Michael Hinczewski

Curriculum Vitae

Address: Department of Physics
Case Western Reserve University
E-mail: mxh605@case.edu
Phone: 216-368-4240
Homepage: biotheory.case.edu

Education

1999 – 2005 Ph.D. in Physics, Massachusetts Institute of Technology
Area: Condensed Matter Theory, Advisor: Prof. A. Nihat Berker

1997 – 1999 Bachelor of Science (summa cum laude) in Physics, Yale University

1995 – 1997 Undergraduate studies, Bard College at Simon's Rock

Positions

2020 – now Warren E. Rupp Associate Professor, Department of Physics,
Case Western Reserve University

2017 – 2020 Warren E. Rupp Assistant Professor, Department of Physics,
Case Western Reserve University

2014 – 2017 Assistant Professor, Department of Physics,
Case Western Reserve University

2009 – 2014 Postdoctoral Researcher, University of Maryland
Advisor: Prof. Devarajan Thirumalai

2008 – 2009 Postdoctoral Researcher, Technical University of Munich
Advisor: Prof. Roland Netz

2005 – 2008 Postdoctoral Researcher, Feza Gürsey Institute
Advisor: Prof. A. Nihat Berker

1999 – 2005 Research / Teaching Assistant, Massachusetts Institute of Technology

Fellowships and Awards

2016 NSF CAREER Award:
"Molecular heterogeneity and the regulation of cell adhesion by force" (#1651560)

2015 Case Western Reserve UCITE Glennan Fellowship for teaching and scholarship

2011 National Institutes of Health Ruth L. Kirschstein Postdoctoral Award:
"Extraction of protein and RNA folding landscapes from force clamp experiments" (F32 GM 97756-01)

2007 Deutscher Akademischer Austausch Dienst (DAAD) Scholarship:
"Research Stays for University Academics and Scientists"

2005 Goodwin Medal, Massachusetts Institute of Technology:
For "a conspicuously effective young teacher who is also a graduate student"

2000 Buechner Teaching Prize, MIT Physics Department

1999 DeForest Pioneers Prize, Yale Physics Department, for senior thesis:
"A Numerical Model for Seismic Anisotropy in the Inner Core of the Earth"

1997 Barry M. Goldwater Scholarship for Math and Science

1995 Bard College at Simon's Rock Scholarship: Acceleration to Excellence Program

Publications

Superscripts indicate students directly supervised while at CWRU:
* undergraduate; † graduate; ‡ postdoc.

68. T-L. Wang†, B. Kuznets-Speck*, J. Broderick*, M. Hinczewski, "The price of a bit: energetic costs and the evolution of cellular signaling", bioRxiv:2020.10.06.327700 (2020).

67. N. Praljak*, S. Iram†, U. Goreke, G. Singh*, A. Hill, U.A. Gurkan, M. Hinczewski, "Integrating deep learning with microfluidics for biophysical classification of sickle red blood cells", bioRxiv:2020.07.01.181545 (2020).

66. G. Palermo, K.V. Sreekanth, N. Maccaferri, G.E. Lio, G. Nicoletta, F. De Angelis, M. Hinczewski, G. Strangi, "Hyperbolic Dispersion Metasurfaces for Molecular Biosensing", *Nanophotonics* in press (2020).

65. S. Iram†, E. Dolson, J. Chiel*, J. Pelesko*, N. Krishnan, Ö. Güngör, B. Kuznets-Speck*, S. Deffner, E. Ilker‡, J.G. Scott, M. Hinczewski, "Controlling the speed and trajectory of evolution with counterdiabatic driving", *Nature Physics* advanced online publication, bioRxiv:867143 (2020).

64. E. Dolson, S. Iram†, J. Chiel*, J. Pelesko*, N. Krishnan, Ö. Güngör, B. Kuznets-Speck*, S. Deffner, E. Ilker‡, J.G. Scott, M. Hinczewski, "An introduction to using counterdiabatic driving to eliminate genetic lag in changing environments", *Artificial Life Conference Proceedings*, 25 (2020).

63. N. Maccaferri, T. Isoniemi, M. Hinczewski, M. Iarossi, G. Strangi, and F. De Angelis, "Designer Bloch plasmon polariton dispersion in grating-coupled hyperbolic metamaterials", *APL Photonics* **5**, 076109 (2020).

62. M. ElKabbash, S.K. Valiyaveedu, A. Fraiwan, J. Cole, Y. Alapan, T. Letsou, N.D. Hoffman, C. Guo, R.M. Sankaran, U.A. Gurkan, M. Hinczewski, G. Strangi, "Ultrathin-film optical coating for angle independent remote hydrogen sensing", *Meas. Sci. Technol.* **31**, 115201 (2020).

61. S. Chatterjee, E. Shkondin, O. Takayama, A.V. Lavrinenko, M. Hinczewski, G. Strangi, "Generalized Brewster effect in aluminum-doped ZnO nanopillars", *Proc. SPIE 11345, Nanophotonics VIII*, 1134524 (2020).

60. D. Hathcock*, R. Tehver, M. Hinczewski, D. Thirumalai, "Myosin V executes steps of variable length via structurally constrained diffusion", *eLife* **9**, e51569 (2020).

59. M.L Mugnai, C. Hyeon, M. Hinczewski, D. Thirumalai, "Theoretical Perspectives on Biological Machines", *Rev. Mod. Phys.* **92**, 025001 (2020).

58. E. Ilker‡, M. Hinczewski, "Modeling the growth of organisms validates a general relation between metabolic costs and natural selection", *Phys. Rev. Lett.* **122**, 238101 (2019).

57. M. ElKabbash, K.V. Sreekanth, Y. Alapan, M. Kim, J. Cole, A. Fraiwan, T. Letsou, Y. Li, C. Guo, R.M. Sankaran, U.A. Gurkan, M. Hinczewski, G. Strangi, "Hydrogen Sensing Using Thin-Film Perfect Light Absorber", *ACS Photonics* **6**, 1889 (2019).

56. K.V. Sreekanth, M. ElKabbash, R. Medwal, J. Zhang, T. Letsou, G. Strangi, M. Hinczewski, R.S. Rawat, C. Guo, R. Singh, "Generalized Brewster-angle effect in thin-film optical absorbers and its application for graphene hydrogen sensing", *ACS Photonics* **6**, 1610 (2019).

55. R.C. Rockne *et al.*, "The 2019 Mathematical Oncology Roadmap", *Phys. Biol.* **16**, 041005 (2019).

54. K.V. Sreekanth, Q. Ouyang, S. Sreejith, S. Zeng, W. Lishu, E. Ilker‡, W. Dong, M. ElKabbash, Y. Ting, C.T. Lim, M. Hinczewski, G. Strangi, K.-T. Yong, R.E. Simpson, R. Singh, "Phase-Change-Material-Based Low-Loss Visible-Frequency Hyperbolic Metamaterials for Ultrasensitive Label-Free Biosensing", *Adv. Opt. Mater.* 1900081 (2019).

53. T. Letsou, M. ElKabbash, S. Iram†, M. Hinczewski, G. Strangi, "Heat-induced perfect light absorption in thin-film metasurfaces for structural coloring" (Invited), *Opt. Mater. Express* **9** 1386, (2019).
Research highlight: Optical Society.

52. S. Adhikari†, J. Moran*, C. Weddle*, M. Hinczewski, "Unraveling the mechanism of the cadherin-catenin-actin catch bond", *PLoS Comput. Biol.* **14**, e1006399 (2018).

51. A.W. Eckford, B. Kuznets-Speck*, M. Hinczewski, P.J. Thomas, "Thermodynamic Properties of Molecular Communication", *2018 IEEE International Symposium on Information Theory (ISIT)*, 2545 (2018).

50. M. ElKabbash, S. Iram†, T. Letsou, M. Hinczewski, G. Strangi, "Designer Perfect Light Absorption Using Ultrathin Lossless Dielectrics on Absorptive Substrates", *Adv. Opt. Mater.* **6**, 1800672 (2018).

49. M. ElKabbash, E. Ilker‡, T. Letsou, N. Hoffman, A. Yaney, M. Hinczewski, G. Strangi, "Iridescence Free and Narrow Band Perfect Light Absorption in Critically Coupled Metal-High Index Dielectric Cavities", *Opt. Lett.* **42**, 3598 (2017).

48. H.S. Samanta, M. Hinczewski, and D. Thirumalai, "Optimal information transfer in enzymatic networks: A field theoretic formulation", *Phys. Rev. E* **96**, 012406 (2017).

47. H.S. Samanta, P.I. Zhuravlev, M. Hinczewski, N. Hori, S. Chakrabarti, D. Thirumalai, "Protein Collapse is Encoded in the Folded State Architecture", *Soft Matter* **13**, 3622 (2017).

46. K.V. Sreekanth, M. ElKabbash, Y. Alapan, E. Ilker‡, M. Hinczewski, U.A. Gurkan, and G. Strangi, "Hyperbolic metamaterials-based plasmonic biosensor for fluid biopsy with single molecule sensitivity", *EPJ Appl. Metamat.* **4**, 1 (2017).

45. S. Chakrabarti, M. Hinczewski, and D. Thirumalai, "Phenomenological and microscopic theories for catch bonds", *J. Struct. Biol.* **197**, 50 (2017).

44. D. Hathcock*, J. Sheehy*, C. Weisenberger†, E. Ilker‡, and M. Hinczewski, "Noise Filtering and Prediction in Biological Signaling Networks", *IEEE Trans. Mol. Biol. Multi-Scale Commun.* **2**, 16 (2016).

43. K.V. Sreekanth, Y. Alapan, M. ElKabbash, A.M. Wen, E. Ilker‡, M. Hinczewski, U.A. Gurkan, N.F. Steinmetz, and G. Strangi, "Enhancing the angular sensitivity of plasmonic sensors using hyperbolic metamaterials", *Adv. Opt. Mater.* **4**, 1767 (2016).

42. M. Hinczewski, C. Hyeon, and D. Thirumalai, "Directly measuring single-molecule heterogeneity using force spectroscopy", *Proc. Natl. Acad. Sci.*, **113**, E3852 (2016).

41. H.T. Vu, S. Chakrabarti, M. Hinczewski, and D. Thirumalai, "Discrete step sizes of molecular motors lead to bimodal non-Gaussian velocity distributions under force", *Phys. Rev. Lett.* **117**, 078101 (2016).

40. K.V. Sreekanth, Y. Alapan, M. ElKabbash, E. Ilker‡, M. Hinczewski, U.A. Gurkan, A. De Luca, and G. Strangi, "Extreme sensitivity biosensing platform based on hyperbolic metamaterials", *Nature Mater.*, **15**, 621 (2016).

39. M. Hinczewski and D. Thirumalai, "Noise control in gene regulatory networks with negative feedback", *J. Phys. Chem. B* **120**, 6166 (2016).

38. P.I Zhuravlev, M. Hinczewski, S. Chakrabarti, S. Marqusee, and D. Thirumalai, "Force-dependent switch in protein unfolding pathways and transition-state movements", *Proc. Natl. Acad. Sci.* **113**, E715 (2016).

37. M. Hinczewski and D. Thirumalai, "Cellular signaling networks function as generalized Wiener-Kolmogorov filters to suppress noise", *Phys. Rev. X* **4**, 041017 (2014).

36. B. Ramm, J. Stigler, M. Hinczewski, D. Thirumalai, H. Herrmann, G. Woehlke, and M. Rief, "Sequence-resolved free energy profiles of stress-bearing vimentin intermediate filaments", *Proc. Natl. Acad. Sci.* **111**, 11359 (2014).

35. S. Chakrabarti, M. Hinczewski, and D. Thirumalai, "Plasticity of hydrogen bond networks regulates mechanochemistry of cell adhesion complexes", *Proc. Natl. Acad. Sci.* **111**, 9048 (2014).

34. C. Hyeon, M. Hinczewski, and D. Thirumalai, "Evidence of disorder in biological molecules from single molecule pulling experiments", *Phys. Rev. Lett.* **112**, 138101 (2014).

33. M. Hinczewski, R. Tehver, and D. Thirumalai, "Design principles governing the motility of myosin V", *Proc. Natl. Acad. Sci.* **110**, E4059 (2013).
Research highlight: A. Klopper, "Walk the line", *Nature Physics* **9**, 692 (2013).

32. M. Hinczewski, J.C.M. Gebhardt, M. Rief, and D. Thirumalai, "From mechanical folding trajectories to intrinsic energy landscapes of biopolymers", *Proc. Natl. Acad. Sci.* **110**, 4500 (2013).

31. O.S. Sariyer, M. Hinczewski, and A.N. Berker, "Phase separation and charge-ordered phases of the d=3 Falicov-Kimball model at nonzero temperature: Temperature-density-chemical potential global phase diagram from renormalization-group theory", *Phys. Rev. B* **84**, 205120 (2011).

30. Y. von Hansen, F. Sedlmeier, M. Hinczewski, and R.R. Netz, "Friction contribution to water-bond breakage kinetics", *Phys. Rev. E* **84**, 051501 (2011).

29. M. Hinczewski and R.R. Netz, "Anisotropic Hydrodynamic Mean-Field Theory for Semiflexible Polymer Dynamics under Tension", *Macromolecules* **44**, 6972 (2011).

28. Y. von Hansen, M. Hinczewski, and R.R. Netz, "Hydrodynamic screening near planar boundaries: Effects on semiflexible polymer dynamics", *J. Chem. Phys.* **134**, 235102 (2011).

27. I. Sorar, D. Saygin-Hinczewski, M. Hinczewski, and F.Z. Tepehan, "Optical and structural properties of Si-doped ZnO thin films", *App. Surf. Sci.* **257**, 7343 (2011).

26. G. Morrison, C. Hyeon, M. Hinczewski, and D. Thirumalai, "Compaction and tensile forces determine the accuracy of folding landscape parameters from single molecule pulling experiments", *Phys. Rev. Lett.* **106**, 138102 (2011).

25. M. Hinczewski, Y. von Hansen, and R.R. Netz, "Deconvolution of dynamic mechanical networks", *Proc. Natl. Acad. Sci.* **107**, 21493 (2010).

24. C. Güven, M. Hinczewski, A. Nihat Berker, "Tensor renormalization group: Local magnetizations, correlation functions, and phase diagrams of systems with quenched randomness", *Phys. Rev. E* **82**, 051110 (2010).

23. M. Hinczewski, Y. von Hansen, J. Dzubiella, and R.R. Netz, "How the diffusivity profile reduces the arbitrariness of protein folding free energies", *J. Chem. Phys.* **132**, 245103 (2010).

22. M. Hinczewski and R.R. Netz, "Dynamics of DNA: Experimental controversies and theoretical insights", *Physica A* **389**, 2993 (2010). Proceedings of the Nihat Berker 60th Birthday Symposium.

21. C. Güven and M. Hinczewski, "The tensor renormalization group for pure and disordered two-dimensional lattice systems", *Physica A* **389**, 2915 (2010). Proceedings of the Nihat Berker 60th Birthday Symposium.

20. Y. von Hansen, R.R. Netz, and M. Hinczewski, "DNA-protein binding rates: Bending fluctuation and hydrodynamic coupling effects", *J. Chem. Phys.* **132**, 135103 (2010).

19. M. Hinczewski and R.R. Netz, "Global cross-over dynamics of single semiflexible polymers", *EPL* **88**, 18001 (2009).

18. A.N. Berker, M. Hinczewski, and R.R. Netz, "Critical percolation phase and thermal Berezinskii-Kosterlitz-Thouless transition in a scale-free network with short-range and long-range random bonds", *Phys. Rev. B* **80**, 041118 (2009).

17. C. Nadir Kaplan, M. Hinczewski, and A.N. Berker, "Infinitely robust order and local order-parameter tulips in Apollonian networks with quenched disorder", *Phys. Rev. E* **79**, 061120 (2009).

16. M. Hinczewski, X. Schlagberger, M. Rubinstein, O. Krichevsky, and R.R. Netz, "End-Monomer Dynamics in Semiflexible Polymers", *Macromolecules* **42**, 860 (2009).

15. C. Nadir Kaplan, A.N. Berker, and M. Hinczewski, "Frustrated further-neighbor antiferromagnetic and electron-hopping interactions in the d=3 t−J model: Finite-temperature global phase diagrams from renormalization group theory", *Phys. Rev. B* **80**, 214529 (2009).

14. M. Hinczewski and A.N. Berker, "Finite-temperature phase diagram of nonmagnetic impurities in high-temperature superconductors using a d=3 tJ model with quenched disorder", *Phys. Rev. B* **78**, 064507 (2008).

13. C. Güven, A.N. Berker, M. Hinczewski, and H. Nishimori, "Reentrant and Forward Phase Diagrams of the Anisotropic Three-Dimensional Ising Spin Glass", *Phys. Rev. E* **77**, 061110 (2008).

12. M. Hinczewski and A.N. Berker, "High-Precision Thermodynamic and Critical Properties from Tensor Renormalization-Group Flows", *Phys. Rev. E* **77**, 011104 (2008).

11. D. Saygin-Hinczewski, M. Hinczewski, I. Sorar, F.Z. Tepehan, and G.G. Tepehan, "Modeling the Optical Properties of WO3 and WO3-SiO2 Thins Films", *Solar Energy Mater. Solar Cells* **92**, 821 (2008).

10. O.S. Sariyer, A.N. Berker, and M. Hinczewski, "Excitation Spectrum Gap and Spin-Wave Stiffness of XXZ Heisenberg Chains: Global Renormalization-Group Calculation", *Phys. Rev. B* **77**, 134413 (2008).

9. M. Hinczewski, "Griffiths singularities and algebraic order in the exact solution of an Ising model on a fractal modular network", *Phys. Rev. E* **75**, 061104 (2007).

8. D. Saygin-Hinczewski, K. Koc, I. Sorar, M. Hinczewski, F.Z. Tepehan, and G.G. Tepehan, "Optical and Structural Properties of Ta2O5-CeO2 Thin Films", *Solar Energy Mater. Solar Cells* **91**, 1726 (2007).

7. M. Hinczewski and A.N. Berker, "$d = 3$ Anisotropic and $d = 2$ tJ Models: Phase Diagrams, Thermodynamic Properties, and Chemical Potential Shift", *Eur. Phys. J. B* **51**, 461 (2006).

6. M. Hinczewski and A.N. Berker, "Inverted Berezinskii-Kosterlitz-Thouless Singularity and High-Temperature Algebraic Order in an Ising Model on a Scale-Free Hierarchical-Lattice Small-World Network", *Phys. Rev. E* **73**, 066126 (2006).

5. M. Hinczewski and A.N. Berker, "Two Superconducting Phases in the $d = 3$ Hubbard Model: Phase Diagram and Specific Heat from Renormalization-Group Calculations", *Eur. Phys. J. B* **48**, 1 (2005).

4. M. Hinczewski and A.N. Berker, "Multicritical Point Relations in Three Dual Pairs of Hierarchical-Lattice Ising Spin-Glasses", *Phys. Rev. B* **72**, 144402 (2005).

3. D. Saygin Hinczewski, M. Hinczewski, F.Z. Tepehan, and G.G. Tepehan, "Optical Filters from SiO2 and TiO2 Multilayers Using Sol-Gel Spin Coating Method", *Solar Energy Mater. Solar Cells* **87**, 181 (2005).

2. M.I. Bergman, L. Giersch, M. Hinczewski, and V. Izzo, "Elastic and attenuation anisotropy in directionally solidified (hcp) zinc, and the seismic anisotropy in the Earth's inner core", *Phys. Earth Planet. Int.* **117**, 139 (2000).

1. M. Hinczewski and J.C.W. Rogers, "The response of a damped pendulum to a large driving force", *Eur. J. Appl. Math.* **9**, 105 (1998).

Teaching

[U = undergraduate course, G = graduate course]

Fall 2020	Introduction to Biological Physics, PHYS320/420 [U/G], CWRU
Spring 2020	Statistical Mechanics, PHYS414 [G], CWRU
Fall 2019	Introduction to Biological Physics, PHYS320/420 [U/G], CWRU
Spring 2019	Statistical Mechanics, PHYS414 [G], CWRU
Fall 2018	Introduction to Biological Physics, PHYS320/420 [U/G], CWRU
Spring 2018	Statistical Mechanics, PHYS414 [G], CWRU
Fall 2017	Introduction to Biological Physics, PHYS320/420 [U/G], CWRU
Spring 2017	Statistical Mechanics, PHYS414 [G], CWRU
	Coding, Coherence, and Control: Information Theory and Thermodynamics in Quantum Systems, PHYS539 reading course [G], CWRU

Fall 2016	Introduction to Biological Physics, PHYS320/420 [U/G], CWRU
Spring 2016	Statistical Mechanics, PHYS414 [G], CWRU
Fall 2015	Introduction to Biological Physics, PHYS320 [U], CWRU
Spring 2015	Statistical Mechanics, PHYS414 [G], CWRU
Fall 2010	Guest lecturer, Honors Chemistry I [U], University of Maryland
Summer 2008	Recitation instructor, Phase Transitions and Renormalization-Group Theory [G], Feza Gürsey Institute Course lecturer, Statistical Field Theory of Biopolymers [G], Institute of Theoretical and Applied Physics Summer School, Turunç, Turkey
Summer 2007	Lecturer/recitation instructor, Phase Transitions and Renormalization-Group Theory [G], Feza Gürsey Institute
Fall 2006	Course lecturer, Renormalization-Group Methods in Statistical Field Theory [G], Feza Gürsey Institute
Winter 2005	Recitation instructor, Statistical Mechanics II [G], MIT
Fall 2004	Recitation instructor, Quantum Theory I [G], MIT
Summer 2004	Head Physics Instructor, MIT Project Interphase [U]
Spring 2004	Recitation instructor, Quantum Field Theory I [G], MIT Writing tutor, Quantum Mechanics III [U], MIT
Fall 2003	Lecturer, Modern Physics [U], Istanbul Technical University
Spring 2003	Lecturer, Modern Physics [U], Istanbul Technical University
Fall 2002	Recitation instructor, Physics II [U], MIT
Spring 2002	Lecturer, Modern Physics [U], Istanbul Technical University
Fall 2001	Recitation instructor, Quantum Mechanics II [U], MIT
Summer 2001	Recitation instructor, Phase Transitions and Renormalization-Group Theory [G], Feza Gürsey Institute
Spring 2001	Writing tutor, Quantum Mechanics III [U], MIT
Fall 2000	Recitation instructor, Quantum Mechanics II [U], MIT
Spring 2000	Recitation instructor, Physics II [U], MIT
Fall 1999	Recitation instructor, Physics I [U], MIT

Students

Supervised in Ph.D. research:

2020 – now	Ayesha Gonzales
2019 – now	Brandon Shipley
2016 – now	Shamreen Iram
2015 – now	Tenglong Wang
2014 – 2020	Casey Weisenberger
2014 – 2019	Shishir Adhikari, currently: postdoctoral fellow in Hormoz lab, Harvard Medical School

Supervised in postdoctoral research:

2015 – 2017	Efe Ilker, currently: postdoctoral fellow in Joanny lab, Institut Curie, Paris

Supervised in undergraduate research [SP = also mentored senior project research]:

2019 – now Niksa Praljak
2019 – now Akshata Rudrapatna
2019 – now Jake Trookman
2019 – now Joshua Holmes
2018 – now Joshua Chiel
2018 – now Gundeep Singh
2018 – 2019 Julia Pelesko
2017 – 2018 Hannah Goldberg
2017 – 2018 Bradley Schissel [SP]
2017 – 2018 Yuta Hozumi
2017 – 2018 Calvin Pozderac
2016 – 2018 Jacob Moran
2015 – 2018 Benjamin Kuznets-Speck [SP]
2015 – 2017 David Hathcock [SP]
2015 – 2016 James Sheehy [SP]
2015 – 2016 Christopher Weddle [SP]
2015 – 2016 Joseph Broderick [SP]
2014 – 2017 Nicholas Hazen

Co-advised in graduate research projects:

2013 – 2014 Shaon Chakrabarti, University of Maryland
2008 – 2009 Yann von Hansen, Technical University of Munich
2007 – 2008 Can Güven, Koç University
2007 – 2008 Cihan Nadir Kaplan, Koç University
2006 – 2008 Ozan Sariyer, Istanbul Technical University

Conference Organization

January 2012 Chair, Gordon Research Seminar, Ventura, CA
"Protein Folding Dynamics: Topics in Protein Folding and Aggregation"
2016 – now Member of International Scientific Advisory Board, Istanbul Statistical Physics Days conference

Peer Review Activities

Journal: Science, Proceedings of the National Academy of Sciences, Physical Review Letters, Biophysical Journal, PLOS Computational Biology, Physical Review E, Physical Review B, Journal of Chemical Physics, Soft Matter, EPL, European Physical Journal B, Journal of Physics A: Mathematical and Theoretical, Physica A, IEEE Transactions on Molecular, Biological, and Multi-Scale Communications, Journal of Physical Chemistry, Communications Chemistry, Mathematical Biosciences and Engineering
Grant: NSF, Netherlands Foundation for Fundamental Research on Matter, Netherlands Organisation for Scientific Research

Department and University Committee Service

2019 – now Marketing and Communication Committee, Strategic Planning Committee
2018 – now University Advisory Committee on Research Computing
2018 – now Undergraduate Curriculum
2014 – 2019 Graduate Admissions, Graduate Program, Qualifier Exam, Computing
2014 – now Undergraduate Advising
2017 – 2018 Chair of faculty search committee for experimental biophysics
2015 – 2016 Faculty search committee for particle/astrophysics theory

Invited Seminars

Aug. 2, 2019 "Controlling protein dynamics through counterdiabatic driving", Information Engines at the Frontiers of Nanoscale Thermodynamics workshop, Telluride
Nov. 9, 2018 "Steering evolution: what can pulling proteins teach us about population genetics", Oesper Symposium, University of Cincinnati
Jul. 23, 2018 "Steering evolution: shortcuts to adiabaticity in population genetics", Information Engines at the Frontiers of Nanoscale Thermodynamics workshop, Telluride
Jul. 9, 2018 "The ties that bind us together: the statistical mechanics of adhesion proteins", Biophysical Dynamics workshop, Telluride
Mar. 14, 2018 "Microeconomics: The Price of Information Transfer in Living Cells", physics colloquium, University of Maryland, Baltimore County
Mar. 13, 2018 "Microeconomics: The Price of Information Transfer in Living Cells", Informal Statistical Physics seminar, University of Maryland, College Park
Aug. 5, 2017 "Thermodynamic costs and the evolution of noise regulation by microRNAs", Information Engines at the Frontiers of Nanoscale Thermodynamics workshop, Telluride
Jun. 13, 2017 "Microeconomics: the price of information transfer in living cells", 2017 Canadian Workshop on Information Theory, Quebec City
Dec. 1, 2016 "Microeconomics: non-equilibrium thermodynamics and the price of information transfer in living cells", physics colloquium, CWRU
Jun. 24, 2016 "The price of information: thermodynamics and the limits of signaling in living systems", keynote seminar (part 2/2), 23rd Istanbul Statistical Physics Days, Istanbul Technical University
Jun. 23, 2016 "The ties that bind us together: the statistical mechanics of cell adhesion proteins", keynote seminar (part 1/2), 23rd Istanbul Statistical Physics Days, Istanbul Technical University
Mar. 7, 2016 "The price of information: thermodynamics and the limits of signaling in living systems", colloquium, Center for Nonlinear Studies, Los Alamos National Laboratory
Nov. 12, 2015 "Cellular telephone games: how biological networks cope with noisy signal transmission", physics colloquium, Oakland University
Sep. 17, 2015 "Cellular telephone games: how biological networks cope with noisy signal transmission", Center for Proteomics and Bioinformatics, CWRU Medical School

Jul. 13, 2015	"Cellular telephone games: optimizing information transfer through nonlinear, stochastic biological networks", Thermodynamics and Nonlinear Dynamics in the Information Age workshop, Telluride
May 27, 2015	"Cellular telephone games: how biological networks cope with noisy signal transmission", Sabanci University
May 16, 2015	"Gripping tales of cellular adhesion: design principles of catch bonds", Biomolecules and Nanostructures 5 conference, Jaroszowice, Poland
Apr. 2, 2015	"Stepping and gripping: how proteins generate and respond to mechanical forces in the cell", physics colloquium, Kent State University
Nov. 3, 2014	"Noise filtering in cellular signaling networks", Mathematics of the Life Sciences seminar series, CWRU
Oct. 9, 2014	"A gripping tale of cellular adhesion: design principles of catch bonds", 110th International Titisee Conference, Titisee-Neustadt, Germany
Jul. 9, 2014	"Searching, stepping, and stomping: how force regulates the dynamics of the motor protein Myosin V", 7th World Congress of Biomechanics, Boston
Jun. 2, 2013	"Interpreting single molecule optical tweezer data: sketching the energy landscape of biomolecules", Protein Folding Consortium Workshop, U.C. Berkeley
Dec. 11, 2012	"Searching, stepping, and stomping: what polymer theory can teach us about the molecular motor Myosin V", University of Maryland, College Park
Jun. 5, 2012	"Understanding the Stepping Dynamics of Myosin V using Polymer Models", Biopolymers Gordon Research Conference, Salve Regina University
Jul. 26, 2011	"Understanding the Stepping Dynamics of Myosin V using Polymer Models", 1st KIAS Conference on Subcellular Dynamics, Korea Institute for Advanced Study
May 19, 2009	"Dynamics of DNA: experimental controversies and theoretical insights", Forschungszentrum Jülich
May 12, 2009	"Hydrodynamic effects on the kinetics of DNA: experimental controversies and theoretical insights", Johannes Gutenberg-Universität Mainz
May 20, 2008	"Connection between Geometry and Thermal Correlations: Small-World and Community Effects in Scale-Free Hierarchical Networks", 3rd Bilateral Workshop on Novel Materials, Koç University
Oct. 4, 2007	"Unusual Phase Transitions in Complex Networks: Algebraic Order and Griffiths Singularities in Small-world, Fractal Hierarchical Lattices", Tokyo Institute of Technology
Jun. 5, 2007	"Unusual Phase Transitions in Complex Networks: Algebraic Order and Griffiths Singularities in Small-world, Fractal Hierarchical Lattices", Technical University of Munich
Dec. 12, 2006	"Unusual Phase Transitions in Complex Networks: Berezinskii-Kosterlitz-Thouless Singularities in Scale-Free, Small-World and Modular Hierarchical Lattices", University of Michigan
Oct. 5, 2006	"Statistical Mechanics on Complex Networks: Unusual Magnetic Orderings on a Scale-Free, Small-World Hierarchical Lattice", Koç University
Aug. 25, 2006	"Renormalization-Group Theory of Electronic Models: Finite-Temperature Phase Diagrams and the Effects of Spatial Anisotropy and Quenched Disorder", 6th International Conference of the Balkan Physical Union, Istanbul University

May 22, 2006 "Inverted Berezinskii-Kosterlitz-Thouless Singularity and High-Temperature Algebraic Order in an Ising Model on a Scale-Free Hierarchical-Lattice Small-World Network", Service de Physique Theorique de Saclay

Mar. 23, 2006 "New Phases, Superfluid Weights, and Free Carrier Densities: Renormalization-Group Theory of Electronic Models", Rutgers University

Dec. 8, 2005 "New Phases, Superfluid Weights, and Free Carrier Densities: Renormalization-Group Theory of Electronic Models", ETH Zürich

Dec. 7, 2005 "The Ising Model on a Scale-Free, Small-World Hierarchical Lattice Network", Technical University of Munich

Dec. 6, 2005 "The Ising Model on a Scale-Free, Small-World Hierarchical Lattice Network", Ludwig-Maximilians-Universitat Munich

Dec. 1, 2005 "Phase Diagrams of Electronic Systems in 3D: Effects of Spatial Anisotropy and Quenched Impurities", Feza Gürsey Institute

Jul. 3, 2003 "Finite-Temperature Phase Diagram of the Hubbard Model in d=3 from Renormalization-Group Theory", 10th International Statistical Physics Days, Istanbul Technical University

Public Talks

Dec. 9, 2015 "Cellular telephone games: coping with noise in biology", *Life, the Universe, and Hotdogs* seminar series at the Happy Dog, Institute for the Science of Origins

Aug. 25, 2015 "Cellular telephone games: coping with noise in biology", *Life, the Universe, and Hotdogs* seminar series at the Happy Dog, Institute for the Science of Origins

May 14, 2019 "Thermodynamics and the origin of life", *Origin Science Scholars* lecture program, Institute for the Science of Origins