following journals: The Journal of Physical Chemistry, The Journal of Chemical Information and Modeling, Macromolecules, ACS Macro Letters, Macromolecular Theory and Simulations, Polymer, Industrial & Engineering Chemistry Research, Langmuir, Journal of Polymer Science, Polymer Chemistry, Nature Chemistry

Grant Reviewer: National Science Foundation and ACS Petroleum Research Fund (PRF).

Community Service and STEM Outreach

Mentoring undergraduate students on research through the Women in Science Project (WISP) program at Dartmouth College
Mentoring high students from underrepresented minority group through ACS Project Seed
Mentoring an African American high school student from a low-income family
Developing open source (Python and Jupyter Notebook based) research training module for enhancing remote/virtual research experience
Demonstrations of molecular dynamics simulations during the National Chemistry Week
Demonstration of Green Chemistry and Plastic recycling for Science Day at Dartmouth

Developing a mobile phone app to introduce polymer recycling and sustainability to the general public

Professional Affiliations

Member, American Physical Society
Member, American Institute of Chemical Engineers
Member, American Chemical Society
Member, Society of Rheology

Teaching Experience

Dartmouth College, General Chemistry II (CHEM.006), 2021 and 2022 Spring

Second part of the general chemistry sequence at Dartmouth College
Topics: Reaction kinetics, introductory quantum mechanics, orbitals, and bonding

Dartmouth College, General Chemistry (CHEM.011), 2022, 2023 and 2024 Fall

Accelerated general chemistry course for first-year undergraduate students with strong backgrounds in chemistry
Topics: Introductory quantum mechanics, orbitals, bonding, thermodynamics, electrochemistry, reaction kinetics

Dartmouth College, Materials Chemistry (CHEM.261), 2021 Winter

Discussions of papers from the material chemistry literature

Dartmouth College, Introduction to Statistical Thermodynamics and molecular simulations (CHEM.101.5/96.05), 2021 Fall and 2024 Winter

A new graduate course developed for graduate and senior undergraduate students with interests in computational and theoretical research
Topics: Introduction to Statistical mechanics, Monte Carlo and Molecular dynamics simulations, mean-field theories.

Dartmouth College, Graduate Research Colloquium in Computational and Theoretical Chemistry (CHEM.265), 2023 and 2024 Winter

Discussions of papers from the theoretical and computational chemistry literature

Dartmouth College, Chemistry of Macromolecules (Chem 101.4/96.04), 2023 and 2025 Spring

Introducing fundamentals of polymer science to undergraduate and graduate students at the introductory level
Topics: Polymer physics, discussion of experimental, computational, and theoretical tools for studying polymers and other macromolecules

University of Michigan, Advanced Special Topics in Chemical Engineering (ChE 496), Guest Lecturer, 2019 Winter

Topics: Introductory Statistical Mechanics, Monte Carlo Simulations

Pennsylvania State University, Process Fluid Mechanics (ChE 300), Teaching Assistant, 2015 Fall

Mentoring Experience

Dartmouth College

Post-docs

Anderson Da Silva Duraes (2023-present)

Graduate students

Lingyi Zou (2020-2025), Cameron Smith (2021-present), Chengxi Li (M.S., 2022-2024), Yunjia Zhang (2024-2025), Shaoyi Hou (2025-present)

Undergraduate students

Anna Beth Swain (2021), Ericka Asmus (2021), Sophia Ruben (2021), Carmela Ribadeneira (2022), Isadore Axinn (2022-2025), Mariana Cepeda Quintero (2023), Caleb Liu (2024-2025), Elaine Jiao (2024)

Highschool students

Maiya Adolphus (2022, ACS Project Seed)

Grants

ACS Petroleum Research Fund, total award amount: \$125,000

PI: Wenlin Zhang

01/2027-12/2029 (**Pending**)

"Relaxation of topological and molecular cross-links in polymer networks"

The Camille and Henry Dreyfus Foundation, total award amount: \$100,000

PI: Wenlin Zhang

09/2026-08/2031 (**Pending**)

"Camille Dreyfus Teacher-Scholar"

National Science Foundation, total award amount: \$420,300

PI: Wenlin Zhang

04/2026-03/2029 (**Pending**)

"Molecular insights of flow-induced crystallization at interfaces during 3D printing of semicrystalline polymers"

Department of Energy, total award amount: \$746,498

co-PI: Wenlin Zhang

12/2025-11/2028 (**Pending**)

"Kinetically Reconfigurable Adapt-Ring and Hop-Ring Networks with Extreme Mechanics"

National Science Foundation, total award amount: \$650,000

PI: Wenlin Zhang

01/2025-12/2029 (**Current**)

"CAREER: Computational crystallization of polymer blends: application to recycled plastics and more" (DMR-2442097)

ACS Petroleum Research Fund, total award amount: \$110,000

PI: Wenlin Zhang

09/2021-08/2025 (**Completed**)

"Understanding the roles of molecular topology and entanglement in polymer crystallization using ring polymers" (PRF # 62491-DNI7)

Department of Energy, total award amount: \$502,000

PI: Chenfeng Ke, co-PI: Wenlin Zhang

08/2021-07/2025 (**Completed**)

"Kinetically trapped Poly(pseudo)rotaxane Networks" (DE-SC0022267)

NH BioMade Seed Grant, total award amount: \$72,317

PI: Wenlin Zhang

09/2021-08/2022 (**Completed**)

“Molecular understanding of microstructure evolution during shear-induced polymer crystallization”

Publications ([Google scholar](#))

= equal contribution; * = corresponding author; undergraduate student(s) highlighted in bold

At Dartmouth

20. “Coarse-grained dynamics” (invited book chapter), Handbook of coarse-grained and multiscale modeling of soft matter, Zhang, W., *submitted*, Elsevier 2026.
19. “Coarse-grained simulations of polyrotaxane hydrogels under quiescent and shear conditions”, Smith, C.D.; Zhang, W.*, *submitted*, 2026.
18. “Additive-free compatibilization of polyolefin blends”, Dunn, C.B.; Zhang, Y.; Wei, P.; Ahn, J.B., Zhang, W.*; Qiang, Z.*, *submitted*, 2025.
17. “Mechanically Reconfigurable Polyrotaxane Networks”, Zheng, D.; Yu, Z.; Smith, C.D.; Liu, J.; Tsai, E.; Zhang, W.*; Ling, S.*; Ke, C.*, *submitted*, 2025.
16. “Predicting bio-corona-induced adsorption and uptake of nanoplastics”, Zhang, W.*; Duraes, A.D.S., *Soft Matter*, 2026, 22, 1141–1150.
15. “Effects of orientational and conformational ordering on isotactic polypropylene crystallization”, Duraes, A.D.S.; Zhang, W.*, *Macromolecules*, 2026, 59, 962–973.
14. “Coarse-grained simulations of crystallization in phase-separated polymer blends with block copolymer compatibilizers”, Zhang, Y.; Zhang, W.*, *Macromolecules*, 2025, 58, 12871–12881
13. “Thermodynamic origin of multi-step polymer crystallization”, Zhang, W.*, *Physical Review Letters*, 2025, 135, 028101. **Editors’ Suggestion.**
12. “All-atom molecular dynamics simulations reveal the effects of nanoplastics on lipid membranes and vice versa”, Duraes, D.S.; **Jiao, E.L.**; Zhang, W.*, *J. Phys. Chem. B*, 2025, 129, 3385–3395. *Featured on Front Cover.*
11. “Roles of interfaces in crystallization in free-standing and bi-layer polymer films”, Zou, L.; Zhang, W.*, *Macromolecules*, 2025, 58, 3589–3594.
10. “Effects of block copolymer compatibilizers and interfacial entanglements on strengthening immiscible glassy polymer blends”, Zhang, Y.; Zhang, W.*, *Macromolecules*, 2025, 58, 2484–2493.
9. “A multi-scale framework for predicting α -cyclodextrin assembly on polyethylene glycol axles”, Smith, C.D.; Ke, C.*; Zhang, W.*, *Soft Matter*, 2024, 20, 9068–9082.
8. “Interfaces and soft confinement promote crystallization in polymer nanodroplets”, **Liu, C.**; Duraes, D.S.; **Jiao, E.L.**; Zhang, W.*, *MRS Adv.*, 2024.

7. "Effects of entanglement on polymer crystal growth and inter-crystalline phase formation", Zou, L.; Zhang, W.*; *Macromolecules*, 2024, 57, 4410–4420.
6. "Direct measurement of polymer chain-end-to-end distances by using RAFT chain transfer agent as the FRET acceptor", Wang, Y.; Fortenberry, A.W.; Zhang, W.; Simon, Y.C.; Qiang, Z, *J. Phys. Chem. B*, 2023, 127, 3100–3108.
5. "Mismatch in nematic interactions leads to composition-dependent crystal nucleation in polymer blends", Zhang, W.*; Zou, L., *Macromolecules*, 2023, 56, 2234–2245.
4. "Nematic layers as precursors to secondary nucleation of alkane oligomer crystals revealed by molecular dynamic simulations", Gong, Y.; Zhang, W.; Larson, R.G., *Macromolecules*, 2022, 55, 6311–6320.
3. "Molecular dynamic simulations of the effects of entanglement on polymer crystal nucleation", Zou, L.; Zhang, W.*; *Macromolecules*, 2022, 55, 4899–4906.
2. "An ultra-dynamic anion cluster-based organic framework", Samanta, J.; Dorn, R.W.; Zhang, W.*; Jiang, X.; Zhang, M.; Staples, R.; Rossini, A.J.*; Ke, C.*; *Chem*, 2022, 1, 7–9.
1. "Molecular dynamics simulations of crystal nucleation near interfaces in incompatible polymer blends", Zhang, W.*; Zou, L., *Polymers*, 2021, 13, 347.

Prior to Dartmouth

16. "Inelastic neutron scattering probes intermolecular lattice modes that limit charge transport in organic semiconductors", Adhikari, J.M.; Zhan, P.; Calitree, B.D.; Zhang, W.; Fair, R.; Harrelson, T.F.; Faller, R.; Moule, A.J.; Milner, S.T.; Maranas, J.K.; Hickner, M.A.; Gomez, E.D., *submitted*, 2023.
15. "Effect of flow-induced nematic order on polyethylene crystal nucleation", Zhang, W.; Larson, R.G., *Macromolecules*, 2020, 53, 7650-7657.
14. "Modeling inter-colloidal interactions induced by adsorption of mobile telechelic polymers onto particle surfaces", Zhang, W.#; Travitz, A.#; Larson, R.G., *Macromolecules*, 2019, 52, 5357–5365.
13. "A metastable nematic precursor accelerates polyethylene oligomer crystallization as determined by atomistic simulations and self-consistent field theory ", Zhang, W.; Larson, R.G., *The Journal of Chemical Physics*, 2019, 150, 244903.
12. "Thermal fluctuations lead to cumulative disorder and enhance charge transport in conjugated polymers", Zhang, W.; Bombile, J.H.; Weisen, A.R.; Xie, R.; Colby, R.H.; Janik, M.J.; Milner, S.T.; Gomez, E.D., *Macromolecular Rapid Communications*, 2019, 40, 1900134.
11. "Tension-induced nematic phase separation in bidisperse homopolymer melts", Zhang, W.; Larson, R.G., *ACS Central Science*, 2018, 4, 1545-1550.
10. "Side chain length affects backbone dynamics in poly(3-alkylthiophene)s ", Zhan, P.; Zhang, W.; Jacobs I.E.; Nisson, D.M.; Xie, R.; Weissen A.R.; Colby, R.H.; Moulé, A.J.; Milner, S.T.; Maranas, J.K.; Gomez, E.D., *Journal of Polymer Science Part B*, 2018, 56, 1193-1202.

9. "Direct all-atom molecular dynamics simulations of the effects of short chain branching on polyethylene oligomer crystal nucleation", Zhang, W.; Larson, R.G., *Macromolecules*, 2018, 51, 4762-4769.
8. "Nematic order imposes molecular weight effect on charge transport in conjugated polymers", Zhang, W.; Milner, S.T.; Gomez, E.D., *ACS Central Science*, 2018, 4, 413-421.
7. "Predicting Flory-Huggins χ from simulations", Zhang, W.; Gomez, E.D.; Milner, S.T., *Physical Review Letters*, 2017, 119, 017801.
6. "Using surface-induced ordering to probe the isotropic-to-nematic transition for semiflexible polymers", Zhang, W.; Gomez, E.D.; Milner, S.T., *Soft Matter*, 2016, 12, 6141-6147.
5. "Predicting the Flory-Huggins χ parameter for polymers with stiffness mismatch from molecular dynamics simulations", **Kozuch, D.J.**; Zhang, W.; Milner, S.T., *Polymers*, 2016, 8, 241.
4. "Molecular Rectification in Conjugated Block Copolymer Photovoltaics", Grieco, C.; Aplan, M.P.; Rimshaw, A.; Lee, Y.; Le, T.P.; Zhang, W.; Wang, Q.; Milner, S.T.; Gomez, E.D.; Asbury, J.A., *Journal of Physical Chemistry C*, 2016, 120, 6978-6988.
3. "Surface induced alignment for semiflexible polymers", Zhang, W.; Gomez, E.D.; Milner, S.T., *Macromolecules*, 2016, 49, 963-971.
2. "Predicting nematic phases of semiflexible polymers", Zhang, W.; Gomez, E.D.; Milner, S.T., *Macromolecules*, 2015, 48, 1454-1462.
1. "Predicting chain dimensions of semiflexible polymers from dihedral potentials", Zhang, W.; Gomez, E.D.; Milner, S.T., *Macromolecules*, 2014, 47, 6453-6461.

Seminars and Conference Presentations

Invited talks

13. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., Stevens Institute of Technology, Hoboken, NJ, April 2026.
12. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., University of Illinois Urbana-Champaign, Champaign, IL, February 2026.
11. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., University of North Carolina at Chapel Hill, Chapel Hill, NC, February 2026.
10. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., Drexel University, Philadelphia, PA, January 2026.
9. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., Georgetown University, Washington, D.C., January 2026.
8. **Seminar** "Effects of conformational and orientational ordering in polymer crystal nucleation", Zhang, W., Stanford University, Stanford, CA, December 2025.

7. **Seminar** "Conformational and orientational ordering in polymer crystallization", Zhang, W., The University of Tennessee, Knoxville, TN, December 2025.
6. **Seminar** "Predicting structures and dynamics of semicrystalline polymer near different interfaces", Zhang, W., University of Massachusetts, Amherst, MA, June 2025.
5. **Conference** "Entanglement, segmental relaxation, and polymer crystallization", Zhang, W., APS Global Physics Summit, Anaheim, CA, March 2025.
4. **Conference** "Effects of entanglement and segmental relaxation on polymer crystallization", Zhang, W., Annual Meeting of the American Institute of Chemical Engineers, San Diego, CA, October 2024.
3. **Seminar** "Towards quantitative modeling crystallization for semicrystalline polymers", Zhang, W., University of New Hampshire, Durham, NH, March 2024.
2. **Conference** "Effect of chain stiffness on the performance of conjugated polymers", Zhang, W.; Gomez, E.D.; Milner, S.T., Frank J. Padden Award Symposium, Annual Meeting of the American Physical Society, New Orleans, LA, March 2017.
1. **Conference** "Predicting nematic phases for semiflexible polymers from simulations", Zhang, W.; Gomez, E.D.; Milner, S.T., Excellence in Graduate Polymer Research Symposium, Annual Meeting of the American Institute of Chemical Engineers, Salt Lake City, UT, November 2015.

Contributed presentations

20. **Oral.** "Predicting the Driving Force for Multi-Stage Crystallization in Polymer Samples", Zhang, W., Annual Meeting of the American Institute of Chemical Engineers, Boston, MA, November 2025.
19. **Poster.** "Conformation-orientation coupling in polymer crystallization, Zhang, W., Gordon Research Conferences: Polymer Physics, Mount Holyoke College, MA, July 2024.
18. **Oral.** "Conformation-orientation coupling in helical polymers from atomistic simulations", Zhang, W., Annual Meeting of the American Physical Society, Minneapolis, MN, March 2024.
17. **Oral.** "Entanglement and amorphous segments in polymer crystal nucleation and growth", Zhang, W.; Zou, L., XIXth International Congress of Rheology, Athens, Greece, July 2023.
16. **Oral.** "Atomistic simulations and theory of composition-dependent crystal nucleation in polymer blends", Zhang, W.; Zou, L., Annual Meeting of the American Physical Society, Las Vegas, NV, March 2023.
15. **Oral.** "Molecular Dynamics Simulations of Composition-Dependent Crystal Nucleation in Polymer Blends", Zhang, W.; Zou, L., Annual Meeting of the American Institute of Chemical Engineers, Phoenix, AZ, November 2022.
14. **Poster.** "Composition-dependent crystal nucleation in polymer blends", Zhang, W., Gordon Research Conferences: Polymer Physics, Mount Holyoke College, MA, July 2022.
13. **Oral.** "Molecular dynamics simulations of crystal nucleation in polymer blends", Zhang, W.; Zou, L., Annual Meeting of the American Institute of Chemical Engineers, Boston, MA, November 2021.

12. **Oral.** "Effects of phase separation and interfaces on incompatible polymer crystallization", Zhang, W.; Zou, L., Annual Meeting of the American Physical Society, Virtual Conference, March 2021.
11. **Oral.** "Modeling Inter-Colloidal Interactions Induced by Adsorption of Mobile Telechelic Polymers onto Particle Surfaces", Zhang, W.; Larson, R.G., Annual Meeting of the American Institute of Chemical Engineers, Orlando, FL, November 2019.
10. **Oral.** "Tension-induced nematic phase separation in bidisperse homopolymer melt", Zhang, W.; Larson, R.G., Annual Meeting of the American Institute of Chemical Engineers, Orlando, FL, November 2019.
9. **Poster.** "Role of stretched chains in flow-induced nucleation of polyethylene", Zhang, W.; Larson, R.G., Gordon Research Conferences: Crystal Growth and Assembly, Southern New Hampshire University, NH, June 2019
8. **Oral.** "Tension-Induced Nematic Phase Separation in Homopolymer Melts", Zhang, W.; Larson, R.G., Annual Meeting of the American Physical Society, Boston, MA, March 2019.
7. **Poster.** "Tension-induced nematic phase separation in bidisperse homopolymer melt", Zhang, W.; Larson, R.G., Gordon Research Conferences: Polymer Physics, Mount Holyoke College, MA, July 2018
6. **Oral.** "Role of thermal fluctuations on local lattice disorder and charge transport in conjugated polymers", Zhang, W.; Milner, S.T.; Gomez, E.D., Annual Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November 2016.
5. **Poster.** "Extracting Flory-Huggins χ for polymers from simulations", Zhang, W.; Kozuch, D.J.; Gomez, E.D.; Milner, S.T., Gordon Research Conferences: Polymer Physics, Mount Holyoke College, MA, July 2016.
4. **Oral.** "Surface induced alignment for semiflexible polymers", Zhang, W.; Gomez, E.D.; Milner, S.T., Annual Meeting of the American Physical Society, Baltimore, MD, March 2016.
3. **Oral.** "Predicting nematic coupling constants of semiflexible polymers from MD simulations", Zhang, W.; Gomez, E.D.; Milner, S.T., Annual Meeting of the American Physical Society, San Antonio, TX, March 2015.
2. **Poster.** "Extracting nematic coupling constants for semiflexible chains from simulations", Zhang, W.; Gomez, E.D.; Milner, S.T., Gordon Research Conferences: Polymer Physics, Mount Holyoke College, MA, July 2014.
1. **Oral.** "Chain shapes and ordering of conjugated polymers from atomistic simulations", Zhang, W.; Gomez, E.D.; Milner, S.T., Annual Meeting of the American Physical Society, Denver, CO, March 2014.