PANKAJ MEHTA

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Education

2006-2010 Postdoctoral Scholar, Molecular Biology and Physics, Princeton University (Mentor: Ned Wingreen)
2006 *Ph.D.* in Physics, Hard Condensed Matter Theory, Rutgers University (Mentor: Natan Andrei)
2000 *B.S.* in Mathematics (with honors), California Institute of Technology

Employment

2021- Professor, Dept. of Physics, Boston University
2020- Founding faculty, Faculty of Computing and Data Science, Boston University
2015- Affiliate faculty, Dept. of Bioengineering,Boston University
2015- Member, BU Biological Design Center, Boston University
2011- Member, Graduate Program in Bioinformatics, Boston University
2013- Member, Center for Regenerative Medicine, Boston University Medical Center
2015-2021 Associate Professor of Physics, Dept. , Boston University
2010-2015 Assistant Professor, Dept. of Physics, Boston University

Fellowships & Awards

2023 Fellow of the American Physical Society
2014 Simons Investigator in the Mathematical Modeling of Living Systems
2014 Scialog Fellow, Molecules Come to Life
2014 Gerald and Deanne Gitner Family Innovation in Teaching Award
2013 Hariri Institute for Computing Junior Faculty Fellow
2011 Alfred P. Sloan Research Fellowship (in Physics)
2008 NIH K25 Quantitative Research Career Development Award

Grants

2022-2023 Investigator, Chan Zuckerberg Initiative (Total Cost: $100,000)
2022-2027 NIH R35 MIRA Outstanding Investigator Award: Modeling emergent behaviors in systems biology:

a biophysical approach (Renewal) (Total Cost: $1,980,000)

2016-2022 NIH R35 MIRA Outstanding Investigator Award: Modeling emergent behaviors in systems biology: a biophysical approach (Total Cost: $1,581,850)

2016-2018 Scialog Grant from Simons Foundation and Research Corporation: Deriving new ecological principles for the microbial world (Total Cost: $75,000)

2015-2016 Scialog Grant from Research Corporation and Moore Foundation: Rethinking the idea of cell type (Total Cost: $50,000)

2014-2019 Simons Investigator in the Mathematical Modeling of Living Systems (Total Cost: $660,000)

2011-2015 Sloan Research Fellowship in Physics (Total Cost: $50,000)

2008-2013 NIH K25 Award: A Quantitative Study of Cell-to-Cell Communication in Bacteria (Total Cost: $643,644)

Professional Service

Workshops and Meetings:

2021 Co-organizer, Eco-evolutionary Dynamics, KITP, UCSB 2021

2020-2021 Program Committee, Mathematical and Scientific Machine Learning, Princeton, NJ

2019 Scientific Advisor, Machine Learning for Quantum Many-Body Physics, KITP, UCSB 2020

2018- Founder and organizer, Annual BU Theory in Biology Meeting, Boston MA May 2018, 2019

2015 Organizer, ICTS and ICTP, Winter School on Quantitative Systems Biology, Dec 2015

2013 Organizer of APS March Meeting session on Excitable Systems in Biology, March 2013

2011 Organizer, Aspen Center for Physics Workshop: Computation and Collective Behavior in Biological Systems, June 2011

2009 Co-organizer of APS March Meeting session on Information Theory, March 2009

Miscellaneous:

2018 Reviewer, NIH R35 MIRA Award Special Study Section

2014- External Reviewer (multiple times), MABS Study Section, NIH

2007-2010 Founder/Principal Organizer of Biophysics Journal Club, Princeton University

Referee for various other funding agencies: European Research Council, FONDECYT-Chile, National Institute of Health, National Science Foundation, Simons Foundation.

Referee for various Journals: Bioinformatics, Biophysical Journal, BMC Systems Biology, Cell, Cell Systems, Current Opinion in Microbiology, Ecology Letters, eLife, Entropy, Journal of the Royal Society Interface, Journal of Statistical Mechanics: Theory and Experiment, Journal of Statistical Physics, Nature Communication, Nucleic Acids Research, Neural Computation, Physical Review Letters, Physics Review B, Physical Review E, Physical Review X, Physical Biology, PLoS Computational Biology, PLoS One, Proceedings of National Academy of Science, Science, Scientific Reports.

Extramural Appointments

2017- Member, Scientific Advisory Board, UnLearn.AI

Teaching & Mentoring

Courses taught:

2010-13 *Mathematical Physics* (graduate) - Designed and taught core-graduate math methods course. Topics covered include Complex Analysis, Dynamical Systems, and Partial Differential Equations.

2011,2018 *Systems Biology for Physicists and Engineers* (graduate) - Designed and taught new course on systems biology for physicists and engineers.

2012-13 *Introductory Physics without Calculus* (undergraduate) - Taught and helped to design materials for a new studio format course that emphasizes active learning (PY105-106).

2014-15 *Methods and Logic in Quantitative Biology* (graduate) - New course cross-listed in Physics and Biomedical Engineering.The main focus of this course is the close reading of published papers illustrating the principles, achievements, and difficulties that lie at the interface of theory and experiment in biology.

2015-17 *Statistical and Thermal Physics* (undergraduate) - This is an undergraduate course that teaches Statistical Physics to undergraduate Physics majors. An emphasis was placed on integrating numerical methods such as Monte Carlo using Python notebooks.

2016,2018, 2020, 2022-23 *Machine Learning for Physicists* (graduate) - A new special topics class for advanced graduate students that I developed to learn Machine Learning.

2019-21 *Introduction to Biological Physics* - Designed new graduate level introductory Biological Physics course.

2021-22 *Statistical Physics* (graduate)- Core graduate level Statistical Physics course.

Mentoring:

Current:

Graduate Students: Maria Yampolskya, Zhijie (Sarah) Feng

Postdocs: Jason Rocks

Alumni: (with last known position)

Postdoctoral Scholars: Charles K. Fisher (CEO and founder, unLearn.ai), Robert Marsland (training to be priest at Pontifical University of the Holy Cross), Alex Golden - jointly with Kirill Korolev (Senior Data Scientist, Wayfair)

Graduate Students: Alex H Lang (Senior Manager- Perception, Cruise), Javad Noorbakhsh (Computational Scientist, Broad Institute), Alexandre Day (Data Scientist Architect, Afiniti), Ching-Hao Wang (AI/ML researcher, GSK),Wenping Cui (KITP Fellow)

Undergraduate Students: Joseph Evans-Sarmiego, Ania Baetica, Wooseok (Steven) Ahn, Madeline Dickens (NSF Graduate Fellowship), Owen Howell (NSF Graduate Fellowship)

Publications and Preprints

2023 E. Blumenthal, J. W. Rocks, and P. Mehta. Phase transition to chaos in complex ecosystems with non-reciprocal species-resource interactions. *arXiv preprint arXiv:2308.15757*, 2023.

2023 E. Blumenthal and P. Mehta. Geometry of ecological coexistence and niche differentiation. *arXiv preprint arXiv:2304.10694*, 2023.

2023 Z. Feng, R. Marsland III, J. W. Rocks, and P. Mehta. Emergent competition shapes the ecological properties of multi-trophic ecosystems. *arXiv preprint arXiv:2303.02983*, 2023.

2023 M. Yampolskaya, M. Herriges, L. Ikonomou, D. Kotton, and P. Mehta. sctop: physics-inspired order parameters for cellular identification and visualization. *bioRxiv*, pages 2023–01, 2023.

2023 M. J. Herriges, M. Yampolskaya, B. R. Thapa, J. Lindstrom-Vautrin, F. Wang, J. Huang, C.-L. Na, L. Ma, M. M. Montminy, P. Bawa, et al. Durable alveolar engraftment of psc-derived lung epithelial cells into immunocompetent mice. *Cell Stem Cell*, 30(9):1217–1234, 2023.

2023 R. W. O'Connell, K. Rai, T. C. Piepergerdes, Y. Wang, K. D. Samra, J. A. Wilson, S. Lin, T. H. Zhang, E. Ramos, A. Sun, et al. Ultra-high throughput mapping of genetic design space. *bioRxiv*, pages 2023–03, 2023.

2022 J. W. Rocks and P. Mehta. Integrating local energetics into maxwell-calladine constraint counting to design mechanical metamaterials. *arXiv preprint arXiv:2208.07419*, 2022.

2022 P. Mehta and J. Rocks. Thermodynamic origins of topological protection in nonequilibrium stochastic systems. *arXiv preprint arXiv:2206.07761*, 2022.

2022 J. Anibal, A. G. Day, E. Bahadiroglu, L. O'Neil, L. Phan, A. Peltekian, A. Erez, M. Kaplan, G. Altan-Bonnet, and P. Mehta. Hal-x: Scalable hierarchical clustering for rapid and tunable single-cell analysis. *PLoS Computational Biology*, 18(10):e1010349, 2022.

2022 J. Anibal, A. G. Day, E. Bahadiroglu, L. O'Neil, L. Phan, A. Peltekian, A. Erez, M. Kaplan, G. Altan-Bonnet, and P. Mehta. Hal-x: Scalable hierarchical clustering for rapid and tunable single-cell analysis. *PLoS Computational Biology*, 18(10):e1010349, 2022.

2022 J. W. Rocks and P. Mehta. Bias-variance decomposition of overparameterized regression with random linear features. *Physical Review E*, 106(2):025304, 2022.

2022 J. W. Rocks and P. Mehta. Memorizing without overfitting: Bias, variance, and interpolation in overparameterized models. *Physical Review Research*, 4(1):013201, 2022.

2021 R. Marsland, O. Howell, A. Mayer, and P. Mehta. Tregs self-organize into a computing ecosystem and implement a sophisticated optimization algorithm for mediating immune response. *Proceedings of the National Academy of Sciences*, 118(1), 2021.

2021 P. Mehta and R. Marsland III. Cross-feeding shapes both competition and cooperation in microbial ecosystems. *arXiv preprint arXiv:2110.04965*, 2021.

2021 C. Huyan, A. Golden, X. Zhu, P. Mehta, and A. E. Sgro. Robust coordination of collective oscillatory signaling requires single-cell excitability and fold-change detection. *bioRxiv*, 2021.

2021 J. W. Rocks and P. Mehta. The geometry of over-parameterized regression and adversarial perturbations. *arXiv preprint arXiv:2103.14108*, 2021.

2021 A. Golden, A. E. Sgro, and P. Mehta. Arnold tongues in oscillator systems with nonuniform spatial driving. *Physical Review E*, 103(4):042211, 2021.

2020 W. Cui, J. W. Rocks, and P. Mehta. The perturbative resolvent method: spectral densities of random matrix ensembles via perturbation theory. *arXiv preprint arXiv:2012.00663*, 2020.

2020 R. Marsland III and P. Mehta. Data-driven modeling reveals a universal dynamic underlying the covid-19 pandemic under social distancing. *arXiv preprint arXiv:2004.10666*, 2020.

2020 R. Marsland III, W. Cui, and P. Mehta. The minimum environmental perturbation principle: A new perspective on niche theory. *The American Naturalist*, 196(3):000–000, 2020.

2020 W. Cui, R. Marsland III, and P. Mehta. Effect of resource dynamics on species packing in diverse ecosystems. *Physical Review Letters*, 125(4):048101, 2020.

2020 D. P. Shams, X. Yang, P. Mehta, and D. J. Schwab. Spatial gradient sensing and chemotaxis via excitability in dictyostelium discoideum. *Physical Review E*, 101(6):062410, 2020.

2020 O. L. Howell, W. Cui, R. Marsland III, and P. Mehta. Machine learning as ecology. *Journal of Physics A: Mathematical and Theoretical*, 2020.

2020 R. Marsland, W. Cui, J. Goldford, and P. Mehta. The community simulator: A python package for microbial ecology. *Plos one*, 15(3):e0230430, 2020.

2020 R. Marsland, W. Cui, and P. Mehta. A minimal model for microbial biodiversity can reproduce experimentally observed ecological patterns. *Scientific Reports*, 10(1):1–17, 2020.

2020 L. Ikonomou, M. J. Herriges, S. L. Lewandowski, R. Marsland, C. Villacorta-Martin, I. S. Caballero, D. B. Frank, R. M. Sanghrajka, K. Dame, M. M. Kańduła, et al. The in vivo genetic program of murine primordial lung epithelial progenitors. *Nature Communications*, 11(1):1–17, 2020.

2019 W. Cui, R. Marsland III, and P. Mehta. Diverse communities behave like typical random ecosystems. *arXiv preprint arXiv:1904.02610*, 2019.

2019 P. Mehta, W. Cui, C.-H. Wang, and R. Marsland III. Constrained optimization as ecological dynamics with applications to random quadratic programming in high dimensions. *Physical Review E*, 99(5):052111, 2019.

2019 P. Mehta, M. Bukov, C.-H. Wang, A. G. Day, C. Richardson, C. K. Fisher, and D. J. Schwab. A high-bias, low-variance introduction to machine learning for physicists. *Physics Reports*, 2019.

2019 R. Marsland III, W. Cui, J. Goldford, A. Sanchez, K. Korolev, and P. Mehta. Available energy fluxes drive a transition in the diversity, stability, and functional structure of microbial communities. *PLoS computational biology*, 15(2):e1006793, 2019.

2019 A. G. Day, M. Bukov, P. Weinberg, P. Mehta, and D. Sels. Glassy phase of optimal quantum control. *Physical Review Letters*, 122(2):020601, 2019.

2018 C.-H. Wang, C. J. Bashor, and P. Mehta. The strength of protein-protein interactions controls the information capacity and dynamical response of signaling networks. *arXiv preprint arXiv:1811.05371*, 2018.

2018 J. E. Goldford, N. Lu, D. Bajić, S. Estrela, M. Tikhonov, A. Sanchez-Gorostiaga, D. Segrè, P. Mehta*, and A. Sanchez*. Emergent simplicity in microbial community assembly. *Science*, 361(6401):469–474, 2018.

2018 M. Bukov, A. G. Day, D. Sels, P. Weinberg, A. Polkovnikov, and P. Mehta. Reinforcement learning in different phases of quantum control. *Physical Review X*, 8(3):031086, 2018.

2018 W. Cui and P. Mehta. Identifying feasible operating regimes for early t-cell recognition: The speed, energy, accuracy trade-off in kinetic proofreading and adaptive sorting. *PloS one*, 13(8):e0202331, 2018.

2018 M. Advani, G. Bunin, and P. Mehta. Statistical physics of community ecology: a cavity solution to macarthur's consumer resource model. *Journal of Statistical Mechanics: Theory and Experiment*,

2018(3):033406, 2018.

2018 M. Bukov, A. G. Day, P. Weinberg, A. Polkovnikov, P. Mehta, and D. Sels. Broken symmetry in a two-qubit quantum control landscape. *Physical Review A*, 97(5):052114, 2018.

2017 M. Kolodrubetz, D. Sels, P. Mehta, and A. Polkovnikov. Geometry and non-adiabatic response in quantum and classical systems. *Physics Reports*, 697:1–87, 2017.

2017 S. T. Pusuluri, A. H. Lang, P. Mehta, and H. E. Castillo. Cellular reprogramming dynamics follow a simple 1d reaction coordinate. *Physical biology*, 15(1):016001, 2017.

2017 C.-H. Wang, P. Mehta, and M. Elbaum. Thermodynamic paradigm for solution demixing inspired by nuclear transport in living cells. *Physical Review Letters*, 118(15):158101, 2017.

2017 K. Dame, S. Cincotta, A. H. Lang, R. M. Sanghrajka, L. Zhang, J. Choi, L. Kwok, T. Wilson, M. M. Kańduła, S. Monti, et al. Thyroid progenitors are robustly derived from embryonic stem cells through transient, developmental stage-specific overexpression of nkx2-1. *Stem Cell Reports*, 8(2):216–225, 2017.

2016 B. Dickens, C. K. Fisher, and P. Mehta. Analytically tractable model for community ecology with many species. *Physical Review E*, 94(2):022423, 2016.

2016 P. Mehta, A. H. Lang, and D. J. Schwab. Landauer in the age of synthetic biology: energy consumption and information processing in biochemical networks. *Journal of Statistical Physics*, pages 1–14.

2015 C. K. Fisher and P. Mehta. Bayesian feature selection with strongly regularizing priors maps to the ising model. *Neural computation*, 27(11):2411–2422, 2015.

2015 J. Noorbakhsh, D. J. Schwab, A. E. Sgro, T. Gregor, and P. Mehta. Modeling oscillations and spiral waves in dictyostelium populations. *Physical Review E*, 91(6):062711, 2015.

2015 A. A. Wilson, L. Ying, M. Liesa, C.-P. Segeritz, J. A. Mills, S. S. Shen, J. Jean, G. C. Lonza, D. C. Liberti, A. H. Lang, et al. Emergence of a stage-dependent human liver disease signature with directed differentiation of alpha-1 antitrypsin-deficient ips cells. *Stem cell reports*, 4(5):873–885, 2015.

2015 A. E. Sgro, D. J. Schwab, J. Noorbakhsh, T. Mestler, P. Mehta, and T. Gregor. From intracellular signaling to population oscillations: Bridging scales in collective behavior. *Molecular Systems Biology*, 11(799), 2015.

2015 C. K. Fisher and P. Mehta. Bayesian feature selection for high-dimensional linear regression via the ising approximation with applications to genomics. *Bioinformatics*, page btv037, 2015.

2014 P. Mehta and D. J. Schwab. An exact mapping between the variational renormalization group and deep learning. *arXiv:1410.3831*.

2014 L. Chen, J. Noorbakhsh, R. M. Adams, J. Samaniego-Evans, G. Agollah, D. Nevozhay, J. Kuzdzal-Fick, P. Mehta, and G. Balázsi. Two-dimensionality of yeast colony expansion accompanied by pattern formation. *PLOS Computational Biology*, 10(12):e1003979, 2014.

2014 A. H. Lang, C. Fisher, T. Mora, and P. Mehta. Thermodynamics of statistical inference by cells. *Physical review letters*, 113:148103, 2014.

2014 C. K. Fisher and P. Mehta. On the transition between the niche and neutral regimes in ecology. *Proceedings of the National Academy of Sciences*, page e102451, 2014.

2014 D. J. Schwab, I. Nemenman, and P. Mehta. Zipf's law and criticality in multivariate data without fine-tuning. *Physical review letters*, 113:68102, 2014.

2014 A. H. Lang, H. Li, J. J. Collins, and P. Mehta. Epigenetic landscapes explain partially reprogrammed cells and identify key reprogramming genes. *PLoS computational biology*, 10(8):e1003734, 2014.

2014 C. K. Fisher and P. Mehta. Identifying keystone species in the human gut microbiome from metagenomic timeseries using sparse linear regression. *PLoS one*, 9(7):e102451, 2014.

2014 W. R. Harcombe, W. J. Riehl, I. Dukovski, B. R. Granger, A. Betts, A. H. Lang, G. Bonilla, A. Kar, N. Leiby, P. Mehta, et al. Metabolic resource allocation in individual microbes determines ecosystem interactions and spatial dynamics. *Cell reports*, 7(4):1104–1115, 2014.

2014 A. Mertiri, H. Altug, M. K. Hong, P. Mehta, J. C. Mertz, L. D. Ziegler, and S. Erramilli. Nonlinear mid-infrared photothermal spectroscopy using zharov splitting and quantum cascade lasers. *ACS Photonics*, 2014.

2013 J. Noorbakhsh, A. H. Lang, and P. Mehta. Intrinsic noise of microrna-regulated genes and the cerna hypothesis. *PloS one*, 8(8):e72676, 2013.

2013 E. Reznik, P. Mehta, and D. Segrè. Flux imbalance analysis and the sensitivity of cellular growth to changes in metabolite pools. *PLoS computational biology*, 9(8):e1003195, 2013.

2012 P. Mehta and D. J. Schwab. Energetic costs of cellular computation. *Proceedings of the National Academy of Sciences*, 109(44):17978–17982, 2012.

2012 P. Mehta and A. Polkovnikov. Efficiency bounds for nonequilibrium heat engines. *Annals of Physics*, 332:110–126, 2012.

2012 D. J. Schwab, G. G. Plunk, and P. Mehta. Kuramoto model with coupling through an external medium. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 22(4):043139, 2012.

2012 D. J. Schwab, A. Baetica, and P. Mehta. Dynamical quorum-sensing in oscillators coupled through an external medium. *Physica D: Nonlinear Phenomena*, 241(21):1782–1788, 2012.

2011 P. Mehta, D. J. Schwab, and A. M. Sengupta. Statistical mechanics of transcription-factor binding site discovery using hidden markov models. *Journal of statistical physics*, 142(6):1187–1205, 2011.

2011 S.-W. Teng, J. N. Schaffer, K. C. Tu, P. Mehta, W. Lu, N. Ong, B. L. Bassler, and N. S. Wingreen. Active regulation of receptor ratios controls integration of quorum-sensing signals in vibrio harveyi. *Molecular systems biology*, 7(1), 2011.

2010 P. Mehta and T. Gregor. Approaching the molecular origins of collective dynamics in oscillating cell populations. *Current opinion in genetics & development*, 20(6):574–580, 2010.

2010 S.-W. Teng, Y. Wang, K. C. Tu, T. Long, P. Mehta, N. S. Wingreen, B. L. Bassler, and N. Ong. Measurement of the copy number of the master quorum-sensing regulator of a bacterial cell. *Biophysical journal*, 98(9):2024–2031, 2010.

2009 P. Mehta, S. Goyal, T. Long, B. L. Bassler, and N. S. Wingreen. Information processing and signal integration in bacterial quorum sensing. *Molecular systems biology*, 5(1), 2009.

2009 T. Long, K. C. Tu, Y. Wang, P. Mehta, N. Ong, B. L. Bassler, and N. S. Wingreen. Quantifying the integration of quorum-sensing signals with single-cell resolution. *PLoS biology*, 7(3):e1000068, 2009.

2008 P. Mehta and N. Andrei. Nonequilibrium quantum impurities: From entropy production to information theory. *Physical review letters*, 100(8):086804, 2008.

2008 P. Mehta, R. Mukhopadhyay, and N. S. Wingreen. Exponential sensitivity of noise-driven switching in genetic networks. *Physical biology*, 5(2):026005, 2008.

2008 P. Mehta, S. Goyal, and N. S. Wingreen. A quantitative comparison of srna-based and protein-based gene regulation. *Molecular systems biology*, 4(1), 2008.

2007 E. Boulat, P. Mehta, N. Andrei, E. Shimshoni, and A. Rosch. Heat transport properties of clean spin ladders coupled to phonons: Umklapp scattering and drag. *Physical Review B*, 76(21):214411, 2007.

2006 P. Mehta and N. Andrei. Nonequilibrium transport in quantum impurity models: The bethe ansatz for open systems. *Physical review letters*, 96(21):216802, 2006.

2005 P. Mehta, N. Andrei, P. Coleman, L. Borda, and G. Zarand. Regular and singular fermi-liquid fixed points in quantum impurity models. *Physical Review B*, 72(1):014430, 2005.

Invited Talks, Seminars, and Schools

12/2023 Invited Talk, ICAM Annual Conference, Santa Barbara, CA

10/2023 Quantitative Biology Seminar, Cold Spring Harbor Laboratory, NY

9/2023 Invited lectures, 17th Granada Seminar of Computational and Statistical Physics, Granada, Spain

8/2023 Invited lectures, NSF IAIFI Summer School, Boston , MA

7/2023 Invited lectures, Les Houches Summer School, Les Houches, France

4/2023 QCB Seminar, Princeton University, Princeton, NJ

3/2023 Invited Talk, APS March Meeting, Las Vegas, NV

2/2023 Widely Applied Math Seminar, Harvard, Cambridge, MA

1/2023 Biophysics and Quantitative Biology in the AI Era, Carnegie Mellow, Pittsburg, PA

12/2022 Biological Physics & Physical Biology Seminar (webinar)

11/2022 Invited Lectures, ICTP-KIAS School on Statistical Physics for Life Sciences, Seoul, Korea

10/2022 Applied Math Seminar, Darthmouth University, Hanover, NH

6/2022 Ned Wingreen 60th Birthday Symposium, Princeton University, Princeton, NJ

4/2022 BiophysTO Lunchtime Talks, University of Toronto, Toronto, ON (online)

4/2022 Center for Theoretical Biological Physics Seminar, Rice University, Houston, TX

4/2022 Quantitative Biology Seminar, Ohio University, Athens OH (online)

2/2022 Physics Colloquium (Machine Learning), Emory University, Atlanta GA

12/2021 Panel, Learning Meaningful Representations of Life, NeuroIPS2021 (online)

12/2021 Physics of Life Network Seminar Series, Imperial College, London, England (online)

12/2021 Physics Colloquium, Brandeis University, Waltham MA

9/2021 Talk, HHMI Janelia Planning Workshop, 4D Cellular Physiology Reimagined: Theory as a Principal Component, Janelia Farms, VA

9/2021 Physics Colloquium (Biophysics), Emory University, Atlanta, GA

7/2021 Lecture, Ecology and Evolution of Microbial Communities, KITP, Santa Barbara, CA

5/2021 Physics Colloquium, University of California Riverside, Riverside, CA

12/2020 Physics Colloquium, Rutgers University, Piscataway, NJ

11/2020 Models, Inference, and Algorithms Seminar, Broad Institute, Cambridge, MA

10/2020 Invited Talk, Physical Concepts in Immunology, Cologne, Germany

4/2020 Physics Theory Seminar, Université Paris Diderot

3/2020 Invited Talk, UCSD Physics Department, San Diego, CA

12/2019 Biophysics Seminar, OSU, Columbus, OH

9/2019 Invited Talk, Deep Learning for Physics, PCTS, Princeton, NJ

7/2019 Invited Talk, Information processing in single cells, Aspen Center for Physics, Aspen, CO

5/2019 Invited Talk, Quantitative Biology Initiative, Harvard University, Cambridge, MA

5/2019 Computations in Science Seminars, University of Chicago, Chicago, IL

2/2019 Invited Lectures, Statistical Physics Approaches to Systems Biology, Havana, Cuba

1/2019 Invited Talk, Theoretical Biophysics Workshop at Emory University, Atlanta, GA

12/2018 Invited Talk, PCTS Bridging Theory and Experiment in Microbial Communities, Princeton, NJ

11/2018 Invited Talk, Quantitative Biology Initiative, Harvard University, Cambridge MA

10/2018 Invited Talk, PhysicsNext Workshop on Machine Learning (organized by Physical Review Editors), Long Island, NY

5/2018 Chemical Engineering Seminar, CSU, Fort Collins, CO

4/2018 Invited Talk, Stochastic Models in Ecology and Evolutionary Biology, Venice, Italy

2/2018 Bioinformatics Seminar, UNC, Chapel Hill, NC

12/2017 Invited Talk, Physics and Machine Learning, CUNY, New York, NY

10/2017 Invited Talk, Harnessing Work from Noise Workshop, UMass Amherst, Amherst, MA

9/2017 Keynote Address, MIT Biophysics Retreat, Cape Cod, MA

9/2017 ”Science at the Edge” Seminar, Michigan State, East, Lansing, MI

8/2017 Invited Talk, KITP Workshop on Eco-Evolutionary Dnyamics, KITP. Santa Barbara, CA

7/2017 Invited Talk, Q-bio Conference, Rutgers University, New Brunswick, NJ

7/2017 Invited Talk, ICTP Workshop: Microbial Economy of Microbial Communities, Trieste, Italy

5/2017 Condensed Matter Seminar, Syracuse, Syracuse, NY

4/2017 Invited Talk, SCIALOG: Molecules Meet Life, Tuscon, AZ

3/2017 Invited Talk, APS March Meeting, New Orleans, LA

2/2017 Condensed Matter Seminar, Rutgers University, Piscataway, NJ

11/2016 Ecology and Evolutionary Biology Seminar, Yale University, New Haven, CT

9/2016 Computational Neuroscience Seminar, University of Pennsylvania, Philadelphia, PA

9/2016 Physical Mathematics Seminar, MIT, Cambridge, MA

7/2016 Annual Meeting of the International Physics of Living Systems (iPoLS) Network, Cambridge, MA

5/2016 Physics Colloquium, Rensselaer Polytechnic Institute, Troy, NY

4/2016 Scialog: Molecules come to Life, Tuscon, MA

3/2016 Scientific Computing Seminar, Applied Mathematics, Brown University, Providence, RI

2/2016 Channing Network Science Seminar, Brigham Young Hospital, Boston, MA

1/2016 MIT Meeting on Quantitative Biology, Cambridge, MA

1/2016 Physics Inspired Machine Learning Conference, Los Alamos, NM

12/2015 ICTS Winter School on Quantitative Systems Biology, Bangalore, India

11/2015 CIRCS Seminar, Northeastern, Boston, MA

11/2015 Physics Colloquium, UMass Boston, Boston, MA

11/2015 Harvard Widely Applied Math Seminar, Cambridge, MA

9/2015 Purdue Center for Cancer Research, Purdue, IN

8/2015 Biological Distributed Algorithms (BDA) 2015, Cambridge, MA

7/2015 META Symposium on Host-Microbe interactions, Eugene, OR
4/2015 Simon's Conference on Theory in Biology, New York, NY
4/2015 Biological Physics Seminar, UCLA, Los Angeles, CA
3/2015 Presentation, Scialog: Molecules Come to Life, Tuscon, AZ
3/2015 Chez Pierre Condensed Matter Theory Seminar, MIT, Cambirdge, MA
2/2015 Theory Lunch, Dept. of Systems Biology, Harvard Medical School, Boston, MA
2/2015 BMSE/Qbio Seminar, UCSB, Santa Barbara, CA
1/2015 Biomedical Engineering Seminar, Boston University, Boston, MA
1/2015 Invited Talk, Dynamics Days, Houston, TX
12/2014 Physics Colloquium,Boston University, Boston, MA
11/2014 Dynamics Seminar, Dept. of Mathematics, Boston University, Boston, MA
11/2014 Hariri Institute for Computing, Boston University, Boston, MA
11/2014 Dynamics Seminar, Dept. of Mathematics, Boston University, Boston, MA
10/2014 Condensed Matter Seminar, Brown University, Providence, RI
10/2014 Invited Talk, BIOMS Workshop "Modeling Cellular Systems", Heidelberg, Germany
6/2014 Invited Talk, ICTP Workshop of Cellular Economics, Trieste, Italy
3/2014 Invited Talk, American Physical Society March Meeting Denver, CO
10/2013 Biophysics Seminar, Princeton University, Princeton, NJ
9/2013 Invited Talk, BANFF Workshop on Stochasticity in Biochemical Networks, Banff, AB, Canada
4/2013 MIT/BU Biophysics Theory Supergroup, MIT, Cambridge, MA
4/2013 Seminar at Center for Physics and Biology, Rockefeller University, New York, NY
11/2012 Physics Colloquium, Brandeis University,Waltham, MA
10/2012 Physics Colloquium, University of Massachusetts Boston, Boston, MA
5/2012 Condensed Matter Seminar, McGill University, Montreal, QC, Canada
2/2012 Networks Seminar, University of Houston, Houston, TX
11/2011 Molecular and Cell Biology Seminar, Boston University, Boston, MA
11/2011 Mathematical Physics Seminar, MIT, Cambridge, MA
5/2011 Bauer Forum, Bauer Center for Systems Biology, Cambridge, MA
1/2011 Systems Biology Seminar, Boston University, Boston, MA
12/2010 MRSEC/Biophysics Joint Seminar, Brandeis, Waltham, MA
11/2010 CSBi Seminar Series, MIT, Cambridge, MA
2/2010 Center for Physics and Biology, Rockefeller University, New York, NY
1/2010 Condensed Matter Seminar, Boston University, Boston, MA
1/2010 Physics Colloquium, Vanderbilt University, Nashville, TN
11/2009 Molecular and Cell Biology Colloquium, University of Arizona, Tuscon, AZ
10/2009 Biophysics Seminar, University of Pennsylvania, Philadelphia, PA
3/2009 Invited Talk, American Physical Society March Meeting, Pittsburg, PA
2/2009 Condensed Matter Seminar, MIT, Cambridge, MA
3/2007 Invited Talk, American Physical Society March Meeting Denver, CO