

Suriyanarayanan Vaikuntanathan

Professor of Chemistry

Department of Chemistry and James Franck Institute, The University of Chicago, Chicago, IL 60637

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Research: statistical mechanics, information theory, and machine learning applied to how physical and biological systems compute, adapt, and self-organize far from equilibrium — nonequilibrium statistical mechanics, biological information processing, active and soft matter, and the physics of learning and memory.

Academic Appointments

Professor Department of Chemistry and James Franck Institute, The University of Chicago	July 2023 – present
Associate Professor Department of Chemistry and James Franck Institute, The University of Chicago	July 2020 – June 2023
Assistant Professor Department of Chemistry and James Franck Institute, The University of Chicago	Aug 2014 – June 2020
Postdoctoral Fellow University of California, Berkeley (advisor: Prof. Phillip L. Geissler)	Sept 2011 – Aug 2014

Education

Ph.D. in Chemical Physics University of Maryland, College Park Advisor: Prof. Christopher Jarzynski Dissertation: <i>Equilibrium free energy differences from nonequilibrium computer simulations: Improving convergence by reducing dissipation</i>	2011
B.Tech. in Biotechnology Indian Institute of Technology Madras, Chennai, India	2006

Honors and Awards

Hirschfelder Distinguished Visitor, Theoretical Chemistry Institute, University of Wisconsin–Madison	2026
ACS Physical Chemistry Division Early Career Award in Theoretical Chemistry	2023
Camille Dreyfus Teacher-Scholar Award	2020
NSF CAREER Award	2019
Alfred P. Sloan Research Fellowship in Chemistry	2017
Ann G. Wylie Dissertation Fellowship, University of Maryland	2011
Chemical Physics Fellowship, University of Maryland	2006 – 2008

Publications

*joint corresponding author; †equal contribution. Numbered in reverse chronological order.

Preprints and manuscripts under review

- [78] M. Du, C. Floyd, D. Jasrasaria, **S. Vaikuntanathan**, “Coherent advantage in the computational expressivity of excitonic networks,” [arXiv:2609.10448](#) (2026).
- [77] E. Rennert, A. K. Behera, Y. Qiu, **S. Vaikuntanathan**, “Diffusion models learn underlying trends in actomyosin networks and predict behavior at unseen filament turnover,” [bioRxiv 10.64898/2026.05.26.727950](#) (2026). (submitted to *Biophysical Journal*)
- [76] C. Floyd[†], H. M. Lopez Rios[†], A. R. Dinner, **S. Vaikuntanathan**, “In-context learning emerges in chemical reaction networks without attention,” [arXiv:2601.06712](#) (2026). (under revision, *Nature Communications*)
- [75] B. Kuznets-Speck, J. Jung, P. Pholraksa, A. Zhong, L. Schwartz, E. Prashnani, **S. Vaikuntanathan**, Y. Goyal, “Interpretable thermodynamic score-based classification of relaxation excursions,” [bioRxiv 10.1101/2025.11.26.690838](#) (2025). (under review, *Cell Systems*)
- [74] S. S. Lu[†], M. J. Styles[†], C. F. Gao[†], A. Nandy, C. Basile, J. A. Pixley, S. Tao, A. R. Dinner, **S. Vaikuntanathan***, B. C. Dickinson*, “Mapping the diverse topologies of protein–protein interaction fitness landscapes,” [bioRxiv 10.1101/2025.10.14.682342](#) (2025). (under review, *Science*)
- [73] R. Mandal, R. Huang, M. Fruchart, P. G. Moerman, **S. Vaikuntanathan**, A. Murugan, V. Vitelli, “Learning dynamical behaviors in physical systems,” [arXiv:2406.07856](#) (2024). (under revision, *Nature Physics*)
- [72] Y. Qiu, E. D. White, E. M. Munro, **S. Vaikuntanathan***, A. R. Dinner*, “Elucidating the role of filament turnover in cortical flow using simulations and representation learning,” [arXiv:2310.10819](#) (2023). (under revision, *Proc. Natl. Acad. Sci. USA*)

Peer-reviewed publications (independent career, 2014 – present)

- [71] C. Floyd, A. R. Dinner, **S. Vaikuntanathan**, “Local imperfect feedback control in nonequilibrium biophysical systems enabled by response constraints,” *Physical Review X*, in press (2026). [arXiv:2507.07295](#)
- [70] B. Kuznets-Speck, L. Schwartz, H. Sun, M. E. Melzer, N. Kumari, B. Haley, E. Prashnani, **S. Vaikuntanathan**, Y. Goyal, “Fluctuation structure predicts genome-wide perturbation outcomes,” *Nature Biotechnology*, in press (2026). [bioRxiv 10.1101/2025.06.27.661814](#)
- [69] D. Goto, H. M. Lopez Rios, M. Scholz, **S. Vaikuntanathan**, “Neuromodulation-inspired gated associative memory networks: Extended memory retrieval and emergent multistability,” *Proc. Natl. Acad. Sci. USA*, in press (2026). [arXiv:2512.13859](#)
- [68] M. Du, A. Goychuk, **S. Vaikuntanathan**, “Hidden nonreciprocity as a stabilizing effective potential in active matter,” *Phys. Rev. Research* **8**, 033330 (2026). [doi:10.1103/23zn-lzx2](#)
- [67] C. Floyd, A. R. Dinner, **S. Vaikuntanathan**, “Learning to control non-equilibrium dynamics using local imperfect gradients,” *Newton* **2**, 100595 (2026). [doi:10.1016/j.newton.2026.100595](#)
- [66] A. Ghosh[†], J. L. Spellberg[†], M. Du, Y. Dou, A. S. Thind, S. Qi, J. Rieger, C. Raab, **S. Vaikuntanathan**, R. F. Klie, L. Quan, S. B. King, “Light-induced ordered pattern formation in 2D copper halide perovskites,” *Nano Letters* **26**, 4189–4196 (2026). [doi:10.1021/acs.nanolett.6c00133](#)
- [65] M. Bauer, A. Goyal, S. Goyal, G. Reddy, S. Chakrabarti, M. M. Desai, W. Gilpin, J. Grilli, K. Husain, S. Jain, M. K. Jolly, K. Kawaguchi, A. Koseska, M. Lin, L. Narlikar, S. Pigolotti, A. Raju, K. Shrinivas, R. Siddharthan, G. J. Stephens, A. Tiffeau-Mayer, **S. Vaikuntanathan**, “Unifying theories in high-

- dimensional biophysics: Approaches, challenges and opportunities,” *npj Systems Biology and Applications* **12**, 43 (2026). doi:[10.1038/s41540-026-00680-9](https://doi.org/10.1038/s41540-026-00680-9)
- [64] A. K. Behera, A. Lamtyugina, A. Nandy, D. Goto, D. Sanwal, C. Floyd, **S. Vaikuntanathan**, “Non-equilibrium active noise enhances generative memory in diffusion models,” *Nature Communications*, in press (2026). [arXiv:2411.07233](https://arxiv.org/abs/2411.07233)
 - [63] A. Lamtyugina, D. S. Banerjee, Y. Qiu, **S. Vaikuntanathan**, “Contractile to extensile transitions and mechanical adaptability enabled by activity in cytoskeletal structures,” *Biophysical Journal*, in press (2026). doi:[10.1016/j.bpj.2026.09.011](https://doi.org/10.1016/j.bpj.2026.09.011)
 - [62] D. S. Banerjee, M. J. Falk, M. L. Gardel, A. M. Walczak, T. Mora, **S. Vaikuntanathan**, “Learning via mechanosensitivity and activity in cytoskeletal networks,” *PRX Life* **4**, 013001 (2026). doi:[10.1103/s7tg-6q4q](https://doi.org/10.1103/s7tg-6q4q)
 - [61] A. K. Behera, M. Du, U. K. Jagadisan, S. Sastry, M. Rao, **S. Vaikuntanathan**, “Connection between Hebbian unlearning and steady states generated by nonequilibrium dynamics,” *PRX Life* (2025). doi:[10.1103/vkt6-bltp](https://doi.org/10.1103/vkt6-bltp)
 - [60] M. Gao, H. Hong, S. Fan, T. Chowdhury, Z. Naqvi, J. Ge, C. Liang, Y. Han, N. P. Guisinger, Y. Qiu, D. H. Kim, **S. Vaikuntanathan**, C. Liu, J. Park, “Room-temperature charge localization in ion-coupled bilayer transistors,” *Science* **390**, 356–360 (2025). doi:[10.1126/science.ady7969](https://doi.org/10.1126/science.ady7969)
 - [59] C. Floyd, A. R. Dinner, A. Murugan, **S. Vaikuntanathan**, “Limits on the computational expressivity of non-equilibrium biophysical processes,” *Nature Communications* **16**, 7184 (2025). doi:[10.1038/s41467-025-61873-0](https://doi.org/10.1038/s41467-025-61873-0)
 - [58] J. L. Shivers, M. Nguyen, A. R. Dinner, P. Vlahovska, **S. Vaikuntanathan**, “Renormalized mechanics and stochastic thermodynamics of growing model protocells,” *PRX Life* (2025). [arXiv:2503.24120](https://arxiv.org/abs/2503.24120)
 - [57] C. Floyd, A. R. Dinner, **S. Vaikuntanathan**, “Tailoring interactions between active nematic defects with reinforcement learning,” *Soft Matter* **21**, 4488–4497 (2025). doi:[10.1039/D4SM01240B](https://doi.org/10.1039/D4SM01240B)
 - [56] M. Du, A. K. Behera, **S. Vaikuntanathan**, “Physical considerations in memory and information storage,” *Annual Review of Physical Chemistry* **76** (2025).
 - [55] E. Rennert, **S. Vaikuntanathan**, “A thermodynamic framework for nonequilibrium self-assembly and force–morphology tradeoffs in branched actin networks,” *eLife* **14**, RP104513 (2025). doi:[10.7554/eLife.104513](https://doi.org/10.7554/eLife.104513)
 - [54] A. Paikar, X. Li, L. Avram, B. S. Smith, I. Sütő, D. Horváth, E. Rennert, Y. Qiu, Á. Tóth, **S. Vaikuntanathan**, S. N. Semenov, “Chemical waves in reaction-diffusion networks of small organic molecules,” *Chemical Science* **16**, 659–669 (2025). doi:[10.1039/D4SC06351A](https://doi.org/10.1039/D4SC06351A)
 - [53] M. Du, A. K. Behera, M. Rao, **S. Vaikuntanathan**, “Sequential pattern retrieval: New representations inspired by non-equilibrium physics and associative memory models,” *ICLR 2025 Workshop on New Frontiers in Associative Memories (NFAM)* (2025).
 - [52] M. Du, A. K. Behera, **S. Vaikuntanathan**, “Active oscillatory associative memory,” *J. Chem. Phys.* **160**, 055103 (2024).
 - [51] C. Floyd, A. R. Dinner, **S. Vaikuntanathan**, “Pattern formation in odd viscoelastic fluids,” *Phys. Rev. Research* **6**, 033100 (2024).
 - [50] C. F. Gao, **S. Vaikuntanathan***, S. J. Riesenfeld*, “Dissection and integration of bursty transcriptional dynamics for complex systems,” *Proc. Natl. Acad. Sci. USA* **121**, e2306901121 (2024).
 - [49] A. K. Behera, M. Rao, S. Sastry, **S. Vaikuntanathan**, “Enhanced associative memory, classification, and learning with active dynamics,” *Physical Review X* **13**, 041043 (2023).
 - [48] A. Ritchhart, Z. Chen, A. Behera, I. Jeon, K. Chapman, **S. Vaikuntanathan**, J. Anderson, “Cluster-spin-glass magnetic behavior and morphology in the coordination polymer alloys $\text{Fe}_y\text{Co}_{1-y}\text{BTT}$,” *J.*

- [47] B. Cheng, Y. Zhong, Y. Qiu, **S. Vaikuntanathan**, J. Park, “Giant gateable osmotic power generation from a Goldilocks two-dimensional membrane,” *J. Am. Chem. Soc.* **145**, 2952–2960 (2023).
- [46] C. Floyd, A. T. Molines, X. Lei, J. E. Honts, F. Chang, M. W. Elting*, **S. Vaikuntanathan***, A. R. Dinner*, M. S. Bhamla*, “A unified model for the dynamics of ATP-independent ultrafast contraction,” *Proc. Natl. Acad. Sci. USA* **120**, e2217737120 (2023).
- [45] C. Floyd, **S. Vaikuntanathan***, A. R. Dinner*, “Simulating structured fluids with tensorial viscoelasticity,” *J. Chem. Phys.* **158**, 054906 (2023).
- [44] D. Wang, C. Zhou, A. S. Filatov, W. Cho, F. Lagunas, M. Wang, **S. Vaikuntanathan**, C. Liu, R. F. Klie, D. V. Talapin, “Direct synthesis and chemical vapor deposition of 2D carbide and nitride MXenes,” *Science* **379**, 1009–1015 (2023).
- [43] A. Lamtyugina, Y. Qiu, E. Fodor, A. R. Dinner, **S. Vaikuntanathan**, “Thermodynamic control of activity patterns in cytoskeletal networks,” *Phys. Rev. Lett.* **129**, 128002 (2022).
- [42] G. Rassolov, L. Tociu, E. Fodor, **S. Vaikuntanathan**, “From predicting to learning dissipation from pair correlations of active liquids,” *J. Chem. Phys.* **157**, 054901 (2022).
- [41] L. Tociu, G. Rassolov, E. Fodor, **S. Vaikuntanathan**, “Mean-field theory for the structure of strongly interacting active liquids,” *J. Chem. Phys.* **157**, 014902 (2022).
- [40] Y. Qiu, M. Nguyen, G. M. Hocky, A. R. Dinner, **S. Vaikuntanathan**, “A strong nonequilibrium bound for sorting of cross-linkers on growing biopolymers,” *Proc. Natl. Acad. Sci. USA* **118**, e2102881118 (2021).
- [39] A. K. Behera, C. del Junco, **S. Vaikuntanathan**, “Mechanism for the generation of robust circadian oscillations through ultrasensitivity and differential binding affinity,” *J. Phys. Chem. B* **125**, 11179–11187 (2021).
- [38] Z. Liao, **S. Vaikuntanathan**, “Energy rectification in active gyroscopic networks under time-periodic modulations,” *Phys. Rev. E* **104**, 014601 (2021).
- [37] M. Han, M. Fruchart, C. Scheibner, **S. Vaikuntanathan**, J. J. de Pablo, V. Vitelli, “Fluctuating hydrodynamics of chiral active fluids,” *Nature Physics* **17**, 1260–1269 (2021).
- [36] M. Nguyen, Y. Qiu, **S. Vaikuntanathan**, “Organization and self-assembly away from equilibrium: Toward thermodynamic design principles,” *Annual Review of Condensed Matter Physics* **12** (2021).
- [35] D. R. Scheff, K. L. Weirich, K. Dasbiswas, A. Patel, **S. Vaikuntanathan**, M. L. Gardel, “Tuning shape and internal structure of protein droplets via biopolymer filaments,” *Soft Matter* **16**, 5659–5668 (2020).
- [34] E. Fodor, T. Nemoto, **S. Vaikuntanathan**, “Dissipation controls transport and phase transitions in active fluids: Mobility, diffusion and biased ensembles,” *New J. Phys.* **22**, 013052 (2020).
- [33] C. del Junco, **S. Vaikuntanathan**, “Robust oscillations in multi-cyclic models of biochemical clocks,” *J. Chem. Phys.* **152**, 055101 (2020). [Featured Article; JCP Scilight; Emerging Investigators special issue]
- [32] N. B. Ludwig, K. L. Weirich, E. Aster, T. A. Witten, M. L. Gardel, K. Dasbiswas, **S. Vaikuntanathan**, “Nucleation and shape dynamics of model nematic tactoids around adhesive colloids,” *J. Chem. Phys.* **152**, 084901 (2020).
- [31] Z. Liao, W. T. M. Irvine, **S. Vaikuntanathan**, “Rectification of energy and motion in non-equilibrium parity violating metamaterials,” *Physical Review X* **10**, 021036 (2020).
- [30] C. del Junco, **S. Vaikuntanathan**, “High chemical affinity increases the robustness of biochemical oscillations,” *Phys. Rev. E* **101**, 012410 (2020).

- [29] Z. Liao, M. Han, M. Fruchart, V. Vitelli, **S. Vaikuntanathan**, “A mechanism for anomalous transport in chiral active liquids,” *J. Chem. Phys.* **151**, 194108 (2019). [Editor’s Pick; Emerging Investigators special issue]
- [28] V. Kamysbayev[†], V. Srivastava[†], N. B. Ludwig[†], O. J. Borkiewicz, H. Zhang, J. Ilavsky, B. Lee, K. W. Chapman, **S. Vaikuntanathan**, D. V. Talapin, “Nanocrystals in molten salts and ionic liquids: Experimental observation of ionic correlations extending beyond the Debye length,” *ACS Nano* **13**, 5760–5770 (2019).
- [27] K. L. Weirich, K. Dasbiswas, T. A. Witten, **S. Vaikuntanathan**, M. L. Gardel, “Self-organizing motors divide active liquid droplets,” *Proc. Natl. Acad. Sci. USA* **116**, 11125–11130 (2019).
- [26] L. Tociu, E. Fodor, T. Nemoto, **S. Vaikuntanathan**, “How dissipation constrains fluctuations in nonequilibrium liquids: Diffusion, structure, and biased interactions,” *Physical Review X* **9**, 041026 (2019).
- [25] A. Souslov, K. Dasbiswas, M. Fruchart, **S. Vaikuntanathan**, V. Vitelli, “Topological waves in fluids with odd viscosity,” *Phys. Rev. Lett.* **122**, 128001 (2019).
- [24] C. del Junco, **S. Vaikuntanathan**, “Interface height fluctuations and surface tension of driven liquids with time-dependent dynamics,” *J. Chem. Phys.* **150**, 094708 (2019). [Editor’s Pick; AIP Scilight]
- [23] N. B. Ludwig, K. Dasbiswas, D. V. Talapin, **S. Vaikuntanathan**, “Describing screening in dense ionic fluids with a charge-frustrated Ising model,” *J. Chem. Phys.* **149**, 164505 (2018). [JCP Editors’ Choice 2018]
- [22] K. Dasbiswas, K. K. Mandadapu, **S. Vaikuntanathan**, “Topological localization in out-of-equilibrium dissipative systems,” *Proc. Natl. Acad. Sci. USA* **115**, E9031–E9040 (2018).
- [21] C. del Junco, L. Tociu, **S. Vaikuntanathan**, “Energy dissipation and fluctuations in a driven liquid,” *Proc. Natl. Acad. Sci. USA* **115**, 3569–3574 (2018).
- [20] P. Figliozzi, N. Sule, Z. Yan, Y. Bao, S. Burov, S. K. Gray, S. A. Rice, **S. Vaikuntanathan**, N. F. Scherer, “Driven optical matter: Dynamics of electrodynamically coupled nanoparticles in an optical ring vortex,” *Phys. Rev. E* **95**, 022604 (2017).
- [19] K. L. Weirich, S. Banerjee, K. Dasbiswas, T. A. Witten, **S. Vaikuntanathan**, M. L. Gardel, “Liquid behavior of cross-linked actin bundles,” *Proc. Natl. Acad. Sci. USA* **114**, 2131–2136 (2017).
- [18] G. C. Sosso, S. Caravati, G. Rotskoff, **S. Vaikuntanathan**, A. Hassanali, “On the role of nonspherical cavities in short length-scale density fluctuations in water,” *J. Phys. Chem. A* **121**, 370–380 (2017).
- [17] A. Murugan, **S. Vaikuntanathan**, “Topologically protected modes in non-equilibrium stochastic systems,” *Nature Communications* **8**, 13881 (2017).
- [16] H. Zhang, K. Dasbiswas, N. B. Ludwig, G. Han, B. Lee, **S. Vaikuntanathan**, D. V. Talapin, “Stable colloids in molten inorganic salts,” *Nature* **542**, 328–331 (2017). [Commentary in C&EN]
- [15] M. Nguyen, **S. Vaikuntanathan**, “Design principles for nonequilibrium self-assembly,” *Proc. Natl. Acad. Sci. USA* **113**, 14231–14236 (2016). [Commentary in Nature Materials]
- [14] A. Murugan, **S. Vaikuntanathan**, “Biological implications of dynamical phases in non-equilibrium networks,” *J. Stat. Phys.* **162**, 1183–1202 (2016).
- [13] S. Katira[†], K. K. Mandadapu[†], **S. Vaikuntanathan**[†], B. Smit, D. Chandler, “Pre-transition effects mediate forces of assembly between transmembrane proteins,” *eLife* **5**, e13150 (2016).
- [12] **S. Vaikuntanathan**^{*}, G. M. Rotskoff, A. Hudson, P. L. Geissler, “Necessity of capillary modes in a minimal model of nanoscale hydrophobic solvation,” *Proc. Natl. Acad. Sci. USA* **113**, E2224–E2230 (2016). [Commentary in PNAS]

Publications as a graduate student and postdoctoral researcher (2008 – 2014)

- [11] T. R. Gingrich, G. M. Rotskoff, **S. Vaikuntanathan**, P. L. Geissler, “Efficiency and large deviations in time-asymmetric stochastic heat engines,” *New J. Phys.* **16**, 102003 (2014). [NJP Highlight of 2014]
- [10] T. R. Gingrich, **S. Vaikuntanathan**, P. L. Geissler, “Heterogeneity-induced large deviations in activity and (in some cases) entropy production,” *Phys. Rev. E* **90**, 042123 (2014).
- [9] **S. Vaikuntanathan**, T. R. Gingrich, P. L. Geissler, “Dynamic phase transitions in simple driven kinetic networks,” *Phys. Rev. E* **89**, 062108 (2014).
- [8] **S. Vaikuntanathan**, P. L. Geissler, “Putting water on a lattice: The importance of long wavelength density fluctuations in theories of hydrophobic and interfacial phenomena,” *Phys. Rev. Lett.* **112**, 020603 (2014). [Commentary in PNAS]
- [7] **S. Vaikuntanathan**, P. R. Shaffer, P. L. Geissler, “Adsorption of solutes at liquid–vapor interfaces: Insights from lattice gas models,” *Faraday Discuss.* **160**, 63–74 (2012).
- [6] **S. Vaikuntanathan**, C. Jarzynski, “Modeling Maxwell’s demon with a microcanonical Szilard engine,” *Phys. Rev. E* **83**, 061120 (2011).
- [5] **S. Vaikuntanathan**, C. Jarzynski, “Escorted free energy simulations,” *J. Chem. Phys.* **134**, 054107 (2011).
- [4] D. D. L. Minh, **S. Vaikuntanathan**, “Density-dependent analysis of nonequilibrium paths improves free energy estimates II. A Feynman–Kac formalism,” *J. Chem. Phys.* **134**, 034117 (2011).
- [3] J. M. Horowitz, **S. Vaikuntanathan**, “Nonequilibrium detailed fluctuation theorem for repeated discrete feedback,” *Phys. Rev. E* **82**, 061120 (2010).
- [2] **S. Vaikuntanathan**, C. Jarzynski, “Dissipation and lag in irreversible processes,” *EPL* **87**, 60005 (2009).
- [1] **S. Vaikuntanathan**, C. Jarzynski, “Escorted free energy simulations: Improving convergence by reducing dissipation,” *Phys. Rev. Lett.* **100**, 190601 (2008).

Research Group and Mentoring

Current postdoctoral scholars

Carlos Floyd (CCTCh Fellow; Assistant Professor, Carnegie Mellon University, from January 2027), Matthew Du (JFI Director’s Fellow), Jordan Shivers (Schmidt AI Fellow; Kadanoff–Rice Fellow), Vidyesh Rao, Hector Lopez Rios (MRSEC Director’s Fellow), Aditya Singh (CCTCh Fellow), Billie Meadowcroft (Kadanoff–Rice Fellow).

Current graduate students

Lissa Rennert, Daiki Goto, Kristina Trifonova (NSF GRFP), Disha Sanwal.

Former postdoctoral scholars

Kinjal Dasbiswas (Assistant Professor, Physics, UC Merced); Yuqing Qiu (joint with A. Dinner; now faculty, Physics, University of Tennessee); Aditya Nandy (Assistant Professor, Chemical & Biomolecular Engineering, UCLA); Deb Sankar Banerjee (faculty, S. N. Bose National Centre for Basic Sciences, Kolkata).

Former graduate students

Frank Gao (Dimension VC); Alexandra Lamtyugina (NSF GRFP); Agnish Behera (Flatiron Institute); Gregory Rassolov; Michael Nguyen (NSF GRFP); Laura Tociu; Clara del Junco (NSERC Fellow; postdoc, Knowledge Lab, UChicago); Zhenghan Liao (postdoc, NYU); Nicholas Ludwig (Mod9 Technologies).

Undergraduate and high-school students

Jerri Beiter (REU, Summer 2018), Daniel Schwartz (REU, Summer 2019); Jacob Shkrob (UChicago Summer Link, 2017), Emma Mueller (UChicago Summer Link, 2016).

Professional Service

- Member of the editorial board, *Journal of Chemical Theory and Computation*.
- Organizer, conference on “Self-assembly and organization far from equilibrium,” June 2023.
- Organizer, Telluride School on Theoretical Chemistry, July 2019; lecturer (Statistical Mechanics), July 2017.
- Lecturer, ICTS Winter School, Bengaluru, India, December 2016.
- Co-organizer, workshop on “Large Deviation Theory in Principle and Practice,” Princeton University, November 2015.
- Reviewer (panel and ad hoc): NSF; DOE Basic Energy Sciences.
- Peer reviewer: Nature Physics, Nature Communications, JACS, PNAS, Physical Review Letters, Physical Review X, Physical Review E, Journal of Chemical Physics, Journal of Physical Chemistry B, Journal of Statistical Physics, New Journal of Physics.

University of Chicago Service

- Chemistry Department Chair search, 2026.
- Chemistry Graduate Student Recruitment Committee, 2014–2016; chair 2021, 2022.
- Chemistry Graduate Admissions Committee, 2021.
- Teaching Matters Committee, 2021, 2022.
- Committee to select MRSEC Director, 2021.
- Chemistry Symposium Committee, 2016–2021.
- Chemistry Candidacy Committee, 2018–2019.
- Committee to select JFI Director, 2018.

Invited Lectures

Over 50 invited talks since 2014, including departmental colloquia and seminars (Harvard, Stanford, Caltech, MIT, Columbia, Cornell, Penn, Johns Hopkins, Rice, Washington University, Northwestern), invited talks at the APS March Meeting (2021, 2023), Gordon Research Conferences, and workshops at KITP, the Lorentz Center, BIRS, MPI-PKS Dresden, ICTS Bengaluru, and Telluride; Hirschfelder Distinguished Visitor lectures, University of Wisconsin–Madison (2026).