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Curriculum Vitae
Corey S. O'Hern

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Citizenship: USA

Positions Held

2011 – present Associate Professor with Tenure, Departments of Mechanical Engineering & Materials Science, Applied Physics, and Physics, Yale University
2006 – 2011 Associate Professor on Term, Department of Mechanical Engineering & Materials Science and Department of Physics, Yale University
2002 – 2006 Assistant Professor, Department of Mechanical Engineering & Materials Science and Department of Physics, Yale University
1999 – 2002 Postdoctoral Research Associate, Department of Physics, James Franck Institute, University of Chicago
1999 – 2002 Postdoctoral Research Associate, Department of Chemistry & Biochemistry, University of California, Los Angeles

Education

1999 Ph.D., University of Pennsylvania (Physics)
 Thesis: “Elasticity Theories for Cationic Lipid and DNA Complexes”
 Thesis advisor: Professor Tom Lubensky
1994 B.S., Duke University (Physics)
 Thesis: “Characteristic Length and Time Scales for Nonequilibrium Systems”
 Thesis advisors: Professors Bob Behringer and Henry Greenside

Research Interests

Protein structure, interactions, and design

Active materials: cell differentiation, packing, tissue formation, crowding and anomalous diffusion in cells.

Computational biology and bioinformatics: ODE modeling and prediction of host response to infectious disease.

Granular materials: shear flows, random close packing, random loose packing, force chains.

Statistical mechanics of nonequilibrium systems

Glass and Jamming Transitions: slow dynamics and collective motions in amorphous materials, glass-forming ability and mechanical properties of bulk metallic glasses.

Awards and Honors

- 2015 APS Outstanding Referee
- 2011 APS-IUSSTF Professorship Award in Physics
- 2008-2012 NSF Cyber-Enabled Discovery and Innovation Award
- 2005-2010 NSF Faculty Early Career Development Award
- 2002 Finalist, University of California Chancellor's Award for Postdoctoral Research
- 1999 Granted National Research Council Postdoctoral Research Associateship at the Center for Bio/Molecular Science and Engineering, Naval Research Laboratory, Washington, DC (declined)
- 1994 Graduated *summa cum laude* and with highest distinction in physics from Duke University
- 1994 Inducted into *Phi Beta Kappa*, Duke University

Journal Articles

1. J. Ketkaew, H. Wang, W. Chen, G. Pereira, Z. Liu, W. Dmowski, C. S. O'Hern, T. Egami, and J. Schroers, "Embrittlement of metallic glasses," submitted to *Nature Materials* (2017).
2. J. Barés, D. Wang, R. P. Behringer, T. Bertrand, D. Wang, and C. S. O'Hern, "Local and global avalanches in a 2D sheared granular medium," submitted to *Phys. Rev. E* (2017).
3. J. C. Gaines, A. Virrueta, D. A. Buch, C. S. O'Hern, and L. Regan, "Collective repacking reveals that the structures of protein cores are uniquely specified by steric interactions," to appear in *Protein Eng. Des. Sel.* (2017).
4. J. C. Gaines, A. H. Clark, L. Regan, and C. S. O'Hern, "Packing in protein cores," submitted to *J. Phys. Condens. Matter* (2017); xxx.lanl.gov/abs/1701.04384
5. K. Zhang, C.-C. Kuo, C. S. O'Hern, and M. Dennin, "Stable small particle clusters in two-dimensional foams," submitted to *Soft Matter* (2016).
6. Y. Yang, C. S. O'Hern, L. Huang, Y. Shi, "Atomic wear is shear-facilitated, athermally-activated, and re-depositable," submitted to *Phys. Rev. Lett.* (2016).
7. C. S. O'Hern, "Signs of a Gardner transition in a granular glass," *Physics* **9** (2016) 133.
8. A H. Clark, N. T. Ouellette, M. D. Shattuck, C. S. O'Hern, "The role of grain dynamics in determining the onset of sediment transport," to appear in *Phys. Rev. Fluids* (2017); xxx.lanl.gov/abs/1602.07571
9. D. Caballero, A. Virrueta, C. S. O'Hern, and L. Regan, "Steric interactions determine side chain conformations in protein cores," *Protein Eng. Des. Sel.* **29** (2016) 367.
10. M. Fan, M. Wang, K. Zhang, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "The effects of cooling rate on particle rearrangement statistics: Rapidly cooled glasses are more ductile and less reversible," *Phys. Rev. E* **95** (2017) 022611; xxx.lanl.gov/abs/1607.04221

11. M. Mai, M. D. Shattuck, and C. S. O'Hern, "Reconstruction of ordinary differential equations from time series data," submitted to *PLOS One* (2017); xxx.lanl.gov/abs/1605.05420
12. T. Bertrand, R. P. Behringer, B. Chakraborty, C. S. O'Hern, and M. D. Shattuck, "Protocol dependence of the jamming transition," *Phys. Rev. E* **93** (2016) 012901; xxx.lanl.gov/abs/1506.05041
13. D. B. Noble, S. G. J. Mochrie, C. S. O'Hern, T. D. Pollard, and L. J. Regan, "Promoting convergence: The Integrated Graduate Program in Physical and Engineering Biology at Yale University, A new paradigm for graduate education," *Biochem. and Mol. Biol. Education* **44** (2016) 537.
14. A. Virrueta, C. S. O'Hern, and L. Regan, "Understanding the physical basis for the side chain conformational preferences of methionine," *Proteins: Structure, Function, and Bioinformatics* **84** (2016) 900.
15. J. Gaines, W. W. Smith, L. Regan, and C. S. O'Hern, "Random close packing in protein cores," *Phys. Rev. E* **93** (2016) 032415; xxx.lanl.gov/abs/1510.04306
16. K. Zhang, M. Fan, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "Beyond packing of hard spheres: The effects of core softness, non-additivity, intermediate-range repulsion, and many-body interactions on the glass-forming ability of bulk metallic glasses," *J. Chem. Phys.* **143** (2015) 184502; xxx.lanl.gov/abs/1509.04731
17. K. Wang, S. Langevin, C. S. O'Hern, M. D. Shattuck, R. Slayden, M. Katze, and M. Kirby, "Anomaly detection in host signaling pathways for the early prognosis of acute infection," *PloS ONE* **11** (2016) e0160919.
18. Y. Rokhlenko, M. Gopinadhan, C. O. Osuji, K. Zhang, C. S. O'Hern, S. R. Larson, P. Gopalan, P. W. Majewski, and K. G. Yager, "Magnetic alignment of block copolymer microdomains by intrinsic chain anisotropy" *Phys. Rev. Lett.* **115** (2015) 258302.
19. K. Zhang, B. Dice, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "On the origin of multi-component bulk metallic glasses: Atomic size mismatches and demixing" *J. Chem. Phys.* **143** (2015) 054501; xxx.lanl.gov/abs/1505.06771
20. A. H. Clark, M. D. Shattuck, N. T. Ouellette, and C. S. O'Hern, "Onset and cessation of motion in hydrodynamically sheared granular beds," *Phys. Rev. E* **92** (2015) 042202; xxx.lanl.gov/abs/1504.03403
21. L. Regan, D. Caballero, M. R. Hinrichsen, A. Virrueta, D. M. Williams, and C. S. O'Hern, "Protein Design: Past, Present, and Future," *Biopolymers: Peptide Science* **104** (2015) 334.
22. K. Zhang, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "The glass-forming ability of model metal-metalloid alloys," *J. Chem. Phys.* **142** (2015) 104504; xxx.lanl.gov/abs/1412.0766
23. D. Caballero, W. W. Smith, C. S. O'Hern, and L. Regan, "Equilibrium transitions between side chain conformations in Leu and Ile," *Proteins: Structure, Function, and Bioinformatics* **83** (2015) 1488.

24. M. Wang, K. Zhang, Z. Li, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "Asymmetric crystallization during cooling and heating in model glass-forming systems," *Phys. Rev. E* **91** (2015) 032309; xxx.lanl.gov/abs/1501.02186
25. M. Mai, K. Wang, G. Huber, M. Kirby, M. D. Shattuck, and C. S. O'Hern, "Outcome prediction in mathematical models of immune response to infection," *PloS ONE* **10** (2015) e0135861; xxx.lanl.gov/abs/1503.08324
26. Z. Shao, Z. Liu, J. P. Singer, H. Li, Y. Liu, M. Gopinadhan, C. S. O'Hern, C. O. Osuji, and J. Schroers, "Shear accelerated crystallization in a supercooled atomic liquid," *Phys. Rev. E* **91** (2014) 020301(R); xxx.lanl.gov/abs/1407.2078
27. P. Pal, J. Blawdziewicz, and C. S. O'Hern, "Quasi-one dimensional models for glassy dynamics," submitted to *Phys. Rev. E* (2014); xxx.lanl.gov/abs/1401.0960
28. A. Q. Zhou, C. S. O'Hern, and L. Regan, "Predicting the side-chain dihedral angle distributions of non-polar, aromatic, and polar amino acids using hard-sphere models," *Proteins: Structure, Function, and Bioinformatics* **82** (2014) 2574.
29. K. Wang, V. Bhandari, C. S. O'Hern, M. D. Shattuck, and M. Kirby, "Angiopoietin-1, Angiopoietin-2, and Bicarbonate as diagnostic biomarkers in children with severe sepsis," *PloS One* **9** (2014) e108461.
30. C. F. Schreck, C. S. O'Hern, and M. D. Shattuck, "Vibrations of jammed disk packings with Hertzian interactions," *Granular Matter* **16** (2014) 209; xxx.lanl.gov/abs/1309.0798
31. K. Zhang, W. W. Smith, M. Wang, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "Connection between the packing efficiency of binary hard spheres and the glass-forming ability of bulk metallic glasses" *Phys. Rev. E* **90** (2014) 032311; xxx.lanl.gov/abs/1404.0465
32. T. Shen, S. Papanikolaou, C. S. O'Hern, and M. D. Shattuck, "The statistics of frictional families," *Phys. Rev. Lett.* **113** (2014) 128302; xxx.lanl.gov/abs/1402.0774
33. W. W. Smith, P.-Y. Ho, and C. S. O'Hern, "Calibrated Langevin dynamics simulations of intrinsically disordered proteins," *Phys. Rev. E* **90** (2014) 042709; xxx.lanl.gov/abs/1401.0960
34. D. Caballero, J. Määttä, A. Q. Zhou, M. Sammalkorpi, C. S. O'Hern, and L. Regan, "Intrinsic α -helix and β -sheet propensities: A computational case study of Ala," *Protein Science* **23** (2014) 970.
35. T. Bertrand, C. F. Schreck, C. S. O'Hern, and M. D. Shattuck, "Hypo-coordinated solids in particulate media," *Phys. Rev. E* **89** (2014) 062203; xxx.lanl.gov/abs/1307.0440
36. N. Geerts, C. F. Schreck, P. A. Beales, C. S. O'Hern, and T. K. Vanderlick, "Using DNA-driven assembled phospholipid nanodiscs as a scaffold for gold nanoparticle patterning," *Langmuir* **29** (2013) 13089.
37. B. R. Parry, I. V. Surovtsev, M. T. Cabeen, C. S. O'Hern, E. R. Dufresne, and C. Jacobs-Wagner, "Cellular metabolism fluidizes the glass-like cytoplasm of bacteria," *Cell* **156** (2013) 183.

38. K. Zhang, M. Wang, S. Papanikolaou, Y. Liu, J. Schroers, M. D. Shattuck, and C. S. O'Hern, "Computational studies of the glass-forming ability of model bulk metallic glasses," *J. Chem. Phys.* **139** (2013) 124503; xxx.lanl.gov/abs/1305.0971
39. K. Wang, V. Bhandari, S. Chepustanova, G. Huber, S. O'Hara, C. S. O'Hern, M. D. Shattuck, and M. Kirby, "Which biomarkers reveal neonatal sepsis," *PloS One* **8** (2013) e82700.
40. C. S. O'Hern and M. D. Shattuck, "Highly evolved grains," *Nature Materials* **12** (2013) 287.
41. S. O'Hara, K. Wang, G. Huber, C. S. O'Hern, M. D. Shattuck, R. A. Slayden, A. Schenkel, and M. Kirby, "Iterative feature removal yields highly discriminative pathways and supports biological discovery," *BMC Genomics* **14** (2013) 832.
42. C. F. Schreck, R. S. Hoy, C. S. O'Hern, and M. D. Shattuck, "Particle-scale reversibility in athermal particulate media below jamming," *Phys. Rev. E* **88** (2013) 052205; xxx.lanl.gov/abs/1301.7492
43. Z. Shao, M. Gopinadhan, G. Kumar, S. Mukherjee, Y. Liu, C. S. O'Hern, J. Schroers, and C. Osuji, "Size-dependent viscosity in the supercooled liquid state of a bulk metallic glass," *App. Phys. Lett.* **102** (2013) 221901.
44. A. Q. Zhou, D. Caballero, C. S. O'Hern, and L. Regan, "New insights into the interdependence between amino acid stereochemistry and protein structure," *Biophys. J.* **105** (2013) 2403.
45. R. S. Hoy, J. Harwayne-Gidansky, and C. S. O'Hern, "Minimal energy packings of nearly flexible polymers," *J. Chem. Phys.* **138** (2013) 054905; xxx.lanl.gov/abs/1210.3712
46. S. Papanikolaou, C. S. O'Hern, and M. D. Shattuck, "Isostaticity at frictional jamming," *Phys. Rev. Lett.* **110** (2013) 198002; xxx.lanl.gov/abs/1207.6010
47. W. W. Smith, C. F. Schreck, N. Hashem, S. Soltani, A. Nath, E. Rhoades, and C. S. O'Hern, "Molecular simulations of the fluctuating conformational dynamics of intrinsically disordered proteins," *Phys. Rev. E* **86** (2012) 041910; xxx.lanl.gov/abs/1208.2636
48. W. Mutoru, W. Smith, C. S. O'Hern, and A. Firoozabadi, "Molecular dynamics simulations of diffusion and clustering along critical isotherms of medium-chain n-alkanes," *J. Chem. Phys.* **138** (2013) 024317.
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53. A. Q. Zhou, C. S. O'Hern, and L. Regan, "The power of hard-sphere models: Explaining side-chain dihedral angle distributions of Thr and Val," *Biophys. J.* **102** (2012) 2345.
54. T. Shen, C. S. O'Hern, and M. D. Shattuck, "Contact percolation transition in athermal particulate systems," *Phys. Rev. E* **85** (2012) 011308; xxx.lanl.gov/abs/1110.0527
55. L. Kondic, A. Goulet, C. S. O'Hern, M. Kramar, K. Mischaikow, and R. P. Behringer, "Topology of force networks in compressed granular media," *Europhys. Lett.* **97** (2012) 54001.
56. L. Kondic, X. Fang, W. Losert, C. S. O'Hern, and R. P. Behringer, "Microstructure evolution during impact on granular matter," *Phys. Rev. E* **85** (2012) 011305.
57. S. F. Liew, J. Yang, H. Noh, C. F. Schreck, E. R. Dufresne, C. S. O'Hern, and H. Cao, "Photonic band gap in 3D network structures with short-range order," *Phys. Rev. A* **84** (2011) 063818; xxx.lanl.gov/abs/1108.1090
58. R. S. Hoy and C. S. O'Hern, "Glassy dynamics of crystallite formation: The role of covalent bonds," *Soft Matter* **8** (2012) 1215; xxx.lanl.gov/abs/1104.4515
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60. A. Nath, M. Sammalkorpi, D. C. DeWitt, A. J. Trexler, S. Elbaum-Garfinkle, C. S. O'Hern, and E. Rhoades, "The conformational ensembles of α -synuclein and tau: Combining single-molecule FRET and simulations," *Biophys. J.* **103** (2012) 1940.
61. J. D. Forster, J.-Gyu Park, M. Mittal, H. Noh, C. F. Schreck, C. S. O'Hern, H. Cao, E. M. Furst, and E. R. Dufresne, "Assembly of optical scale dumbbells into dense photonic crystals," *ACS Nano* **5** (2011) 6695.
62. S. F. Liew, J. Forster, H. Noh, C. F. Schreck, V. Saranathan, X. Lu, L. Yang, C. S. O'Hern, E. R. Dufresne, and H. Cao, "Short-range order and near-field effects on optical scattering and structural coloration," *Optics Express* **19** (2011) 8208.
63. C. F. Schreck, T. Bertrand, C. S. O'Hern, and M. D. Shattuck, "Repulsive contact interactions make jammed particulate systems inherently nonharmonic," *Phys. Rev. Lett.* **107** (2011) 078301; xxx.lanl.gov/abs/1012.0369
64. C. F. Schreck, C. S. O'Hern, and L. E. Silbert, "Tuning frictionless disk packings from isostatic to hyperstatic," *Phys. Rev. E* **84** (2011) 011305; xxx.lanl.gov/abs/1007.2162
65. J.-K. Yang, C. F. Schreck, H. Noh, S.-F. Liew, C. S. O'Hern, and H. Cao, "Photonic band gap effects in two-dimensional polycrystalline and amorphous structures," *Phys. Rev. A* **82** (2010) 053838; xxx.lanl.gov/abs/1008.4804
66. R. S. Hoy and C. S. O'Hern, "Minimal energy packings and collapse of sticky tangent hard-sphere polymers," *Phys. Rev. Lett.* **105** (2010) 068001; xxx.lanl.gov/abs/1003.6763

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100. R. D. Kamien, T. C. Lubensky, C. S. O'Hern, and P. Nelson, "Direct determination of DNA twist-stretch coupling," *Europhys. Lett.* **38** (1997) 237.
101. C. S. O'Hern, D. A. Egolf, and H. S. Greenside, "Lyapunov spectral analysis of a nonequilibrium Ising-like transition," *Phys. Rev. E* **53** (1996) 3374.
102. Brian Miller, C. O'Hern, and R. P. Behringer, "Stress fluctuations for continuously sheared granular materials," *Phys. Rev. Lett.* **77** (1996) 3110.

Conference Proceedings

1. G. Lois, J. Blawdziewicz, and C. S. O'Hern, "Jamming in attractive granular media", *Proceedings in Applied Mathematics and Mechanics* **7** (2007) 1090605.
2. L. Kondic, C. S. O'Hern, and R. P. Behringer, "Dense Granular Systems: From Theory to Applications", *SIAM News* **40** (2007) 13.
3. G.-J. Gao, J. Blawdziewicz, and C. S. O'Hern, "Testing the equal-probability assumption for jammed particle packings," *Reports of the Institute of Fluid Science, Tohoku University* **19** (2007) 23.
4. N. Xu and C. S. O'Hern, "Effective temperatures in repulsive glasses sheared at fixed normal load," *Powders and Grains*, eds. R. Garcia-Rojo, H. J. Hermann, and S. McNamara, (A. A. Balkema, Leiden, 2005).
5. C. S. O'Hern, S. A. Langer, A. J. Liu, and S. R. Nagel, "Jamming in liquids and granular materials," *Materials Research Society Proceedings, The Granular State*, **627** (2000).
6. C. S. O'Hern, R. D. Kamien, T. C. Lubensky, and P. Nelson, "Twist-stretch elasticity of DNA," *Materials Research Society Proceedings, Statistical Mechanics in Physics and Biology*, **463** (1997).

Book Chapters

1. A. H. Clark, A. Petersen, L. Kondic, C. S. O'Hern, and R. P. Behringer, "Granular Impact: A Grain-scale Approach", in *Rapid Penetration into Granular Media: Visualizing the Fundamental Physics of Rapid Earth Penetration*, ed. by M. G. Iskander (Elsevier, Waltham, MA, 2015).
<http://store.elsevier.com/Rapid-Penetration-into-Granular-Media/Magued-Iskander/isbn-9780128008683/>
2. C. S. O'Hern, "Computational Methods" and "Static Packings", in *Handbook of Granular Materials*, ed. by M. D. Shattuck and S. F. Franklin (CRC Press, New York, 2015).
<https://www.crcpress.com/Handbook-of-Granular-Materials/Franklin-Shattuck/9781466509962>

3. C. F. Schreck and C. S. O'Hern, "Computational Methods to Study Jammed Systems", in *Experimental and Computational Techniques in Soft Condensed Matter Physics*, ed. by J. S. Olafsen (Cambridge University Press, New York, 2009).
<http://www.cambridge.org/us/catalogue/catalogue.asp?isbn=9780521115902>

Recent Invited Presentations (78 since 2002)

- **Invited Speaker**, Workshop "Jam Packed: Packing and jamming of particulate systems," Beijing, China (August 28 - September 1, 2016).
- **Invited Participant**, KITPC Program on "Morphogenesis and cell mechanics: Bridging the scales from molecular biology to tissue development," Beijing, China (August 15-21, 2016).
- **Invited Participant**, KITPC Program on "Nonequilibrium processes at the nanoscale," Beijing, China (August 1-14, 2016).
- **Invited Speaker**, International Workshop on Jamming and Granular Matter, Queen Mary University of London, United Kingdom (July 13-15, 2016).
- **Invited Speaker**, Euromech Colloquium 580 on "Strongly Nonlinear Dynamics and Acoustics of Granular Metamaterials," French Institute for Research in Computer Science and Automation (INRIA), Grenoble, France (July 11-13, 2016).
- **Invited Lecturer**, UMass Summer School: Soft Solids & Complex Fluids, University of Massachusetts, Amherst, MA (May 29 - June 2, 2016).
- **Invited Speaker**, Workshop of Topology: Identifying Order in Complex Systems, University of Pennsylvania, Philadelphia, PA (April 9, 2016).
- **Invited Speaker**, American Physical Society March Meeting, Invited Session on the Physics of Proteins, Baltimore, MD (March 2016).
- **Invited Participant**, NSF Workshop on "Grand Challenges in Soft-Condensed Matter Experiment," Arlington, Virginia (January 30-31, 2016).
- **Invited Participant**, KITPC Program for "Controlled structural formation of soft matter," Beijing, China (August 3-28, 2015).
- **Invited Speaker**, Annual Meeting of the International Physics of Living Systems Network, Arlington, Virginia (July 17-20, 2015).
- **Invited Speaker**, Wesleyan Summer Lecture Series, Wesleyan University (June 11, 2015).
- **Invited Speaker**, *13th New England Granular Materials Workshop*, Clark University (June 12, 2015).
- **Invited Participant**, KITP Follow-on Program for "Avalanches, Intermittency, and Nonlinear Response in Far-from-equilibrium Solids," Santa Barbara, CA (May 18-29, 2015).
- **Invited Speaker**, Workshop on Amorphous Solids, International Center for Science, Cuernavaca, Mexico (February 8-14, 2015).

- **Invited Speaker**, Workshop “Unifying concepts in glass physics VI,” Aspen, Colorado (February 1-6, 2015).
- **Invited Speaker**, Brown Bag Lunch Talk, KITP Program on “Avalanches, Intermittency, and Nonlinear Response in Far-from-equilibrium Solids,” Santa Barbara, CA (October 13, 2014).
- **Invited Speaker**, Workshop “Jam Packed: Packing and jamming of particulate systems,” Erlangen, Germany (September 15-18, 2014).
- **Invited Lecturer**, Pan-American Study Institute on “Frontiers in Particulate Media: From Fundamentals to Applications,” La Plata, Argentina (August 11-22, 2014).
- **Discussion Leader**, Gordon Research Conference on “Granular & Granular-Fluid Flow” Easton, MA (July 20-25, 2014).
- **Invited Speaker**, Workshop on “Modeling granular media across scales,” Montpellier, France (July 9-11, 2014).
- **Invited Speaker**, Graduate Students’ Lunch with the Experts, “Granular materials as materials,” American Physical Society March Meeting, Denver, CO (March 20, 2014).
- **Invited Speaker**, Gordon Research Conference on “Colloidal, Macromolecular, & Polyelectrolyte Solutions,” Ventura, CA (February 16-21, 2014).
- **Invited Speaker**, Workshop on the “Mechanics of Particulates,” New York University, Polytechnic Engineering School (February 12, 2014).
- **Invited Speaker**, Yale-Weizmann Encounter in the Biological, Physical, and Engineering Sciences, Weizmann Institute of Science, Rehovot, Israel (January 7-8, 2014).
- **Invited Speaker**, Mini-conference on “Dynamic Triggering and Earthquake Hazard Workshop,” Department of Geosciences, Pennsylvania State University (November 19-20, 2013).
- **Invited Speaker**, “Turbulence and Amorphous Materials,” Eilat, Israel (November 8-15, 2013).
- **Invited Participant**, National Academies’ Committee on Key Challenge Areas for Convergence and Health Conference on “Convergence in the Life Sciences,” Washington, DC (September 16-17, 2013).
- **Invited Speaker**, 12th International Conference on Complex Acute Illness, Budapest, Hungary (August 8-11, 2013).
- **Invited Speaker**, Workshop on the “Physics of glassy and granular materials,” Yukawa Institute for Theoretical Physics, Kyoto, Japan (July 16-19, 2013).
- **Invited Speaker**, American Physical Society March Meeting, Invited Session on Jamming and Rheology of Disordered Systems, Baltimore, MD (March 2013).
- **Invited Speaker**, 2nd Biophysics and Structural Biology Symposium, Yale University (November 2, 2012).

- **Invited Speaker**, Mini-symposium on “Comparison of plasticity and intermittency in crystalline and amorphous solids,” 22nd Annual International Workshop on the Mechanics of Materials, Baltimore, MD (September 24-26, 2012).
- **Invited Speaker**, Symposium on “Dynamics and Jamming in Complex Environments,” American Chemical Society National Meeting, Philadelphia, PA (August 19-23, 2012).
- **Invited Discussion Leader**, 2012 Gordon Research Conference on Granular & Granular-Fluid Flow, Davidson, NC (July 22-27, 2012).
- **Invited Speaker**, James A. Krumhansl Symposium on Unifying Concepts in Materials, Bangalore, India (February 6-8, 2012).
- **Invited Speaker**, Workshop on “Complex Dynamics of Dislocations, Defects, and Interfaces,” Center for Nonlinear Studies, Los Alamos, NM (November 14-16, 2011).
- **Invited Speaker**, DARPA Dialysis Like Therapeutics Program Kickoff Meeting, San Diego, CA (October 18-19, 2011).
- **Invited Speaker**, Conference on “Sphere packing and amorphous materials,” Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (July 25-29, 2011).
- **Invited Lecturer**, Center for Scientific Computation and Mathematical Modeling Summer School on “Granular Flows—From Simulations to Astrophysical Applications,” University of Maryland (June 14-15, 2011).
- **Invited Speaker**, Workshop on “Large fluctuations and collective phenomena in disordered materials,” Institute for Condensed Matter Theory, University of Illinois at Urbana-Champaign (May 17-19, 2011).
- **Invited Speaker**, Dynamics Days, Chapel Hill, NC (January 5-8, 2011).
- **Invited Speaker**, Recent Progress in the Physics of Dissipative Particles, Yukawa Institute of Theoretical Physics, Kyoto University (November 24-26, 2010).
- **Invited Speaker**, New England Workshop on Mechanics of Materials and Structures, Harvard University (September 25, 2010).
- **Invited Speaker**, Particulate Materials in Extreme Environments, Lawrence Livermore National Laboratory (September 22, 2010).
- **Invited Speaker**, Conference on “Particulate Matter: Does Dimension Matter?,” Max Planck Institute for the Physics of Complex Systems, (May 31-June 4, 2010).
- **Invited Speaker**, Mini-symposium on “Mesoscopic Self Assembly,” SIAM Conference on Mathematical Aspects of Materials Science, (May 23-26, 2010).
- **Invited Speaker**, Special Session, “Topological and Computational Dynamics,” American Mathematical Society Eastern Section Meeting, (May 22-23, 2010).
- **Invited Speaker**, Special Session, “Dense Packings of Non-spherical Particles,” 25th annual Shanks Conference, “Optimal Configurations on the Sphere and Other Manifolds,” (May 17-20, 2010).

- **Invited Participant**, Kavli Institute for Theoretical Physics Program on The Physics of Glasses, (May 2010).
- **Invited Speaker**, TCG-XI Penetration Meeting, Defense Threat Reduction Agency, Picatinny Arsenal (April 8, 2010).
- **Invited Speaker**, DARPA Workshop on Granular Science, (February 17-18, 2010).
- **Invited Speaker**, Special Session, “Gels, Glasses, and Jammed Systems,” 81st Annual Meeting of the Society of Rheology (October 2009).
- **Invited Speaker**, Minisymposium, “Force chain fluctuations and jamming in dense granular flows,” 7th EUROMECH Solid Mechanics Conference, (September 2009).
- **Invited Speaker**, Symposium on Defects and Microstructure at the Nanoscale and Beyond, 10th US National Congress on Computational Mechanics (July 2009).
- **Invited Speaker**, Workshop on the Statistical Mechanics of Static Granular Media, Lorentz Center, Leiden University (July 2009).
- Symposium on Local Structure and Dynamics in Amorphous Systems, 2008 Materials Research Society Fall Meeting (December 2008).
- **Invited Speaker**, Complex Fluids Symposium, 45th Annual Meeting, Society of Engineering Science, University of Illinois at Urbana- Champaign (October 2008).
- **Invited Speaker**, Workshop on Dynamical Heterogeneities in Glasses, Colloids, and Granular Media, Lorentz Center, Leiden University (August 2008).
- **Invited Participant**, Aspen Center for Physics Summer Program on Complexity, Disorder, and Algorithms (June 2008).
- **Invited Speaker**, Workshop on Crystallization and Jamming in Soft Matter under Driving, Lorentz Center, Leiden University (February 2008).
- **Invited Speaker**, Society for Industrial and Applied Mathematics Conference on Mathematics for Industry: Challenges and Frontiers, Philadelphia, PA (October 2007).
- **Invited Participant**, Aspen Center for Physics Summer Program on Jamming (July 2007).
- **Invited Speaker**, 6th International Congress on Industrial and Applied Mathematics, ETH, Zurich (July 2007).
- **Invited Speaker**, 4th International Workshop in Complex Systems, Tohoku University, Sendai, Japan (January 2007).
- **Invited Speaker**, 8th Greater Boston Area Statistical Mechanics Meeting, Brandeis University (October 2006).
- **Invited Speaker**, Gordon Research Conference on Granular Flow, Queen’s College, Oxford, England (July 2006).
- **Invited Speaker**, mini-symposium on “The mechanics of new materials for everyday life,” 15th US National Conference on Theoretical and Applied Mechanics, University of Colorado-Boulder (June 2006).

- **Invited Speaker**, *26th Complex Fluids Workshop*, Yale University (March 2006).
- **Invited Speaker**, *10th International Workshop on Disordered Systems*, Molveno, Italy (March 2006).
- **Invited Speaker**, *Powders and Grains 2005*, Institute for Computational Physics, University of Stuttgart (July 2005).
- **Invited Speaker**, *3rd New England Granular Materials Workshop*, held at Wesleyan University (June 2005).
- **Invited Speaker**, Granular Physics Program, Kavli Institute for Theoretical Physics, University of California, Santa Barbara (June 2005).
- **Invited Speaker**, American Physical Society March Meeting, Invited Session on Jamming, Los Angeles, CA (March 2005).
- **Lecturer**, Tutorial on “Jamming in Soft-Condensed Matter Physics”, American Physical Society March Meeting, Los Angeles, CA (March 2005).
- **Invited Speaker**, American Physical Society March Meeting, Invited Session on Effective Temperatures in Driven Systems, Austin, TX (March 2003).
- **Invited Speaker**, *9th International Workshop on Disordered Systems*, Molveno, Italy (June 2002).

Selected Seminars and Colloquia (60 since 2002)

- **Seminar**, Department of Pharmaceutical Sciences, University of Connecticut, (October 3, 2017).
- **Seminar**, Department of Mechanical Engineering, Shizuoka University, Japan (September 3, 2016).
- **Seminar**, Department of Thermal Engineering, Tsinghua University, Beijing, China (August 18, 2016).
- **Seminar**, Institute of Mechanics, Chinese Academy of Sciences, Beijing, China (August 10, 2016).
- **Seminar**, Department of Mechanics and Engineering Science, Peking University, Beijing, China (August 8, 2016).
- **Seminar**, Institute of Physics, Chinese Academy of Sciences, Beijing, China (August 2, 2016).
- **Seminar**, Inria Grenoble Rhone-Alpes, Grenoble, France (July 8, 2016).
- **Seminar**, Interdisciplinary Research Group on Disordered Packings, Department of Physics & Astronomy, University of Pennsylvania (April 8, 2016).
- **Seminar**, Squishy Physics Seminar, School of Engineering and Applied Science, Harvard University (March 30, 2016).

- **Seminar**, School of Physics, Georgia Institute of Technology (March 28, 2016).
- **Seminar**, Department of Physics, University of Science and Technology of China, Hefei, China (August 18, 2015).
- **Seminar**, Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan (August 21, 2015).
- **Seminar**, Department of Physics, University of Michigan (March 11, 2014).
- **Seminar**, Institute for Nanoscience and Quantum Engineering, Yale University (September 2013).
- **Seminar**, Department of Microbiology, University of Washington (May, 2013).
- **Colloquium**, Department of Chemical Physics, Weizmann Institute (March, 2013).
- **Seminar**, Department of Physics, New York University (December, 2012).
- **Seminar**, Department of Applied Mechanics, School of Engineering and Applied Sciences, Harvard University (October, 2012).
- **Colloquium**, Department of Physics, Duke University (September, 2012).
- **Seminar**, Center for Nonlinear and Complex Systems, Duke University (September, 2012).
- **Seminar**, Laboratoire Charles Coulomb, CNRS and Université Montpellier (June 2011).
- **Seminar**, Laboratoire de Physique Théorique, Ecole Normale Supérieure (June 2011).
- **Colloquium**, Department of Mechanical Engineering, Texas Tech University (May, 2011).
- **Seminar**, Mechanical, Industrial, and Systems Engineering Department, University of Rhode Island (November, 2010).
- **Colloquium**, Department of Mechanical and Aerospace Engineering, University of Florida (October, 2010).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics and Astronomy, University of Pennsylvania (October, 2010).
- **Colloquium**, Center for Nonlinear Studies, Los Alamos National Laboratory (April, 2010).
- **Seminar**, Condensed Matter Seminar, Department of Physics and Astronomy, Johns Hopkins University (March 2010).
- **Colloquium**, Department of Physics, Emory University (January, 2010).
- **Seminar**, Soft Matter Seminar, Department of Physics, Georgetown University (November 2009).
- **Seminar**, Department of Chemical Engineering, Pennsylvania State University (October 2009).
- **Seminar**, Department of Applied Mathematics, Harvard University (May 2009).

- **Seminar**, Benjamin Levich Institute for Physico-Chemical Hydrodynamics, City College of CUNY (April 2009).
- **Seminar**, Institute for Nanoscience and Quantum Engineering, Yale University (February 2009).
- **Colloquium**, Department of Physics, Rochester Institute of Technology (December 2008).
- **Seminar**, Single Molecule Discussion Group, Department of Molecular Biochemistry and Biophysics, Yale University (December 2008).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics, University of Massachusetts-Amherst (November 2008).
- **Seminar**, Condensed Matter Physics Seminar, Syracuse University (November 2007).
- **Seminar**, School of Materials Science and Engineering, Georgia Institute of Technology (November 2007).
- **Seminar**, Chemical Engineering Seminar, Case Western Reserve University (October 2007).
- **Seminar**, Institute for Nanoscience and Quantum Engineering Seminar, Yale University (October 2007).
- **Seminar**, Nonlinear Dynamics Seminar, Physics Department, University of Texas at Austin (September 2007).
- **Colloquium**, Department of Engineering Sciences and Applied Mathematics, Northwestern University (May 2007).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics, Boston University (February 2007).
- **Seminar**, Computations in Science Seminar, Department of Physics, The University of Chicago (November 2006).
- **Seminar**, Complex Materials Theory Group, Department of Chemistry, Princeton University (August 2005).
- **Seminar**, Theory Department, Max Planck Institute for Polymer Research, Mainz, Germany (July 2005).
- **Seminar**, Squishy Physics Seminar, School of Engineering and Applied Science, Harvard University (June 2005).
- **Colloquium**, Department of Applied Mathematics, Massachusetts Institute of Technology (November 2004).
- **Seminar**, Center for Scientific Computation and Mathematical Modeling, University of Maryland (November 2004).
- **Colloquium**, Department of Physics, Wesleyan University (February 2004).
- **Colloquium**, Department of Applied Physics and Applied Mathematics, Columbia University (November 2003).

- **Colloquium**, Department of Applied Mathematics, New Jersey Institute of Technology (October 2003).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics, University of Massachusetts-Amherst (June 2003).
- **Seminar**, Statistical Physics Seminar, Institute for Physical Science and Technology, University of Maryland (April 2003).
- **Seminar**, Department of Physics, Brandeis University (December 2002).
- **Seminar**, Center for Systems Science, Department of Electrical Engineering, Yale University (November 2002).
- **Colloquium**, Department of Physics, Georgetown University (November 2002).
- **Colloquium**, Department of Physics, Clark University (October 2002).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics, Yale University (September 2002).
- **Seminar**, Division of Materials and Process Computation, Sandia National Lab (February 2002).
- **Seminar**, Condensed Matter Physics Seminar, Department of Physics, University of Wisconsin-Madison (February 2002).

Current Support

- NSF PHY-1019147; *Collaborative Research: PoLS Student Research Network*; \$1,166,500; 10/1/15-9/30/20; supplement \$183,346.
- NSF DBI-1458609; *REU Site: Convergence of research at the interface of the biological, physical, and engineering sciences*; \$248,244; 4/1/15-3/31/18.
- ARO W911NF-14-1-005; *Determining the essential elements of hydrodynamic erosion of granular beds*; \$360,000; 11/15/13-11/14/17; HSAP/URAP supplement \$12,000.
- W. M. Keck Foundation; *Self-assembly in the macro-world*; \$1,000,000; 7/1/14-6/30/17.
- NIH; *Quantification and modeling of the emergence of tissue-level mechanics from individual cell heterogeneity*; \$1,214,149; 9/30/14-8/31/17.
- NSF CMMI-1462439; *Collaborative Research: Mechanics of granular acoustic meta-materials with engineered particles and packings*; \$253,197; 4/1/15-3/31/18; REU supplement \$10,000.
- NIH; *Convergent graduate training in engineering, physics, and biology*; \$1,449,345; 4/1/16-3/31/21.
- NSF IOS; *Role of RHAMNOSE BIOSYNTHESIS 1 in cell growth and patterning*; \$780,000; 9/1/16-8/31/19.
- NSF CBET; *The origin of geometric friction and cohesion*; \$437,021; 9/1/16-8/31/19; REU supplement \$12,675.

- ARO; *Strengthening and armoring of sheared granular beds*; \$483,742; 3/1/17-2/29/20.
- Raymond and Beverly Sackler Institute for Biological, Physical, and Engineering Sciences Seed Project; *Physical modeling of tumor development*; \$60,000; 1/01/17-12/31/17.

Pending Support

- NSF CLP; *Design of bio-orthogonal protein interfaces to enable in vivo cell imaging*; \$592,436; 5/1/17-4/30/20.
- NSF CMP; *Collaborative Research: The connection between particle-scale rearrangements and macroscopic mechanical properties of amorphous materials*; \$224,490; 7/1/17-6/30/20.
- NSF MSN; *Hierarchical assemblies in supramolecular comb polymers and discotic mesophases with mixed ligands*; \$467,213; 7/1/17-6/30/20.
- NSF; *PFI: BIC Smart human spaces: Linking building environments to outdoor spaces*; \$999,987; 6/1/17-6/30/20.
- ACS PRF; *Development of packing simulations to elucidate hydrate formation*; \$110,000; 9/1/18-8/31/20.

Prior Support

- NSF CBET-1460426; *SYMPOSIUM: Support for US participants for the Symposium on "Statics and dynamics of dense granular matter," July 6-10, 2015, Madrid, Spain*; \$20,000; 6/1/15-5/28/16.
- NSF PHY-1019147; *Collaborative Research: PoLS Student Research Network*; \$584,000; 7/1/10-6/30/15.
- NSF DBI-1156585; *REU Site: Integrated Research at the Frontiers of the Biological, Physical, and Engineering Sciences*; \$238,004; 3/1/12-2/28/15.
- NSF CBET-1341341; *Northeastern Granular Materials Workshop*; \$5,140; 6/15/13-6/14/14.
- Center for Research on Interface Structures and Phenomena Seed Project; *Design of Complex Granular Metamaterials*; \$166,000; 6/01/12-5/31/14.
- DTRA BRBAA08-H-2-0108; *Microstructure, Fluidization and Control of Penetrator Trajectories in Granular Media*; \$410,407; 4/1/10-3/31/14.
- NSF DMR-1006537; *Jamming and Glassy Behavior in Systems with Nonspherical Particles and Constrained by Chain Connectivity*; \$270,000; 9/01/10-8/31/13.
- NSF CBET-0967262; *Collaborative Research: Experiment, Simulation, and Theory of Slowly Driven Granular Materials—From Microstate Statistics to Macroscopic Properties*; \$205,342; 4/01/10-3/31/13.
- NSF DMS-0835742; *CDI-Type II: Collaborative Research: Computational Homology, Jamming, and Force Chains in Dense Granular Flows*; \$509,738; 10/01/08-9/30/12.
- DARPA; *Predictive Modeling and Control of Sepsis*; \$340,000; 9/01/11-8/31/12.

- NSF CBET-1115279; *Fluctuations and Response in Active Materials: From Driven Granular Systems to Swarming Bacteria*; \$17,450; 5/01/11-4/30/12.
- NSF Career Award; DMR-0448838; *Career: Computer Simulations of Glassy and Athermal Systems*; \$400,000; 4/01/05-3/31/10.
- NSF CBET-0908238; *Force Chain Fluctuations and Jamming in Dense Granular Flows*; \$12,950; 6/01/09-5/31/10.
- NSF CTS-0456703; *Collaborative Research: Studies of Aging and Memory in Granular Materials*; \$40,000; 8/01/05-7/31/06; REU supplement \$6,000.
- NSF CTS-0625149; *Collaborative Research: Visualization of the Aging Process in Granular Matter using Experiment and Simulation*; \$130,000; 9/01/06-8/31/08. REU Supplement \$7,000.
- Yale Institute for Nanoscience and Quantum Engineering Seed Project; *Coordinated Simulations and Experiments to Predict the Dynamics of Protein Folding from the Amino Acid Sequence*; \$60,000; 8/15/07-8/14/08.
- Yale Institute for Nanoscience and Quantum Engineering Seed Project; *Using Theory, Simulation, and Experiment to Design and Build Structure-seeking Nano- and Bio-materials*; \$55,000; 9/15/08-9/14/09.
- Raymond and Beverly Sackler Institute for Biological, Physical, and Engineering Sciences Seed Project; *Using proteins to create ‘smart’, stimuli-responsive nano-materials*; \$40,000; 11/01/09-10/31/10.
- Raymond and Beverly Sackler Institute for Biological, Physical, and Engineering Sciences Seed Project; *The role of curvature in α -synuclein binding to lipid bilayers*; \$40,000; 11/01/09-10/31/10.
- Raymond and Beverly Sackler Institute for Biological, Physical, and Engineering Sciences Seed Project; *The Neglected Component of Protein Folding and Protein-protein Interactions: Investigating Packing by Simulation and Experiment*; \$50,000; 1/01/12-12/31/12.

Teaching

- **CBB752b**, (Spring 2010, Spring 2011, Spring 2012, Fall 2012, Spring 2014, Spring 2015, Spring 2016, Spring 2017) (0.3) *Bioinformatics: Practical Application of Simulation and Data* (Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization of microarray data, mining of functional genomics data sets, and machine learning approaches for data integration.)
- **ENAS991b/MB&B591b**, (Spring 2010, Spring 2013, Spring 2014, Spring 2015, Spring 2016, Summer 2016) (0.5) *Integrated Workshop* (A laboratory course involving hands-on

modules with students working in pairs. A biological student will be paired with a physics or engineering student; a computation/theory student will be paired with an experimental student. The modules are devised so that a range of skills are acquired, and students learn from each other.)

- **MB&B517/ENAS517a**, (Fall 2009, Fall 2010, Spring 2012, Spring 2013, Spring 2014, Spring 2015, Spring 2016, Spring 2017) *Methods & Logic in Interdisciplinary Research* An intensive seminar-style class in which two professors with complimentary expertise (for example, expertise in physical versus biological systems or theory versus experiment) meet with students to dissect and analyze hallmark papers from the literature.
- **MB&B635a/ENAS518a**, (Fall 2009, Fall 2010, Fall 2011, Fall 2013) (0.3) *Mathematical Methods in Biophysics* (Applied mathematical methods relevant to analysis and interpretation of biophysical and biochemical data. Statistics and error analysis, differential equations, linear algebra, and Fourier transforms. Analysis of real data from research groups in MB&B and IGPPEB.).
- **PHY628b/ENAS849b**, (Spring 2007) *Statistical Physics II* (statistical formulation of thermodynamics, review of canonical and grand canonical ensembles, review of phase transitions and critical phenomena, and introduction to renormalization group).
- **ENAS 500a**, (Fall 2006) *Mathematical Methods I* (vector analysis, linear algebra, complex analysis, Fourier integrals and Laplace transforms).
- **MENG 383b**, (Spring 2005, Fall 2007, Fall 2009, Fall 2010, Spring 2012, Fall 2012, Fall 2013, Fall 2015, Fall 2017) *Mechanical Engineering III: Dynamics* (kinematics and dynamics of rigid bodies, energy and momentum methods, vibrations).
- **ENAS 130b**, (Spring 2003, Spring 2004, Spring 2008, Spring 2011, Spring 2017) *Introduction to Computing for Engineers and Scientists* (computer programming in Fortran, C++, Matlab, and Mathematica using examples from numerical methods, data analysis, database management, and visualization).
- **PHYS 523a/MB&B523a/ENAS541a**, (Fall 2012, Fall 2013, Spring 2015, Spring 2016, Fall 2016) (1.0) *Biological Physics* (An introduction to the physics of several important biological phenomena, including molecular motors, protein folding, bacterial locomotion, and allostery. The material and approach are positioned at the interface of the physical and biological sciences.)
- **ENAS 705a/MB&B715b**, (Fall 2003, Fall 2004, Spring 2013) *Numerical Simulations of Liquids* (statistical mechanics of liquids, molecular dynamics simulations, nonequilibrium conditions, e.g. shear and heat flow, linear response theory, Monte Carlo simulations)
- Research mentor to many undergraduates (46 since 2002), Eric T. Anderson (Mechanical Engineering & Materials Science, 2016), Matthew Barber (Physics, 2009), Ellen Bengtson (Chemical Engineering, 2014), Erik Brown (Physics, 2005), David Buch from West Virginia University (Chemistry, 2018), Brianna Chrisman (Biomedical Engineering & Applied Physics, 2015), Manolis Davris (Mechanical Engineering & Materials Science, 2012), Bradley Dice from William Jewel College (Physics, 2016), Evan Feinberg (Applied Physics, 2013), Jonathan Hartman (Mechanical Engineering & Materials Science, 2009), Nabeem Hashem (Physics, 2012), Po-Yi Ho (Physics, 2014), Maya Jones from Spelman College

(Biology, 2019), Hans Kassier (Mechanical Engineering, 2016), Nathaniel Knapp (Chemical Engineering, 2014), Matthew Kremer (Applied Physics, 2011), Dominic Kwok (Physics, 2013), Andy Law (Mechanical Engineering, 2016), Seoyun Soy Lee (Applied Mathematics, 2015), Georgia Lill (Applied Math, 2013), Jiabin Liu from Bryn Mawr College (Physics, 2013), Alizeh Maqbool (Physics, 2016), Maxwell Micali (Mechanical Engineering & Materials Science, 2012), Sarah Penrose from Connecticut College (Chemistry, 2013), Grant Phelps (Mechanical Engineering, 2013), Benjamin Pollak from Washington University in St. Louis (Physics, 2014), Aman Richard (Mechanical Engineering, 2014), Alyssa Roland (Mechanical Engineering, 2011), Gabrielle Roberts (Physics, 2018), Ian Rose (Physics, 2009) (Perspectives on Science), Christina Schindler from Heidelberg University (DAAD Rise Scholarship), Saranya Sethuraman (Applied Math, 2011), Ajay Shalwala (Chemical Engineering, 2005), Sherwin Soltani (Physics, 2012), Stefan Stanojeviae from Brandeis University (Physics, 2014), Rebecca Taft (Physics, 2008), Phillippa Thomson (Mechanical Engineering, 2006), Mikayla Thompson (Physics, 2015), Anthony Tokman (Physics, 2016), Aishwarya Vijay (Chemical Engineering, 2014), Michael Weiner (Physics, 2011), Amy Werner-Allen (Applied Math, 2011), William Henry Wilkin (Physics, 2013), Wesley Wilson (Applied Physics, 2012), Alexandra Witthoft from Mount Holyoke College (Physics, 2009) (Yale Summer Undergraduate Research Fellowship), Stefanie Wyche from Claffin University (Computer Science, 2016), and Christopher Yerino (Physics, 2006).

- Faculty discussant for Perspectives on Science (2007-2008), which is a discussion course for first-year Yale College students with exceptional abilities in science, math, and engineering.
- Ph.D. thesis advisor for 23 students: Ning Xu (Mechanical Engineering, 2005), Prasanta Pal (Applied Physics, 2011), Guo-Jie Gao (Mechanical Engineering, 2009), Carl Schreck (Physics, 2012), Tianqi Shen (Physics, 2014), Alice Qinhua Zhou (Molecular Biophysics & Biochemistry, 2014, HHMI International Student Research Fellow), Thibault Bertrand (Mechanical Engineering & Materials Science, 2016, Advanced Graduate Leadership Program Fellow), Diego Caballero (Physics, 2016), Wendell Smith (Physics, 2016), Manuel Mai (Physics, 2016), Alejandro Virrueta (Mechanical Engineering & Materials Science, 2017, NSF Graduate Research Fellow and Ford Foundation Fellow), Minglei Wang (Mechanical Engineering & Materials Science, 2016), Julia Salevan (Mechanical Engineering & Materials Science, 2017), Alexandra Signoriello (Computational Biology & Bioinformatics, 2018), Meng Fan (Mechanical Engineering & Materials Science, 2018), Jennifer Gaines (Computational Biology & Bioinformatics, 2018), Kyle Vanderwerf (Physics, 2019), Qikai Wu (Mechanical Engineering & Materials Science, 2018), Peter Williams (Applied Physics, 2020), Zhe Mei (Chemistry, 2020), Aya Nawano (Mechanical Engineering & Materials Science, 2021), John Treado (Mechanical Engineering & Materials Science, 2021), Daming Li (Physics, 2021).
- Ph.D. thesis committee member for Ross Bauer (Mechanical Engineering & Materials Science, 2020), Sukalyan Bhattacharya (Mechanical Engineering, 2005), Max Dapeng Bi (Physics, Brandeis University, 2012), Lin Bo (Physics, CCNY, 2015), Punnathat Bordeenithikasem (Mechanical Engineering & Materials Science, 2017), Joseph Buttacci (Chemical Engineering, 2019), Eric DeGiuli (Mathematics, University of British Columbia, 2013), David Dewitt (Molecular Biophysics & Biochemistry, 2014), Mehmet Dogan (Physics, 2016), Brian Dunnican (Molecular Biophysics & Biochemistry, 2015), Seth Dworkin (Mechanical Engineering, 2009), Jason Forster (Mechanical Engineering & Materials Science, 2012), Stefan Elrington (Physics, 2017), Samuel Flores (Physics, 2007),

Kevin Garrity (Physics, 2011), Silke Henkes (Physics, Brandeis University, 2008), Aline Hubard (Physics, CCNY, 2015), Yuliang Jin (Physics, CCNY, 2012), Mark Kanner (Physics, CCNY, 2014), Xiangmeng Kong (Chemistry, 2017), Peter Koo (Physics 2015), Nidhi Khurana (Mechanical Engineering & Materials Science, 2012), Jittisa Ketkaew (Mechanical Engineering & Materials Science, 2019), Sebastian Kube (Mechanical Engineering & Materials Science, 2021), Zhusong Li (Physics, CCNY, 2015), Yang Liao (Mechanical Engineering & Materials Science, 2015), Yanglin Liu (Mechanical Engineering & Materials Science, 2016), Xinhui Lu (Physics, 2009), Mitch Mailman (Physics, Brandeis University, 2011), Jason Merrill (Physics, 2011), Aaron Mertz (Physics, 2013), Rodrigo Mota (Mechanical Engineering & Materials Science, 2020), Ahsan Nawroj (Mechanical Engineering & Materials Science, 2018), Bradley Perry (Molecular, Cellular, and Developmental Biology, 2015), Niveditha Samudrala (Chemical Engineering, 2016), Baran Sarac (Mechanical Engineering & Materials Science, 2013), Neelima Sharma (Mechanical Engineering & Materials Science, 2020), Michael Sneddon (Computational Biology and Bioinformatics, 2012), Rujie Song (Computational Biology & Bioinformatics, 2018), Yingjie Xiang (Mechanical Engineering & Materials Science, 2019), Terry Xie (Mechanical Engineering & Materials Science, 2019), Ye Xu (Mechanical Engineering & Materials Science, 2012), Hongqiang Wang (Physics, UMass-Amherst, 2010), Ali Yawar (Mechanical Engineering & Materials Science, 2021), Nian Zhang (Mechanical Engineering, 2005), Lin Zhou (Mechanical Engineering, 2006).

- Postdoctoral advisor for Dr. Gregg Lois from Department of Physics, University of California, Santa Barbara, 2006-2009, Dr. Robert Hoy from Department of Physics and Astronomy, Johns Hopkins University, 2009-2012, Dr. S. S. Ashwin from Theoretical Sciences Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, 2009-2012, Dr. Vijay Murthy from the Indian Institute of Science, Bangalore, 2010-2011, Dr. Maria Sammalkorpi from Aalto University, Finland, 2010-2011, Dr. Stefanos Papanikolaou from University of Illinois, Urbana-Champaign, 2011-2013, Dr. Kai Zhang from Department of Chemistry, Duke University, 2012 - 2015, Dr. Abram Clark from Department of Physics, Duke University, 2014 - 2017, Bhaskar Sen Gupta from Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, 2015-2017, Arman Boromand from Department of Macromolecular Science and Engineering, Case Western Reserve University, 2016 - 2018, Sandra Acebes Serrano, from Computational and Theoretical Chemistry, University of Barcelona, 2017-2018.
- Advisor for Visiting Assistant in Research (VAR) students: Sheng Chen (Peking University, Ph.D., 1/22/2017 - 1/22/2018), Weiwei Jin (Tsinghua University, Ph.D., 9/24/2016 - 9/20/2017), Andreas Kvist Bacher (Roskilde University, Ph.D., 2/1/2016 - 6/30/2016), Thibault Bertrand (Ecole Normal Supérieure Cachan, M.S. Physics, 4/15/2010 - 8/15/2010), Mark Kanner (City College of New York, Ph.D. Physics, 6/12/2012 - 8/10/2012), Fei Jianbo (Tsinghua University, Ph.D. Civil Engineering, 12/1/2014 - 7/15/2015), Torrey Levin-Russell (Southern Connecticut State University, M. S. Physics, 3/15/2015 - 5/31/2015), Zhusong Li (City College of New York, Ph.D. Physics, 3/1/2014 - 4/30/2014), Jukka Määttä (Aalto University, Ph.D. Physics, 5/1/2013 - 9/1/2013), Katja Schaefer (Mississippi State University, Ph.D. Physics, 2/2009 - 8/2009), Florian Ulmann (University of Basel, M. S. Physics, 7/2014 - 1/2015), and Gili Zilberman (University of Haifa, M.S. Biology, 10/2009 - 10/2010).

Professional Activities

- Invited speaker, Tilde Cafe, Branford, CT Public Library, “The Physics of Bird Nests,” March 11, 2017.
- Organizer, 4th International Workshop on Packing Problems, Yale University (July 2018).
- Invited speaker, CRISP MRSEC and Pathways to Science Public Lecture, “The Mysteries of Sand II,” October 22, 2016.
- Public Lecture, New Haven Bird Club, “The strength of bird nests,” October 13, 2016.
- Invited speaker, CRISP MRSEC and Pathways to Science Public Lecture, “The Mysteries of Sand I,” April 23, 2016.
- Co-organizer, *66th New England Complex Fluids Workshop*, held at Yale University (March 2016).
- Co-organizer, Minisymposium, “Statics and dynamics of dense granular media,” 9th EUROMECH Solid Mechanics Conference, Madrid, Spain (July 2015).
- Featured in Episode 1 (The Nest) of the PBS Nature documentary, “Animal Homes,” April 8, 2015.
- Co-organizer, Conference “Complexity in mechanics: Intermittency and collective phenomena in disordered solids,” KITP, University of California, Santa Barbara (October 20-24, 2014).
- Scientific coordinator for KITP Program “Avalanches, intermittency, and nonlinear response in far-from-equilibrium solids” (September 22 - December 12, 2014).
- Co-organizer, Pan-American Study Institute on “Frontiers in Particulate Media: From Fundamentals to Applications,” La Plata, Argentina (August 11-22, 2014)
- Co-organizer, Yale-Weizmann Encounter in the Biological, Physical, and Engineering Sciences, Weizmann Institute of Science, Rehovot, Israel (January 7-8, 2014).
- Co-organizer, Special Session, “Statistical Physics of Granular Materials: From Microstates to Effective Thermodynamic Descriptions,” for the Seventh MIT Conference on Computational Fluid and Solid Mechanics (June 12-14, 2013).
- Guest editor, Special volume, “Flows and patterns: The physics of fluids, granular materials, and soft matter,” *Granular Matter* (2014).
- Section Editor, *Papers in Physics* (2011-2015).
- Co-organizer, STATPHYS25 satellite meeting, “Physics of Glassy and Granular Materials,” Yukawa Institute for Theoretical Physics, Kyoto University (July 16-19, 2013).
- Organizer, *11th Northeastern Granular Materials Workshop*, held at Yale University (June 2013).
- Organizer, Flint Visitors Fund Lecture Series on Granular Materials by Prof. Mark Shattuck, Yale University (April, 2013).
- Co-organizer, *54th New England Complex Fluids Workshop*, held at Yale University (March 2013).

- Co-organizer, Minisymposium, “Comparison of plasticity and intermittency in crystalline and amorphous solids,” 12th International Workshop on Computational Mechanics of Materials (September 24, 2012).
- Co-organizer, Minisymposium, “New methods to quantify the structural and mechanical properties of dense granular media,” 8th EUROMECH Solid Mechanics Conference, Graz, Austria (July 2012).
- Co-organizer, *50th New England Complex Fluids Workshop*, held at Yale University (March 2012).
- Co-organizer, Biophysical Society Thematic Meeting, “Dynamic DNA Packaging across Kingdoms,” Asilomar, Pacific Grove, CA (July 5-8, 2011).
- Co-organizer, Workshop, “Fluctuations and Response in Active Materials: From Driven Granular Systems to Swarming Bacteria” Lorentz Center, Leiden University (June 20-24, 2011).
- Co-organizer, Workshop, “Fluctuations and Response in Granular Materials” Aspen Center for Physics (May 22 - June 12, 2011).
- Co-organizer, *46th New England Complex Fluids Workshop*, held at Yale University (March 2011).
- Organizer, DARPA Workshop, “The Physics of Accelerating Skin Recovery,” (August 12-13, 2010)
- Co-organizer, *42nd New England Complex Fluids Workshop*, held at Yale University (March 2010).
- Organizer, Focus Session, “Jamming: Theory and Experiment”, American Physical Society March Meeting, Portland, OR (March 2010).
- Hosted sabbatical visits for Prof. March Shattuck, Physics Department, City College of New York (October, 2007 - May 2008; May 2014 - January 2015) and Prof. Bulbul Chakraborty, Physics, Brandeis University (January, 2011 - May, 2011).
- Organizer, Flint Visitors Fund Lecture Series on Soft Matter and Biological Physics by Prof. Bulbul Chakraborty, Yale University (October 2010).
- Vice-chair, Chair, and Past-Chair of the Topical Group on Statistical and Nonlinear Physics of the American Physical Society (2008-2010)
- Session co-Chair, “Gels, Glasses, and Jammed Systems,” 81st Annual Meeting of the Society of Rheology (October 2009).
- Co-organizer, Minisymposium, “Force chain fluctuations and jamming in dense granular flows,” 7th EUROMECH Solid Mechanics Conference, Lisbon, Portugal (September 2009).
- Organizer, *7th Northeastern Granular Materials Workshop*, held at Yale University (June 2009).
- Co-Organizer, Focus Session, “Polymer Collapse and Protein Folding”, American Physical Society March Meeting, New Orleans, LA (March 2008).

- Co-organizer, *30th New England Complex Fluids Workshop*, held at Yale University (March 2007).
- Co-Organizer, Boulder School for Condensed Matter and Materials Physics, “Physics of Soft Matter: Complex Fluids and Biological Materials” (July 2006).
- Co-Organizer, Focus Session, “Jamming in Glasses, Grains, and Gels”, American Physical Society March Meeting, Baltimore, MD (March 2006).
- Organizer, Focus Session, “Jamming: Rheology and Failure”, American Physical Society March Meeting, Los Angeles, CA (March 2005).
- Organizer, *2nd Northeastern Granular Materials Workshop*, held at Yale University (June 2004).
- Co-organizer, *15th New England Complex Fluids Workshop*, held at Yale University (June 2003).
- Panelist for Particulate & Multiphase Processes Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, NSF (March 2003, October 2014), Chemistry of Life Processes, Division of Chemistry, NSF (March 2016), Mechanics of Materials Program, Division of Civil, Mechanical, and Manufacturing Innovation, NSF (2014, 2015, 2016), Panelist for NASA Complex Fluids Program (May 2013); Panelist for the University of Chicago NSF MRSEC site visit (June 2012); Panelist for 2007 NSF Graduate Research Fellowship Program.
- Referee for *Acta Materialia*, Austrian Science Fund, Army Research Office, *Biophysical Journal*, *Chemical Engineering Science*, *Chemical Physics Letters*, Chilean Ministry for the Economy, Development, and Tourism, Department of Energy: Basic Energy Sciences, ETH Zurich Research Commission, *European Physical Journal E*, *Europhysics Letters*, French National Research Agency, Georgia National Science Foundation, *Granular Matter*, Greek Ministry for Education, *Intermetallics*, Israel Science Foundation, *Journal of Chemical Physics*, *Journal of Computational Physics*, *Journal of Physical Chemistry B*, *Journal of Physical Chemistry Letters*, *Journal of Physics: Condensed Matter*, *Journal of Physics A: Mathematical and General*, *Journal of Physics D: Applied Physics*, *Journal of Rheology*, *Journal of Statistical Mechanics*, Lawrence Livermore National Lab, *Macromolecules*, *Materials & Design*, *Mechanics of Materials*, *Modeling and Simulation in Materials Science and Engineering*, *Molecular Simulation*, NASA, National Science Foundation, National Science Foundation Graduate Research Fellowship Program, Natural Sciences and Engineering Research Council of Canada, *Nature Materials*, *Nature Physics*, Netherlands Foundation for Fundamental Research on Matter, Netherlands Organization for Scientific Research, Petroleum Research Fund, *New Journal of Physics*, *Physica D*, *Physical Chemistry Chemical Physics*, *Physical Review Applied*, *Physical Review Letters*, *Physical Review E*, *Physical Review X*, *Physics of Fluids*, *Physics Letters A*, *Physics Today*, *Proceedings of the National Academy of Sciences, USA*, *Proceedings of the Royal Society A*, *Protein Engineering, Design, and Selection*, *Science*, *SIAM Journal of Applied Mathematics*, Simons Foundation, *Soft Matter*, U.S. Civilian Research and Development Foundation.

Administrative and Service Activities

- Member of Selection Committee for 2017-2018 Associates in Teaching Program (2017).

- Member of Advisory Committee for Search for Yale College Dean (2017).
- Member of Scholar Awards Committee, Yale University (2016 - present).
- Member of Graduate Admissions Committee, Department of Physics, Yale University (2016).
- Yale College Fulbright Grants Committee (2014-2015).
- SEAS Materials Committee, Yale University (2014-2015).
- Faculty Search Committee for the Department of Chemical and Environmental Engineering, Yale University (2014-2015).
- ABET Self-study and On-site visit coordinator for Department of Mechanical Engineering & Materials Science, Yale University (2013-2014).
- Invited Speaker, Summer Undergraduate Math Research at Yale Colloquium Series, Yale University (July 2014)
- Invited Speaker, Society for Physics Students, Yale University (March 2013).
- Co-Director of Graduate Admissions, Graduate Program in Computational Biology & Bioinformatics; member of BBS Executive Committee (2012 - present).
- Faculty Advisory Council, Yale Engineering and Science Weekend (2012).
- Faculty Search Committee for the Department of Mechanical Engineering & Materials Science, Yale University (2011-2013).
- Advisory Committee for the Science Research Software Core, Yale University (2011-present).
- Invited Speaker, Pioneering Research at the Intersection of Biological, Physical, and Engineering Sciences, Yale Tomorrow Campaign Celebration (September 2011).
- Director of Undergraduate Studies, Department of Mechanical Engineering & Materials Science (2011 - present).
- Participant, Yale Engineering and Science Weekend (February 2011).
- Invited Speaker, Physics Research at Yale Seminar (PRAYS) for Yale Physics Ph.D. students, Yale University (2011-2015).
- Advisory Committee for the Office of Digital Assets and Infrastructure, Yale University (2010-2011)
- Keynote Speaker, Yale Pathways to Science, Outreach event for Yale's CRISP (October 2010)
- Panelist, Sterling Fellows Forum, Luce Hall, Yale University (April 2010).
- Invited Speaker, Society for Physics Students, Yale University (April 2010).
- Organizer of Prospective Graduate Student Open House for School of Engineering and Applied Science, Yale University (2009-2010).

- Member of Graduate Curriculum Committee for Department of Mechanical Engineering, Yale University (2008).
- Co-Founder and member of Executive Committee for Yale's Integrated Graduate Program in Physical and Engineering Biology (2008-present).
- Member of Executive Committee for Yale's Raymond and Beverly Sackler Institute for Biological, Physical, and Engineering Sciences (2008-present).
- Member of Yale College Writing Center Advisory Committee (2005-2008).
- Member of Graduate Admissions Committee for Yale's School of Engineering and Applied Science (2003-2010).
- Faculty representative to Admissions Committee for Yale College (2005, 2011).
- Member of Graduate Prize Committee for Faculty of Engineering, Yale University (2004).
- Colloquium organizer for Department of Mechanical Engineering, Yale University (2004).
- First-year academic advisor for Ezra Stiles College, Yale University (2004-2006).

Professional Societies

- American Physical Society
- American Chemical Society
- Biophysical Society
- Materials Research Society
- Protein Society