ILYA NEMENMAN

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CV last updated on August 31, 2016
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EDUCATION

Princeton University, Physics, PhD 2000, Advisor: William Bialek
San Francisco State University, Physics, MS 1997, Advisor: Ronald Adler
Santa Clara University, Physics/Math, BS 1995
Belarusian State University, Theoretical Physics, 1991 – 1994, Advisor: Albert Minkevich

APPOINTMENTS

since 2009 Professor, Departments of Physics and Biology (tenured since 2012, Associate Professor until 2016), Emory University, Atlanta, GA
2005 – 2009 Technical Staff Member, R&D Scientist-4, CCS-3, Los Alamos National Laboratory
2004 – 2005 Associate Research Scientist, Joint Centers for Systems Biology, Columbia University Medical Center, New York, Advisor: Andrea Califano
2001 – 2004 Postdoctoral Scientist, Kavli Institute for Theoretical Physics, UC Santa Barbara, Postdoctoral fellows at KITP do not have formal advisors
2000 – 2001 Postdoctoral Scientist, NEC Research Institute, Princeton, New Jersey, Advisor: William Bialek
1998 – 1999 Research Scientist, Gravity Probe B (GP-B), HEPL, Stanford University.
1997 – 1997 Student Researcher, L3 experiment, CERN/PPE, Geneva

CONCURRENT APPOINTMENTS

since 2010 Population Biology, Ecology, and Evolution Graduate Program, Emory University
since 2010 Neuroscience Graduate Program, Emory University
since 2011 External Research Associate, Info-metrics Institute, American University, Washington, DC
since 2010 External Associate, Vanderbilt Institute for Integrative Biosystems Research and Education (VIIBRE), Nashville, TN
since 2009 Computational and Life Sciences Strategic Initiative Core Faculty, Emory University
2007 – 2010 Visiting Scientist, New Mexico Consortium, Los Alamos, NM
2007 – 2009 Affiliate, Executive Committee Member, Center for Nonlinear Studies, Los Alamos National Laboratory
2008 – 2009 Information Science and Technology Center Science Council, LANL
2007 – 2008 Adjunct Assistant Professor, Department of Physics, University of New Mexico, Albuquerque, NM

TEACHING

since 2009 Emory University: Introductory Physics, Computational Neuroscience, Stochasticity in Biology, Physical Biology: Information Processing in Biological Systems, Quantum Field Theory, Graduate Electrodynamics, Freshman Seminar: Where do laws of nature come from?, Computational Modeling for Scientists and Engineers
2012, 2015 Emory-Tibet Science Initiative, Quantum Mechanics and Classical Mechanics courses for Tibetan monastics, India
2011 – 2015 *The q-bio Conference on Cellular Information Processing*, tutorial
2007 – 2010, 2013 – 2014 *The q-bio Summer School on Cellular Information Processing*, organizer and instructor
2009 *Information Processing in Biology* summer school, Beijing University, China
2006 – 2007 *Los Alamos Summer School*, instructor
2004 – 2005 Columbia University, Department of Biomedical Informatics, co-instructor, *Computational Biology: Functional and Integrative Genomics*
2002 UCSB, Department of Statistics; NYU, Courant Institute, Bioinformatics group, visiting instructor, lecture series in *Statistical Inference*

1999 – 2001 Marine Biological Laboratory, Woods Hole, MA, teaching assistant, *Methods in Computational Neuroscience*
1997 – 1999 Princeton University, Department of Physics, teaching assistant
1995 – 1996 San Francisco State University, Department of Physics, teaching assistant

HONORS AND AWARDS

2016 Computational and Systems Neuroscience (COSYNE) Conference Mentorship Travel Award (Mentee: Caroline Holmes)
2015 Elected General Member of the Board, Aspen Center for Physics, Aspen, CO
2015 Heinz Pagels Public Lecture, Aspen Center for Physics, Aspen, CO
2013 Elected to the Chair line, Division of Biological Physics, American Physical Society
2013, 2015 Phi Beta Kappa Mentor Recognition
2012 James S. McDonnell Foundation Complex Systems Scholar Award
2012 Student-invited colloquium, Cornell University Biophysics Program, Ithaca, NY
2012 Vice Chair nomination, Division of Biological Physics, American Physical Society
2011 Emory University, *Top Ten Science Story of 2011* recognition of Cheong et al., 2011
2011 Physical Biology: *Highlight of 2010* recognition of Bel et al., 2010
2011 Executive Committee nomination, Division of Biological Physics, American Physical Society
2009 Distinguished Performance Award Nomination, LANL
2009 SPOT Award, Computer and Computational Sciences Division, LANL
2004 National Science Foundation Scholar (declined), StatPhys 22
1999 Outstanding Teaching Assistant, Department of Physics, Princeton University
1997 Graduate Student Distinguished Achievement Award, SFSU
1996 Outstanding Teaching Assistant, Department of Physics, SFSU
1993–1994 Honorary Stipend, Belarusian State University, Minsk, Belarus
1991 Winner, Belarusian National High School Physics Olympiad

RESEARCH SUPPORT

Current

NSF/PoLS/1410978 "Collaborative Research: Multicellular Communication in Gradient Sensing," PI, 2015-2018
JSMF/ 220020321 "In search of simplicity: Coarse-graining cellular information processing networks", PI, 2012-2017.
NSF/IOS/1208126 "Computational characterization of *C. elegans* nociceptive behavior as a quantitative model for pain transduction", PI, 2012-2016.

Completed

HFSP/RGY0084/2011 "Adaptive behavior of *C. elegans* in complex sensory environments", PI (multiple PIs), collaborative program requiring multiple international investigators, 2011-2015.
NIH/NIGMS/2R13GM082162-03 "Information processing in cellular signaling and gene regulation", PI (multiple PIs; contact PI for 2009-2011), *The q-bio Conference* support grant, 2011-2014.
NIH/NCI/7R01CA132629 "Differential Metabolic Analysis of Tumor Progression", co-PI 2007–2012.
ARO/60704-NS-II "Improving image segmentation with adaptive, recurrent, spiking neural network models of the primary visual cortex", PI, 2011-2012.
DOE/LANL/LDRD/20090001DR "Synthetic Cognition Through Peta-scale Modeling of Mammalian Visual Cortex", 2008–2011, co-PI in 2008-2009, collaborator since 2009.
NSF-OCI-0749348 "Peta-scale computing infrastructure: High Performance Neural Computing", co-PI, 2008–2011.
DOE/LANL/LDRD/20080391ER "Stochastic Transport on Networks: Efficient Modeling And Applications to Epidemiology", PI, 2007–2010.
DOE/LANL/LDRD/20080138DR "Genomes to Behavior: Predicting Bacterial Response by Constrained Network Interpolation", co-investigator, 2007–2010.
NIH/NIGMS/1R21GM080216 "System-wide Study of Transcriptional Control of Metabolism", co-PI, 2007–2009.
NSF/ECS/0425850 "QSB: Optimal information processing in biological networks", co-PI, 2004–2008.

NSF/ECS/0332479 "SGER: Developing learning theory for genetic network inference", co-PI, 2003–2005.

SYNERGISTIC ACTIVITIES

National Service

- General Member of the Board, Public Lectures Committee, Aspen Center for Physics
- Chair (2016), Chair-elect / Program Committee chair (2015), and Vice-Chair / Chair of Fellowship Committee (2014), Division of Biological Physics, American Physical Society
- Chair, The q-bio Conference Board (2013-2016)
- Bellman Prize Committee member, Mathematical Biosciences, Society for Mathematical Biology (2015)
- The Info-Metrics Halbert L. White, Jr. Memorial Prize Selection Committee member (2015)

Emory Service

- Computational and Life Sciences Internal Advisory Committee and Faculty Search Committee (2009-2013)
- URC Natural Sciences Sub-Committee member and chair (2010-2014)
- Physics/Theoretical Biophysics Faculty Search Committee, Biology/Computational Neuroscience Faculty Search Committee (2013-2015)
- Physics Graduate Program Selection Committee (2009-2011)
- PBEE Recruitment Chair (2014-2017)
- Physics Curriculum Committee (2013-onwards)
- Quantitative Biology Track Committee (2014-2015)
- other minor committees

LANL Service

- Biological and Environmental Research / Systems Biology, Neuroscience, and Information Science steering committee
- New Mexico Consortium Neural Computing steering committee
- CNLS Executive Committee

External Advising

- DOE/GTL Knowledgebase
- NIH/NCI "Physical Science and New Frontiers in Oncology" Think Tank

Editorial Boards

- *Physical Biology* (since 2013)
- *IET Systems Biology* (2009-2013)
- *Experimental Biology and Medicine* (2009-2012)

School organization

- *Cargese School on Theoretical Biophysics*, Corsica, France (2017)
- *The q-bio Summer School on Cellular Information Processing*, Los Alamos, NM (2007-2009) — founding organizer

Conference organization

- *The APS March Meeting*, Division of Biological Physics program chair, Baltimore, MD (2016)
- *Atlanta Systems Biophysics meeting*, Atlanta, GA (2015)
- *Physics of Neural Systems* Focus Session, APS March Meeting, 2015, San Antonio, TX
- *The q-bio Conference on Cellular Information Processing*, Santa Fe, NM, Blacksburg, VA, Nashville, TN (2007-2017) — founding organizer
- *11th International Conference on Computational Methods in Systems Biology*, Vienna, Austria (2013)

- Aspen Center for Physics program on *Physics of Behavior*, Aspen, CO (2012)
- APS March Meeting Focus Session on *Physics of Behavior*, Portland, OR (2010)
- *Principles of Biological Computation*, Santa Fe, NM (2008)
- CNLS Annual Conference on *Information Sciences and Technology*, Santa Fe, NM (2008)
- *Unconventional computation: Quo Vadis?*, Santa Fe, NM (2007)
- *Grand Challenges in Neural Computation*, Santa Fe, NM (2007)
- *NIPS'03* workshop on *Estimation of entropy and information of undersampled probability distributions*, Whistler, BC (2003)
- KITP long program *Understanding the brain*, KITP/UCSB (2004)

Public events organization

- *Atlanta Science Festival, Science at Emory: The Lab Changing the World*, Atlanta, GA (2014–2015)
- *The Nature of Knowledge* Lecture Series, Emory University (2012–2013)
- *The q-bio Public Lecture Series*, Santa Fe, NM, 2009.

Conference program committees

- APS March Meeting (2015 – 2017)
- *RECOMB* satellite workshop on *Systems Biology* (2007)
- *The DREAM Conference* (2006–2010)

Recent Refereeing

- *Nature Phys*, *Science*, *Phys Rev*, *PNAS*, *PLoS Pathogens*, *J Stat Phys*, *PLoS Biology*, *Neural Computation*, *J Neurophysiol*, *BMC Bioinformatics*, *BMC Systems Biology*, *PLoS ONE*, *PLoS Computational Biology*, *Physica D*, *IET Systems Biology*, *Biophys J*, *Physical Biology*, *Proc R Soc B*, *J Theor Biol*, *J Biomed Biotech*, *Entropy*, etc.

Grant refereeing

- NSF; NIH/NCI, NIGMS; DOE SBIR/STTR; Israeli Science Foundation

Software: NSB entropy estimation, `nsb-entropy.sf.net`; Sir Isaac dynamical inference, `https://github.com/EmoryUniversityTheoreticalBiophysics/SirIsaac`.

Current Memberships: American Physical Society

ADVISEES

Postdocs:

David Hofmann Current postdoc
Damian Hernandez Current postdoc
Andrew Mugler Currently Assistant Professor, Physics, Purdue University, IN
Lina Merchan Currently Assistant Professor, Physics, Savannah State University, Savannah, GA
Martin Tchernookov Currently Assistant Professor, Physics, Lamar University, Beaumont, TX
Sorin Tanase Nicola Currently Assistant Professor, Cell and Molecular Biology, Uppsala University, Sweden
Nikolai Sinitsyn Currently Staff Member, Theory Division, Los Alamos National Lab, Los Alamos, NM
Golan Bel Currently Senior Lecturer (Associate Professor), Environmental Physics, Ben Gurion University, Israel
Brian Munsky Currently Assistant Professor, Chemical and Biological Engineering, Colorado State University, Fort Collins, CO

Graduate Students:

George Leung, Xinxian Shao, Baohua Zhou, Catalina Rivera, Joe Natale all current PhD students at Emory
Vijay Singh PhD 2015, currently Fellow, Computational Neuroscience Institute, University of Pennsylvania
Jakub Otwinowski PhD 2012, currently postdoctoral scientist, Evolutionary Biology, University of Pennsylvania

John Kirkham MS 2013, currently a software engineer at Janelia Farms

Graduate Students co-Advised: Etay Ziv (PhD 2007, Columbia), Andrew Mugler (PhD 2010, Columbia).

Graduate Student Theses Committees: Xiang Cheng, Shanshan Li (Emory Physics), Lukas Hoffmann, Varun Saravanan (Emory Neuroscience), Mengcheng Zhu (GaTech BME).

Rotation Students: Xiang Cheng, Chloe Robins, Akin Morrison, Shanshan Li, Taylor Smith.

Undergraduate Students: Caroline Holmes, Rajiv Velury, Rebecca Butterfield, Farhan Kamili (now: GaTech, Bioengineering).

Summer Students: Martin Halicek (GeorgiaTech), Aly Pesic (Stanford), Misha Shashkov (Berkeley), Pradeep Bandaru, Sean Escola, Michael Vidne (Columbia), Wiet de Ronde (AMOLF), Bryan Daniels (Cornell).

PUBLICATIONS

Refereed

1. K Srivastava, C Holmes, M Vellema, A Pack, C Elemans, I Nemenman, and S Sober. Motor control by precisely timed spike patterns. Submitted, 2016. arXiv:1605.09023.
2. X Shao, A Mugler, J Kim, H J Jeong, B Levin and I Nemenman. Growth of bacteria in 3-d colonies. Submitted, 2016. arXiv:1605.01098.
3. K Leung, A Mohammadi, W Ryu, and I Nemenman. Stereotypical escape behavior in *Caenorhabditis elegans* allows quantification of nociceptive stimuli levels. Submitted, 2016. arXiv:1601.04685.
4. V Singh and I Nemenman. Accurate sensing of multiple ligands with a single receptor. Submitted, arXiv:1506.00288, 2015.
5. V Singh, M Tchernookov, and I Nemenman. Effects of receptor correlations on molecular information transmission. *Phys Rev E* **94**, 022425, 2015.
6. T Smith, S Fancher, A Levchenko, I Nemenman, A Mugler. Role of spatial averaging in multicellular gradient sensing. *Phys Biol* **13** 035004, 2016.
7. L Merchan and I Nemenman. On the sufficiency of pairwise interactions in maximum entropy models of biological networks. *J Stat Phys* **162**, 1294, 2016.
8. D Ellison, A Mugler, M Brennan, S H Lee, R Huebner, E Shamir, L A Woo, J Kim, P Amar, I Nemenman[1], A Ewald[1], A Levchenko[1]. Cell-cell communication enhances the capacity of cell ensembles to sense shallow gradients during morphogenesis. *PNAS*, doi/10.1073/pnas.1516503113, 2016.
9. A Mugler, A Levchenko and I Nemenman. Limits to the precision of gradient sensing with spatial communication and temporal integration. *PNAS*, doi/10.1073/pnas.1509597112, 2016.
10. I Nemenman. A mathematical framework for falsifiability. *Physics Today* **68**(10), 11 (2015), 2015.
11. B Daniels and I Nemenman. Automated adaptive inference of coarse-grained dynamical models. *Nature Communications* **6**, 8133, 2015.
12. B Daniels and I Nemenman. Efficient inference of parsimonious phenomenological models of cellular dynamics using S-systems and alternating regression. *PLoS ONE* **10**, e0119821, 2015.
13. I Nemenman[1], M Wall, and C Strauss. Of fishes and birthdays: Efficient estimation of polymer configurational entropies. arXiv:1502.02364, 2015.
14. C Tang, D Chehayeb, K Srivastava, I Nemenman, and S Sober. Millisecond-scale motor encoding in a cortical vocal area. *PLoS Biology* **12**, e1002018, 2014.
15. V Singh, M Tchernookov, R Butterfield, and I Nemenman. Continuum dynamics model of the primary visual cortex for contour detection. *PLoS ONE* **9**, e108991, 2014.
16. D Schwab, I Nemenman, and P Mehta. Zipfs law and criticality in multivariate data without fine-tuning. *Phys Rev Lett* **113**, 068102, 2014.
17. A Levchenko and I Nemenman. Cellular noise and information transmission. *Current Opinion Biotech* **28**, 156, 2014.

[1] Corresponding author.

18. M Tchernookov and I Nemenman. Predictive information in a nonequilibrium critical model. *J Stat Phys* **153**, 442, 2013.
19. J Otwinowski and I Nemenman. Genotype to phenotype mapping and the fitness landscape of the *E. coli lac* promoter. *PLoS ONE* **8**, e61570, 2013.
20. S Stromberg, R Antia and I Nemenman. Population-expression modeling of immune response. *Physical Biology* **10**, 035010, 2013.
21. X Cheng, L Merchan, M Tchernookov and I Nemenman. Large number of receptors may reduce cellular response time variation. *Physical Biology* **10**, 035008, 2013.
22. I Nemenman. Gain control in molecular information processing: Lessons from neuroscience. *Physical Biology* **9**, 026003, 2012.
23. I Nemenman. Coincidences and estimation of entropies of random variables with large cardinalities. *Entropy* **13**, 2013-2023, 2011.
24. S Tanase Nicola and I Nemenman. Fitness in time-dependent environments includes a geometric phase contribution. *J R Soc Interf* **9**, 1354, 2012.
25. R Cheong, A Rhee, J Wang, I Nemenman, and A Levchenko. Information transduction capacity of noisy biochemical signaling networks. *Science* **334**, 354, 2011.
26. V Gintautas, M Ham, B Kunsberg, S Barr, S Brumby, C Rasmussen, J George, I Nemenman, L Bettencourt, G Kenyon. Model cortical association fields account for the time course and dependence on target complexity of human contour perception. *PLoS Comp Biol* **7**, e1002162, 2011.
27. J Otwinowski, S Tanase Nicola, and I Nemenman. Speeding up evolutionary search by small fitness fluctuations. *J Stat Phys* **144**, 367, 2011.
28. Y Wei, X Wang, J Liu, I Nemenman, A Singh, H Weiss, and B Levin. The population dynamics of bacteria in physically structured habitats and the adaptive virtue of random motility. *Proc Natl Acad Sci USA* **108**, 4047, 2011.
29. P Bandaru, M Bansal, and I Nemenman. Mass conservation and inference of metabolic networks from mass spectrometry data. *J Comput Bio* **18**, 147, 2011.
30. N Sinitsyn and I Nemenman, Time-dependent corrections to effective rate and event statistics in Michaelis-Menten kinetics. *IET Syst Biol* **4**, 409, 2010.
31. A Margolin, K Wang, A Califano, and I Nemenman. Multivariate dependence and genetic networks inference. *IET Syst Biol* **4**, 428, 2010.
32. G Bel, B Munsky, and I Nemenman. The simplicity of completion time distributions for common complex biochemical processes. *Physical Biology* **7**, 016003, 2010.
33. B Munsky, I Nemenman, and G Bel. Specificity and Completion Time Distributions of Biochemical Processes. *J Chem Phys* **131**, 235103, 2009.
34. K Wang, M Saito, B Bisikirska, M Alvarez, W Lim, P Rajbhandari, Q Shen, I Nemenman, K Basso, A Margolin, U Klein, R Dalla-Favera, and A Califano. Genome-wide identification of post-translational modulators of transcription factor activity in human B cells. *Nature Biotech* **27**, 829, 2009.
35. W de Ronde, B Daniels, A Mugler, N Sinitsyn, and I Nemenman. Mesoscopic statistical properties of multistep enzyme-mediated reactions. *IET Syst Biol* **3**, 429, 2009.
36. A Mugler, E Ziv, I Nemenman, and C Wiggins. Quantifying evolvability in small biological networks. *IET Syst Biol* **3**, 379, 2009.
37. G Bel and I Nemenman. Ergodic and non-ergodic anomalous diffusion in coupled stochastic processes. *New J Phys* **11** 083009, 2009.
38. N Sinitsyn, N Hengartner, and I Nemenman. Adiabatic coarse-graining and simulations of stochastic biochemical networks. *Proc Natl Acad Sci (USA)* **106**, 10546, 2009.
39. A Mugler, E Ziv, I Nemenman, and C Wiggins. Serially-regulated biological networks fully realize a constrained set of functions. *IET Syst. Biol.* **2**, 313, 2008.

40. D Dreisigmeyer, J Stajic, I Nemenman, W Hlavacek, and M Wall. Determinants of bistability in induction of the *Escherichia coli lac* operon. *IET Syst. Biol.* **2**, 293, 2008.
41. I Nemenman, GD Lewen, W Bialek, RR de Ruyter van Steveninck. Neural coding of natural stimuli: Information at sub-millisecond resolution. *PLoS Comput. Biol.* **4**(3), e1000025, 2008.
    - Preliminary version available as: I Nemenman, G Lewen, W Bialek, and R de Ruyter van Steveninck. Neural coding of natural stimuli: information at sub-millisecond resolution. *BMC Neurosci.* **8** (Suppl 2), S7, 2007.
42. NA Sinitsyn and I Nemenman. A universal geometric theory of mesoscopic stochastic pumps and reversible ratchets. *Phys. Rev. Lett.* **99**, 220408, 2007.
43. I Nemenman, GS Escola, WS Hlavacek, PJ Unkefer, CJ Unkefer, ME Wall. Reconstruction of metabolic networks from high-throughput metabolite profiling data: *in silico* analysis of red blood cell metabolism. *Ann. N.Y. Acad. Sci.* **1115**, 102, 2007.
44. E Ziv, I Nemenman, and C Wiggins. Optimal signal processing in small stochastic biochemical networks. *PLoS ONE* **2**, e1077, 2007.
45. NA Sinitsyn and I Nemenman. Berry phase and pump effect in stochastic chemical kinetics. *EPL* **77**, 58001, 2007.
46. A Margolin, K Wang, WK Lim, M Kustagi, I Nemenman, and A Califano. Reverse engineering cellular networks. *Nature Protocols* **1**, 663, 2006.
47. K Wang, I Nemenman, N Banerjee, A Margolin, and A Califano. Genome-wide discovery of modulators of transcriptional interactions in human B lymphocytes. In *Lecture Notes in Computer Science, '3909*, *Proceedings of Research in Computational Molecular Biology: 10th Annual International Conference, RECOMB 2006*, pp. 348 (Springer: Berlin / Heidelberg, 2006).
48. A Margolin, I Nemenman, K Basso, U Klein, C Wiggins, G Stolovitzky, Riccardo D Favera, and A Califano. ARACNE: An algorithm for reconstruction of genetic networks in a mammalian cellular context. *BMC Bioinformatics* **7**(Suppl. 1), S7, 2006.
49. I Nemenman. Fluctuation-dissipation theorem and models of learning. *Neural Comp.* **17**(9), 2006, 2005.
50. I Nemenman, W Bialek, and R de Ruyter van Steveninck. Entropy and information in neural spike trains: Progress on the sampling problem. *Phys. Rev. E* **69**, 056111, 2004.
51. C Wiggins and I Nemenman. Process pathway inference via time series analysis. *Experim. Mech.* **43**, 361, 2003.
52. A Silbergleit, I Nemenman, and I Mandel. On the interaction of point charges in an arbitrary domain. *Techn. Phys.* **48**, 146, 2003.
53. A Silbergleit, I Mandel, and I Nemenman. Potential and field singularity at a surface point charge. *J. Math. Phys.* **44**, 4460, 2003.
54. I Nemenman, F Shafee, and W Bialek. Entropy and inference, revisited. In TG Dietterich, S Becker, and Z Ghahramani, editors, *Adv. Neural Inf. Proc. Syst. 14* (MIT Press: Cambridge, MA, 2002).
55. I Nemenman, and W Bialek. Occam factors and model-independent Bayesian learning of continuous distributions. *Phys. Rev. E* **65**, 026137, 2002.
    - Preliminary version available as: I Nemenmanand W Bialek, Learning Continuous Distributions: Simulations With Field Theoretic Priors. In T Leen, T Dietterich, and V Tresp, eds. *Adv. Neural Inf. Proc. Syst. 13*, pp. 287 (MIT Press: Cambridge, MA, 2001).
56. W Bialek, I Nemenman, and N Tishby. Complexity through nonextensivity. *Physica A* **302**, 89, 2001.
57. W Bialek, I Nemenman, and N Tishby. Predictability, complexity, and learning. *Neur. Comp.* **13**, 2409, 2001.
58. R Adler, I Nemenman, J Overduin, and D Santiago. On the detectability of quantum spacetime foam with gravitational-wave interferometers. *Phys. Lett. B* **477**, 424, 2000.
59. J Naud, I Nemenman, M Van Raamsdonk, and V Periwal. Minimal subtraction and the Callan-Symanzik equation. *Nucl. Phys. B* **540**, 533, 1999.

60. I Nemenman and A Silbergleit. Explicit Green's function of a boundary value problem for a sphere and trapped flux analysis in Gravity Probe B experiment. *J. Appl. Phys.* **86**, 614, 1999.
61. A Minkevich and I Nemenman. On the influence of gravitating vacuum on dynamics of homogeneous isotropic models in gauge-theories of gravity. *Class. Quant. Grav.* **12**, 1259, 1995.
    - Preliminary version available as: A Minkevich and I Nemenman. On the influence of gravitating vacuum on dynamics of homogeneous isotropic models in gauge-theories of gravity. *Dokl. Akad. Nauk Belar.* **39**, 45, 1995. In Russian.

Views, Editorials, Books, and Chapters

1. W Hlavacek, S Gnanakaran, B Munsky, M Wall, J Faeder, Y Jiang, I Nemenman, and O Resnekov. The eighth q-bio conference: meeting report and special issue preface. *Phys Biol* **12** 060401, 2015.
2. I Nemenman, J Faeder, S Gnanakaran, W Hlavacek, B Munsky, M Wall, and Y Jiang. The Seventh q-bio Conference: meeting report and preface. *Phys Biol* **11**, 040301, 2014.
3. I Nemenman, S Gnanakaran, B Munsky, M Wall, Y Jiang, W Hlavacek, and J Faeder. Special section dedicated to The Sixth q-bio Conference: meeting report and preface. *Physical Biology* **10**, 030301, 2013.
4. I Nemenman, W Hlavacek, J Faeder, S Gnanakaran, Y Jiang, B Munsky, M Wall. Editorial: Selected papers from the Fifth q-bio Conference on Cellular Information Processing. *Physical Biology* **9**, 050201, 2012.
5. I Nemenman, Information theory and adaptation. In *Quantitative biology: From molecules to Cellular Systems*, ME Wall, ed. (CRC Press, 2012.)
6. I Nemenman, J Faeder, W Hlavacek, Y Jiang, M Wall, and A Zilman. Selected papers from the Fourth Annual q-bio Conference on Cellular Information Processing. *Phys Biol* **8**, 050301, 2011.
7. I Nemenman, W Hlavacek, Y Jiang, M Wall, and A Zilman. Editorial: Selected papers from the Third q-bio Conference on Cellular Information Processing. *IET Syst Biol* **4**, 331, 2010.
8. I Nemenman, W Hlavacek, Y Jiang, and M Wall, Editorial: Selected papers from the Second q-bio Conference on Cellular Information Processing. *IET Syst Biol* **3**, 297, 2009.
9. I Nemenman, W Hlavacek, J Edwards, J Faeder, Y Jiang, and M Wall, Editorial: Selected papers from the First q-bio Conference on Cellular Information Processing. *IET Syst Biol* **2**, 203, 2008.
10. C Teuscher, I Nemenman, and F Alexander. Novel Computing Paradigms: Quo Vadis? *Physica D* **237**, 10, 2008.
11. J Edwards, J Faeder, W Hlavacek, Y Jiang, I Nemenman, and M Wall. q-bio 2007: a watershed moment in modern biology. *Mol Syst Biol* **3**, 148, 2007.
12. I Nemenman. *Information Theory and Learning: A Physical Approach*. PhD thesis, Princeton University, Department of Physics, 2000. arXiv:physics/0009032.

Unpublished work

1. K Wang, N Banerjee, A Margolin, I Nemenman, K Basso, R Dalla Favera, and A Califano. Conditional network analysis identifies candidate regulator genes in human B cells. Unpublished manuscript, 2005. arXiv:q-bio/0411003.
2. A Margolin, N Banerjee, I Nemenman, and A Califano. Reverse engineering of yeast transcriptional network using the ARACNE algorithm. Unpublished manuscript, 2004. Available at `nemenmanlab.org`.
3. T Holy and I Nemenman. On impossibility of learning in a reparameterization covariant way. Technical Report NSF-KITP-03-123, KITP, UCSB, 2002. Available at `nemenmanlab.org`.
4. I Kominis and I Nemenman. BGO dead crystal correction and shower fitting. Tech. Rep. 2157, *CERN: L3*, 1997. Available at `nemenmanlab.org`.