

# Todd R. Gingrich

DOW CHEMICAL COMPANY ASSOCIATE PROFESSOR · DEPARTMENT OF CHEMISTRY

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## Professional Appointments

2026–present **Associate Professor of Engineering Sciences & Applied Mathematics by courtesy**, Northwestern University  
2025–present **Dow Chemical Company Associate Professor of Chemistry**, Northwestern University  
2018–2025 **Assistant Professor of Chemistry**, Northwestern University  
2015–2018 **Physics of Living Systems Fellow**, Massachusetts Institute of Technology

## Education

### University of California, Berkeley

PH.D. IN CHEMISTRY

• Advisor: Prof. Phillip L. Geissler

Berkeley, CA

2010–2015

### University College, Oxford University

M.SC. (BY RESEARCH) IN PHYSICAL AND THEORETICAL CHEMISTRY

• Advisor: Prof. Mark Wilson

Oxford, UK

2008–2010

### California Institute of Technology

B.S. WITH HONORS IN CHEMISTRY

• Advisor: Prof. Nathan S. Lewis

Pasadena, CA

2004–2008

## Major Research Interests

Statistical mechanics, stochastic thermodynamics, chemical kinetics, molecular motors, tensor networks, and molecular simulations.

## Awards and Honors

|                                                                                           |           |
|-------------------------------------------------------------------------------------------|-----------|
| DOE Early Career Award, U.S. Department of Energy                                         | 2025      |
| New Horizons Solvay Lecture in Chemistry, International Solvay Institutes                 | 2025      |
| Camille Dreyfus Teacher-Scholar Award, Camille and Henry Dreyfus Foundation               | 2024      |
| Weinberg College of Arts & Sciences Distinguished Teaching Award, Northwestern University | 2023      |
| NSF Faculty Career Development (CAREER) Award, National Science Foundation                | 2023      |
| Sloan Research Fellow, Sloan Foundation                                                   | 2023      |
| Searle Fellows Program, Searle Center for Advancing Learning and Teaching                 | 2019–2020 |
| APS Oppenheim Award, American Physical Society                                            | 2019      |
| Physics of Living Systems Fellowship, Massachusetts Institute of Technology               | 2015      |
| Outstanding Graduate Student Instructor, University of California, Berkeley               | 2013      |
| Dan Lucas Book Prize, College of Chemistry, University of California, Berkeley            | 2011      |
| Richard P. Schuster Chemistry Prize, California Institute of Technology                   | 2008      |
| Fannie and John Hertz Foundation Graduate Fellowship, Fannie and John Hertz Foundation    | 2008      |
| National Science Foundation Graduate Research Fellowship, National Science Foundation     | 2008      |
| Rhodes Scholarship, Rhodes Trust                                                          | 2008      |
| Robert L. Noland Leadership Award, California Institute of Technology                     | 2007      |
| Amgen Scholars Summer Research Fellowship, Amgen Foundation                               | 2007      |
| Upper Class Merit Award, California Institute of Technology                               | 2005–2008 |
| Robert C. Byrd Honors Scholarship, U.S. Department of Education                           | 2004–2008 |

## Publications

(**TRG** as corresponding author in bold; Gingrich group members underlined)

### PREPRINTS

Murphy, C.; Nicholson, S.B.; Freitas, N.; Penocchio, E.; **Gingrich, T.R.** “Dissipation-Reliability Tradeoff for Stochastic CMOS Bits in Series.” arXiv:2603.04658, 2026.

Gu, G.; Alvarez, D.; Strahan, J.; Albaugh, A.; Penocchio, E.; **Gingrich, T.R.** “It Takes Two to Make a Thing Go Right: Boosting Current in Coupled Motors.” arXiv:2601.09907, 2026.

Tan, T.H.; Watson, G.A.; Chao, Y.-C.; Li, J.; Gingrich, T.R.; Horowitz, J.M.; Fakhri, N. “Scale-dependent irreversibility in living matter.” arXiv:2107.05701, 2021.

### ACCEPTED

**Gingrich, T.R.**; Igoshin, O.A.; Kolomeisky, A.B.; Makarov, D.E. “Thermodynamic inference from noisy single-molecule time series.” *J. Chem. Phys.*, 2026, accepted. arXiv:2606.23619

### PUBLISHED

#### Northwestern Faculty Career

35. Strahan, J.; **Gingrich, T.R.** “Sensitivity analysis in the face of rare events.” *J. Chem. Phys.*, 2026, *165*, 104106. [DOI:10.1063/5.0345394]
34. Zima, J.P.; Nicholson, S.B.; **Gingrich, T.R.** “Chemical master equation parameter exploration using DMRG.” *J. Chem. Phys.*, 2025, *163*, 054118. [DOI:10.1063/5.0276591]
33. Penocchio, E.; Gu, G.; Albaugh, A.; **Gingrich, T.R.** “Power strokes in molecular motors: predictive, irrelevant, or somewhere in between?” *J. Am. Chem. Soc.*, 2025, *147*(1), 1063-1073. [DOI:10.1021/jacs.4c14481]
32. Strand, N.E.; Nicholson, S.B.; Vroylandt, H.; **Gingrich, T.R.** “From high-dimensional committers to reactive insight.” *J. Chem. Phys.*, 2024, *161*, 224109. [DOI:10.1063/5.0232705]
31. Albaugh, A.; Fu, R.-S.; Gu, G.; **Gingrich, T.R.** “Limits on the Precision of Catenane Motors: Insights from Thermodynamics and Molecular Dynamics Simulations.” *J. Chem. Theory Comput.*, 2024, *20*, 1-6. [DOI:10.1021/acs.jctc.3c01201]
30. Nicholson, S.B.; **Gingrich, T.R.** “Quantifying Rare Events in Stochastic Reaction-Diffusion Dynamics Using Tensor Networks.” *Phys. Rev. X*, 2023, *13*, 041006. [DOI:10.1103/PhysRevX.13.041006]
29. Albaugh, A.; Gu, G.; **Gingrich, T.R.** “Sterically driven current reversal in a molecular motor model.” *Proc. Natl. Acad. Sci. USA*, 2023, *120*(33), e2210500120. [DOI:10.1073/pnas.2210500120]
28. Binks, L.; Borsley, S.; Gingrich, T.R.; Leigh, D.A.; Penocchio, E.; Roberts, B.W. “The role of kinetic asymmetry and power strokes in an information ratchet.” *Chem*, 2023, *9*, 1-16. [DOI:10.1016/j.chempr.2023.05.035]
27. Fu, R.-S.; **Gingrich, T.R.** “Thermodynamic uncertainty relation for Langevin dynamics by scaling time.” *Phys. Rev. E*, 2022, *106*, 024128. [DOI:10.1103/PhysRevE.106.024128]
26. Strand, N.E.; Vroylandt, H.; **Gingrich, T.R.** “Computing time-periodic steady-state currents via the time evolution of tensor network states.” *J. Chem. Phys.*, 2022, *157*, 054104. [DOI:10.1063/5.0099741]
25. **Gingrich, T.R.** “Measuring how effectively light drives a molecular pump.” *Nat. Nanotechnol.*, 2022, *17*, 675. [DOI:10.1038/s41565-022-01152-x] (**News & Views**)
24. Strand, N.E.; Vroylandt, H.; **Gingrich, T.R.** “Using tensor network states for multi-particle Brownian ratchets.” *J. Chem. Phys.*, 2022, *156*, 221103. [DOI:10.1063/5.0097332] (**Editor’s Pick**)

23. Albaugh, A.; **Gingrich, T.R.** “Simulating a Chemically Fueled Molecular Motor with Nonequilibrium Molecular Dynamics.” *Nat. Comm.*, 2022, *13*, 2204. [DOI:10.1038/s41467-022-29393-3]
22. Albaugh, A.; **Gingrich, T.R.** “Estimating Reciprocal Partition Functions to Enable Design Space Sampling.” *J. Chem. Phys.*, 2020, *153*, 204102. [DOI:10.1063/5.0025358]
21. Strand, N.E.; Fu, R.-S.; **Gingrich, T.R.** “Current inversion in a periodically driven two-dimensional Brownian ratchet.” *Phys. Rev. E*, 2020, *102*, 012141. [DOI:10.1103/PhysRevE.102.012141] (**Editor’s Suggestion**)
20. Owen, J.A.; Gingrich, T.R.; Horowitz, J.M. “Universal thermodynamic bounds on nonequilibrium response with biochemical applications.” *Phys. Rev. X*, 2020, *10*, 011066. [DOI:10.1103/PhysRevX.10.011066]
19. Vroylandt, H.; Proesmans, K.; **Gingrich, T.R.** “Isometric Uncertainty Relations.” *J. Stat. Phys.*, 2020, *178*, 1039-1053. [DOI:10.1007/s10955-020-02484-5]
18. Horowitz, J.M.; **Gingrich, T.R.** “Thermodynamic uncertainty relations constrain nonequilibrium fluctuations.” *Nat. Phys.*, 2020, *15*, 1. [DOI:10.1038/s41567-019-0702-6]
17. Li, J.; Horowitz, J.M.; **Gingrich, T.R.**; Fakhri, N. “Quantifying dissipation using fluctuating currents.” *Nat. Comm.*, 2019, *10*, 1666. [DOI:10.1038/s41467-019-09631-x]

#### Independent Postdoctoral Fellowship

16. **Gingrich, T.R.**; Horowitz, J.M. “Fundamental Bounds on First Passage Time Fluctuations for Currents.” *Phys. Rev. Lett.*, 2017, *119*, 170601. [DOI:10.1103/PhysRevLett.119.170601]
15. Bisker, G.; Poletini, M.; Gingrich, T.R.; Horowitz, J.M.; “Hierarchical Bounds on Entropy Production Inferred from Partial Information.” *J. Stat. Mech.: Theory Exp.*, 2017, 093210. [DOI:10.1088/1742-5468/aa8c0d]
14. Horowitz, J.M.; **Gingrich, T.R.** “Proof of the Finite-Time Thermodynamic Uncertainty Relation for Steady-State Currents.” *Phys. Rev. E*, 2017, *96*, 020103(R). [DOI:10.1103/PhysRevE.96.020103] (**Editor’s Suggestion**)
13. Zakine, R.; Solon, A.; Gingrich, T.R.; van Wijland, F. “Stochastic Stirling engine operating in contact with active baths.” *Entropy*, 2017, *19*(5), 193. [DOI:10.3390/e19050193]
12. **Gingrich, T.R.**; Rotskoff, G.M.; Horowitz, J.M. “Inferring dissipation from current fluctuations.” *J. Phys. A*, 2017, *50*, 184004. [DOI:10.1088/1751-8121/aa672f]
11. **Gingrich, T.R.**; Horowitz, J.M.; Perunov, N.; England, J.L. “Dissipation bounds all steady-state current fluctuations.” *Phys. Rev. Lett.*, 2016, *116*, 120601. [DOI:10.1103/PhysRevLett.116.120601]

#### Mentored Research

10. **Gingrich, T.R.**; Rotskoff, G.M.; Crooks, G.E.; Geissler, P.L. “Near-optimal protocols in complex nonequilibrium transformations.” *Proc. Natl. Acad. Sci. USA*, 2016, *113*(37), 10263. [DOI:10.1073/pnas.1606273113]
9. Gingrich, T.R.; Geissler, P.L. “Preserving correlations between trajectories for efficient path sampling.” *J. Chem. Phys.*, 2015, *142*(23), 234104. [DOI:10.1063/1.4922343] (**Editor’s Choice**)
8. Gingrich, T.R.; Rotskoff, G.M.; Vaikuntanathan, S.; Geissler, P.L. “Efficiency and large deviations in time-asymmetric stochastic heat engines.” *New J. Phys.*, 2014, *16*(10), 102003. [DOI:10.1088/1367-2630/16/10/102003] (**Fast Track Communication**)
7. Gingrich, T.R.; Vaikuntanathan, S.; Geissler, P.L. “Heterogeneity-induced large deviations in activity and (in some cases) entropy production.” *Phys. Rev. E*, 2014, *90*, 042123. [DOI:10.1103/PhysRevE.90.042123]
6. Vaikuntanathan, S.; Gingrich, T.R.; Geissler, P.L. “Dynamic phase transitions in simple driven kinetic networks.” *Phys. Rev. E*, 2014, *89*, 062108. [DOI:10.1103/PhysRevE.89.062108]

5. Gingrich, T.R.; Wilson, M. "The control of inorganic nanotube morphology using an applied potential." *J. Phys. Condens. Matter*, 2011, 23(13), 135306. [DOI:10.1088/0953-8984/23/13/135306]
4. Gingrich, T.R.; Wilson, M. "On the Ewald summation of Gaussian charges for the simulation of metallic surfaces." *Chem. Phys. Lett.*, 2010, 500(1), 178. [DOI:10.1016/j.cplett.2010.10.010]
3. Katz, J.E.; Gingrich, T.R.; Santori, E.A.; Lewis, N.S. "Combinatorial synthesis and high-throughput photopotential and photocurrent screening of mixed-metal oxides for photoelectrochemical water splitting." *Energy Environ. Sci.*, 2009, 2(1), 103. [DOI:10.1039/B812177J]
2. Thallapally, P.K.; Dobrzanska, L.; Gingrich, T.R.; Wirsig, T.B.; Barbour, L.J.; Atwood, J.L. "Acetylene absorption and binding in a nonporous crystal lattice." *Angew. Chem.*, 2006, 45(39), 6506. [DOI:10.1002/anie.200601391]
1. Gingrich, T.R.; Smith, G.P. "Hydroxyapatite chromatography of phage-display virions." *BioTechniques*, 2005, 39(6), 879. [DOI:10.2144/000112032]

## PATENTS

N.S. Lewis, J.E. Katz, T.R. Gingrich. "High-throughput screening and device for photocatalysts." Issued 9/8/2015, US Patent No. 9,126,175.

## Research Support

### PRESENT

**Computer Simulation of Molecular Motors Far from Equilibrium** December 1, 2021-March 1, 2027  
Gordon and Betty Moore Foundation, PI, \$1,963,820

**CAREER: Reaction-Diffusion Kinetics with Tensor Networks** September 1, 2023–August 31, 2028  
NSF CHE, PI, \$650,000

**Self-Propellant Nanoparticle@MOF Catalysts for Chemical Warfare Agent Detoxification** March 2024-March 2029  
DTRA, co-PI, \$2,500,000 (\$750,000 for TRG)

**Computational Tools for Stochastic, Far-From-Equilibrium Chemical Kinetics** June 2024-June 2029  
Camille Dreyfus Teacher-Scholar Award, \$100,000

**Designing Dynamic Function for Nonequilibrium Dissipative Chemistry** August 1, 2025-July 31, 2030  
DOE Office of Science Early Career Research Program, PI, \$875,000

**Developing Tensor Networks to Investigate Stochastic Phenotypes of Somite Segmentation** August 2025-August 2026  
NSF-Simons National Institute for Theory and Mathematics in Biology (NITMB), co-PI (with Ertuğrul Özbudak, Northwestern)

### COMPLETED

**Sloan Research Fellowship** September 15, 2023–September 14, 2025  
Sloan Foundation, \$75,000

**From Microscopic Motors to Macroscopic Work** September 15, 2023–September 14, 2024  
Northwestern IIN Seed Grant, Seed Investigator, \$100,000

**EAGER: ADAPT: Optimizing chemical reaction networks with AI** September 1, 2021–August 31, 2023  
NSF CHE, PI, \$300,000

**Steering the dynamics of nanomachines** February 1, 2021–July 31, 2022  
Northwestern IIN Seed Grant, Seed Investigator, \$100,000

## Invited Lectures

### SCHEDULED

|                                                                                                    |                |
|----------------------------------------------------------------------------------------------------|----------------|
| <b>New Methods and Applications of Tensor Networks Workshop</b> , Flatiron Institute, New York, NY | September 2026 |
| <b>Emerging AI and Machine Learning Methods in Molecular Simulation</b> , Mesilla, NM              | April 2027     |
| <b>American Conference on Theoretical Chemistry (ACTC 2027)</b> , Salt Lake City, UT               | June 2027      |

### DELIVERED

|                                                                                                                                                                                                           |                |
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| <b>Telluride Workshop on Condensed Phase Dynamics</b> , Telluride, CO                                                                                                                                     | July 2026      |
| <b>International Workshop on New Advances in Theoretical and Computational Molecular Sciences for Complex and Quantum Processes (TMCQ 2026)</b> , Korea Institute for Advanced Study (KIAS), Seoul, Korea | June 2026      |
| <b>Non-equilibrium Dynamics, from Active Matter to Evolutionary Dynamics Workshop</b> , Kavli Institute for Theoretical Physics (KITP), UC Santa Barbara                                                  | June 2026      |
| <b>129th Statistical Mechanics Meeting</b> , Rutgers University                                                                                                                                           | December 2025  |
| <b>Engineering Sciences and Applied Mathematics (ESAM) Department Seminar</b> , Northwestern University                                                                                                   | October 2025   |
| <b>Marcus Center for Theoretical Chemistry Meeting</b> , Caltech                                                                                                                                          | July 2025      |
| <b>CompQu Seminar Series (Zoom)</b> , National Center for Theoretical Sciences, National Taiwan University                                                                                                | May 2025       |
| <b>New Horizons Solvay Lecture in Chemistry</b> , University of Ghent                                                                                                                                     | April 2025     |
| <b>New Horizons Solvay Lecture in Chemistry</b> , KU Leuven                                                                                                                                               | April 2025     |
| <b>New Horizons Solvay Lecture in Chemistry</b> , Université libre de Bruxelles                                                                                                                           | April 2025     |
| <b>New Horizons Solvay Lecture in Chemistry</b> , University of Luxembourg                                                                                                                                | March 2025     |
| <b>Statistical Mechanics in Physical Chemistry: Theories and Simulations Session</b> , ACS Global Virtual Symposium                                                                                       | March 2025     |
| <b>Machine Learning in Molecular and Multiscale Dynamics</b> , Mesilla, NM                                                                                                                                | March 2025     |
| <b>Chinese-American Kavli Frontiers of Science Symposium [Invited Poster]</b> , Jointly hosted by the National Academy of Sciences and the Chinese Academy of Sciences in Beijing, China                  | November 2024  |
| <b>Simon Fraser University, Department of Biophysics</b> , Burnaby, BC, Canada                                                                                                                            | September 2024 |
| <b>Emergence of Information in Molecular Systems Workshop</b> , Munich, Germany                                                                                                                           | July 2024      |
| <b>Midwest Undergraduate Computational Chemistry Consortium</b> , Evanston, Illinois                                                                                                                      | July 2024      |
| <b>Telluride Workshop on Condensed Phase Dynamics</b> , Telluride, CO                                                                                                                                     | July 2024      |
| <b>Dissipative Processes in Molecular Systems Workshop</b> , Padova, Italy                                                                                                                                | June 2024      |
| <b>Nonequilibrium Dynamics, Information Processing, and Aging of Living Cells Workshop</b> , ITS @ The Graduate Center, CUNY, New York, NY                                                                | May 2024       |
| <b>University of Michigan Chemistry</b> , Ann Arbor, MI                                                                                                                                                   | April 2024     |
| <b>University of Michigan Complex Systems</b> , Ann Arbor, MI                                                                                                                                             | April 2024     |
| <b>University of Chicago, Department of Chemistry</b> , Chicago, IL                                                                                                                                       | March 2024     |
| <b>Stanford University, Department of Chemistry</b> , Palo Alto, CA                                                                                                                                       | March 2024     |
| <b>New York University, Department of Chemistry</b> , New York, NY                                                                                                                                        | March 2024     |
| <b>Rice University Center for Theoretical Biophysics</b> , Houston, TX                                                                                                                                    | February 2024  |
| <b>Rutgers University, Department of Chemistry</b> , New Brunswick, NJ                                                                                                                                    | December 2023  |
| <b>Northwestern/Muenster Symposium on Smart Materials, International Institute of Nanotechnology</b> , Evanston, IL                                                                                       | August 2023    |
| <b>MIT, Physics of Living Systems</b> , Cambridge, MA                                                                                                                                                     | June 2023      |
| <b>University of North Carolina, Department of Chemistry</b> , Chapel Hill, NC                                                                                                                            | April 2023     |
| <b>Informal Statistical Physics Seminar</b> , University of Maryland, College Park, MD                                                                                                                    | April 2023     |
| <b>Rare Events: Analysis, Numerics, and Applications</b> , Brin Mathematics Research Center, University of Maryland, College Park, MD                                                                     | February 2023  |
| <b>Northwestern University, Department of Physics</b> , Evanston, IL                                                                                                                                      | January 2023   |
| <b>Berkeley Statistical Mechanics Meeting</b> , Berkeley, CA                                                                                                                                              | January 2023   |

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| <b>Telluride Workshop on Condensed Phase Dynamics</b> , Telluride, CO                                                                                         | July 2022      |
| <b>Midwest Theoretical Chemistry Conference</b> , Columbus, OH                                                                                                | June 2022      |
| <b>Workshop on Stochastic Thermodynamics II</b> , Sante Fe Institute, Sante Fe, NM (Virtual)                                                                  | May 2021       |
| <b>University of Colorado at Boulder, Department of Chemistry</b> , Boulder, CO (Virtual)                                                                     | March 2021     |
| <b>Oxford University, Theoretical Chemistry Group</b> , Oxford, England (Virtual)                                                                             | February 2021  |
| <b>Telluride Workshop on Condensed Phase Dynamics</b> , Virtual                                                                                               | July 2020      |
| <b>Illinois State University, Department of Physics</b> , Normal, IL                                                                                          | February 2020  |
| <b>Oppenheim Prize Talk, APS March Meeting</b> , Boston, MA                                                                                                   | March 2019     |
| <b>Lawrence Berkeley National Lab/UC Berkeley Soft Matter Seminar</b> , Berkeley, CA                                                                          | January 2019   |
| <b>Why Measure Entropy Production?</b> , Princeton Center for Theoretical Science, Princeton, NJ                                                              | November 2018  |
| <b>Stochastic Thermodynamics: Experiment and Theory</b> , Max Planck Institute for the Physics of Complex Systems, Dresden, Germany                           | September 2018 |
| <b>Telluride Workshop on Condensed Phase Dynamics</b> , Telluride, CO                                                                                         | July 2018      |
| <b>CCI Solar Fuels Workshop</b> , Ventura, CA                                                                                                                 | July 2018      |
| <b>Large deviation theory in statistical physics: Recent advances and future challenges</b> , Indian Center for Theoretical Sciences (ICTS), Bangalore, India | September 2017 |
| <b>Igert Summer Institute, Brandeis University</b> , Waltham, MA                                                                                              | June 2017      |
| <b>Berkeley Statistical Mechanics/Machine Learning Meeting</b> , Berkeley, CA                                                                                 | January 2017   |
| <b>New York University, Department of Chemistry</b> , New York, NY                                                                                            | December 2016  |
| <b>Stanford University, Department of Chemistry</b> , Palo Alto, CA                                                                                           | December 2016  |
| <b>Columbia University, Department of Chemistry</b> , New York, NY                                                                                            | November 2016  |
| <b>University of California at Santa Barbara, Department of Chemistry</b> , Santa Barbara, CA                                                                 | November 2016  |
| <b>Northwestern University, Department of Chemistry</b> , Evanston, IL                                                                                        | October 2016   |
| <b>Boston University, Condensed Matter Theory/Biophysics</b> , Boston, MA                                                                                     | March 2016     |
| <b>JCP Editor's Choice Session, APS March Meeting</b> , Baltimore, MD                                                                                         | March 2016     |
| <b>Modeling and Inference from Single Molecules to Cells</b> , MBI Workshop, Columbus, OH                                                                     | February 2016  |
| <b>Large Deviation Theory in Principle and in Practice</b> , Princeton Center for Theoretical Science, Princeton, NJ                                          | November 2015  |
| <b>Chemistry &amp; Physics of Liquids Gordon Research Conference, Poster Prize Short Talk</b> , Holderness, NH                                                | August 2015    |
| <b>Workshop on Statistical Mechanics and Computation of Large Deviation Rate Functions</b> , Ecole Normale Supérieure, Lyon, France                           | June 2015      |
| <b>Princeton University, Princeton Biophysics Symposium</b> , Princeton, NJ                                                                                   | December 2014  |
| <b>Workshop on Large Deviations in Statistical Physics</b> , National Institute for Theoretical Physics (NITheP), Stellenbosch, South Africa                  | July 2014      |

## Teaching Experience

### **CHEM 171: Advanced General Inorganic Chemistry** (New Curriculum Development)

|                                                                        |           |
|------------------------------------------------------------------------|-----------|
| · Course Rating: 5.16/6.00; Instructor Rating: 5.64/6.00; 172 Students | Fall 2025 |
| · Course Rating: 5.13/6.00; Instructor Rating: 5.74/6.00; 184 Students | Fall 2024 |
| · Course Rating: 5.09/6.00; Instructor Rating: 5.66/6.00; 186 Students | Fall 2023 |
| · Course Rating: 4.64/6.00; Instructor Rating: 5.26/6.00; 175 Students | Fall 2022 |

### **CHEM 348: Physical Chemistry for ISP** (New Curriculum Development)

|                                                                       |             |
|-----------------------------------------------------------------------|-------------|
| · Course Rating: 5.40/6.00; Instructor Rating: 6.00/6.00; 11 Students | Spring 2022 |
| · Course Rating: 5.30/6.00; Instructor Rating: 5.90/6.00; 12 Students | Spring 2021 |
| · Course Rating: 5.43/6.00; Instructor Rating: 6.00/6.00; 11 Students | Spring 2020 |
| · Course Rating: 5.63/6.00; Instructor Rating: 5.88/6.00; 8 Students  | Spring 2020 |

### **CHEM 444: Elementary Statistical Mechanics** (New Curriculum Development)

|                                                                       |           |
|-----------------------------------------------------------------------|-----------|
| · Course Rating: 5.50/6.00; Instructor Rating: 5.61/6.00; 32 Students | Fall 2025 |
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| · Course Rating: 5.24/6.00; Instructor Rating: 5.65/6.00; 22 Students | Fall 2023 |
| · Course Rating: 5.27/6.00; Instructor Rating: 5.57/6.00; 20 Students | Fall 2022 |
| · Course Rating: 5.67/6.00; Instructor Rating: 5.67/6.00; 9 Students  | Fall 2020 |
| · Course Rating: 5.67/6.00; Instructor Rating: 6.00/6.00; 14 Students | Fall 2019 |
| · Course Rating: 5.50/6.00; Instructor Rating: 5.58/6.00; 13 Students | Fall 2018 |

## Advising/Supervision

### GRADUATE STUDENTS

|                                                                                       |           |
|---------------------------------------------------------------------------------------|-----------|
| <b>Wei-Shan Huynh</b> , PhD Student                                                   | 2026-     |
| <b>Rittik Mandal</b> , PhD Student                                                    | 2025-     |
| <b>John Zima</b> , PhD Student                                                        | 2024-     |
| <b>Cathryn (Kate) Murphy</b> , PhD Student                                            | 2023-     |
| <b>Jonah Greenberg</b> , PhD                                                          | 2019-2025 |
| <b>Geyao Gu</b> , PhD                                                                 | 2019-2025 |
| <b>Nils Strand</b> , PhD, Now a Postdoc at UChicago with Aaron Dinner and Yuehaw Koon | 2018-2023 |
| <b>Rueih-Sheng (Ray) Fu</b> , PhD                                                     | 2018-2023 |

### POSTDOCTORAL SCHOLARS

|                                                                                                                                         |           |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Jay-Hak Lee</b> , Postdoctoral Scholar                                                                                               | 2025-     |
| <b>Geyao Gu</b> , Postdoctoral Scholar, Now Process Engineer at Lam Research                                                            | 2025-2026 |
| <b>John Strahan</b> , Postdoctoral Scholar                                                                                              | 2024-2026 |
| <b>Kathleen Krist</b> , Postdoctoral Scholar, Now Assistant Professor of Chemistry, Tusculum University                                 | 2023-2025 |
| <b>Emanuele Penocchio</b> , Postdoctoral Scholar, Now Marie Curie Fellow, Strasbourg University                                         | 2022-2026 |
| <b>Schuyler (Sky) Nicholson</b> , Postdoctoral Scholar and Research Associate, Now Postdoctoral Fellow, Sante Fe Institute              | 2020-2024 |
| <b>Alex Albaugh</b> , Postdoctoral Scholar, Now Assistant Professor of Chemical Engineering & Materials Science, Wayne State University | 2018-2023 |
| <b>Hadrien Vroylandt</b> , Postdoctoral Scholar, Now Junior Professor at GREYC (University of Caen Normandy, France)                    | 2018-2020 |

### UNDERGRADUATE RESEARCH STUDENTS

|                                                                                                                  |             |
|------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Elliott Yoder</b> , Undergraduate Researcher                                                                  | Summer 2026 |
| <b>Annan Vora</b> , Undergraduate Researcher                                                                     | Summer 2026 |
| <b>Tate Darin</b> , Undergraduate Researcher                                                                     | 2025-       |
| <b>Jamie Obala</b> , Undergraduate Researcher                                                                    | 2025-       |
| <b>Drew Alvarez</b> , WCAS Summer Undergraduate Research Award and McCormick Summer Undergraduate Research Award | 2023-       |
| <b>Isabelle Goodrow</b> , Cornell University Summer Experience Grant                                             | Summer 2023 |
| <b>Ashini Shah</b> , Undergraduate Researcher                                                                    | 2022-2024   |
| <b>Niles Babin</b> , International Institute of Nanotechnology REU                                               | Summer 2022 |
| <b>Akhil Kalghatgi</b> , ISP 398 student                                                                         | 2021        |

### HIGH SCHOOL STUDENTS

|                                               |                   |
|-----------------------------------------------|-------------------|
| <b>Conor Scheidt</b> , High School Researcher | Summer 2024, 2025 |
|-----------------------------------------------|-------------------|

## Service

### EXTERNAL

|                                                                                                                                         |            |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Editorial Board Member</b> , <i>Physical Review E</i>                                                                                | 2022-      |
| <b>Workshop Co-organizer</b> , Nonequilibrium Systems Under Control, Lorentz Center, Leiden, Netherlands                                | 2025       |
| <b>Co-organizer and Statistical Mechanics Instructor</b> , Telluride School on Theoretical Chemistry, Telluride Science Research Center | 2021, 2023 |

|                                                                           |         |
|---------------------------------------------------------------------------|---------|
| <b>Selection Committee Member</b> , ACS Junior/Senior Theory Award        | 2022    |
| <b>Selection Committee Member</b> , APS Oppenheim Award                   | 2020    |
| <b>Selection Committee Member</b> , Rhodes Scholarship, District 15 (USA) | 2013-15 |

#### UNIVERSITY SERVICE

|                                                                                               |       |
|-----------------------------------------------------------------------------------------------|-------|
| <b>Associate Director</b> , Integrated Science Program (ISP), Northwestern University         | 2023- |
| <b>Residential College Fellow</b> , Slivka Residential College, Northwestern University       | 2023- |
| <b>Committee Member</b> , Integrated Science Program (ISP) Committee, Northwestern University | 2022- |

#### DEPARTMENT SERVICE

|                                                                                            |           |
|--------------------------------------------------------------------------------------------|-----------|
| <b>Committee Member</b> , Graduate Curriculum Committee                                    | 2023-     |
| <b>Chair</b> , Assistant Professor of Instruction Search Committee, Successful Double Hire | 2022-2023 |
| <b>Committee Member</b> , General Chemistry Committee                                      | 2021-     |
| <b>Committee Member</b> , Graduate Admissions Committee                                    | 2018-     |