Michael DeWeese

Research Areas
Systems neuroscience, experiment and theory. Neural coding and computation. Cortical mechanisms of selective auditory attention. Cortical mechanisms of working memory. Statistics of natural scenes and sounds. Information theory. Machine learning. Nonequilibrium Statistical Mechanics.

Appointments
Member, Biophysics Graduate Group, University of California, Berkeley (2008-date)
Member, Computational Science and Engineering Grad. Group, University of California, Berkeley (2008-date)
Member, Vision Science Graduate Group, University of California, Berkeley (2007-date)
Member, Redwood Center for Theoretical Neuroscience, University of California, Berkeley (2006-date)
Asst. Professor, Dept. of Physics & Helen Wills Neuroscience Inst., University of California, Berkeley (2006-date)
Postdoctoral Scholar, Cold Spring Harbor Laboratory, Long Island, NY (1999-2006)
Postdoctoral Scholar, Salk Institute, La Jolla, CA (1995-1999)

Degrees
BA, Physics, University of California, Santa Cruz; with highest honors in Physics, 1988
MS, Physics, Princeton University, 1991
PhD, Physics, Princeton University, 1995

Selected Honors and Awards
McKnight Neuroscience of Brain Disorders Award (2010)
McDonnell Special Initiative Grant Award (2010)
Hellman Family Faculty Fund: Chancellor's Award (2008)
Swartz Post-Doctoral Fellowship for Computational Neuroscience (2000)
Sloan Post-Doctoral Fellowship for Theoretical Neuroscience (1995)

Selected Recent Significant Professional Activities
Co-organized workshop; Computational and Systems Neuroscience (COSYNE) meeting, The Canyons, UT (2007, 2009)
Co-organized the Annual Meeting of the Sloan Centers, Salk Institute, La Jolla, CA (1999)
Academic Editor, Public Library of Science (PLOS) Biology
Ad Hoc reviewer for 22 scientific journals, two annual conferences (NIPS and COSYNE), and two granting agencies (NSF and NWO council Earth and Life Sciences, the Netherlands)
Reviewer, Amgen Scholars Summer Research Program (2007)

Selected Recent Significant University or LBNL Service
Member, Graduate Student Admissions and Scholarship Committee, Physics (2007)
Member, Graduate Student Admissions Committee, Biophysics Graduate Group, (2009)
Member, 28 PhD Qualifying Exam or Thesis committees; Chair for 5 of these (2007-date)
Student Advisor, Designated Emphasis in Computational Science and Engineering (2008-date)
Physics Liaison, Designated Emphasis in Computational Science and Engineering (2008-date)
Oral Examiner, Graduate Preliminary Exam, Physics Dept. (Sp. 2008, Fa. 2008, Fa. 2009, Sp. 2010)
Member, Lower Division Courses Committee, Physics (2008-date)
Member, Graduate Student Recruitment Committee, Physics (2008)
Member, Biophysics faculty search committee, Physics (2008)
Undergraduate Student Advisor to Physics majors, Physics, (2009-date)
Member, Faculty Liaison to Lower Div Lecture/Demos and Lab Committee, Physics (2010-date)

Archival Publications and Invited Talks
21 publications in refereed journals
43 invited talks

Recent Courses Taught
Physics 177, Principles of Molecular Biophysics; Physics 7A, 8A, and 8B, Introductory Physics.

Michael DeWeese (cont.)

Graduate and Undergraduate Research Students, Post-doctoral Scholars Supervised

29 Graduate Students (including 3 members of other labs I have co-mentored and 11 rotation students), 50 undergraduate student researchers, 2 postdoctoral scholars

Selected Archival Journal Publications (no more than 10; recent and/or particularly significant)

Zylberberg, J., Murphy, J.T., and DeWeese, M.R. (2011). A sparse coding model with synaptically local plasticity and spiking neurons can account for the diverse shapes of V1 simple cell receptive fields. Public Library of Science Computational Biology. 7(10):e1002250.

Sohl-Dickstein, J., Battaglino, P., and DeWeese, M.R. (2011). New method for parameter estimation in probabilistic models: Minimum probability flow. Physical Review Letters. 107(22):220601.

Carlson, N., Ming, V.L., and DeWeese, M.R. (2012). Sparse codes for speech predict spectrotemporal receptive fields in the inferior colliculus. Public Library of Science Computational Biology. 7(10):e1002250.

Zulkowski, P.R., Sivak, D.A., Crooks, G.E., and DeWeese, M.R. (2012). The geometry of thermodynamic control. Physical Review E. 86(4):041148.

Zylberberg, J., Pfau D., and DeWeese, M.R. (2012). Dead leaves and the dirty ground: low-level image statistics in transmissive and occlusive imaging environments. Physical Review E. 86(6):066112.

King, P., Zylberberg, J., and DeWeese, M.R. (2013). Inhibitory interneurons decorrelate excitatory cells to drive sparse code formation in a spiking model of V1. Journal of Neuroscience. 33(13):5475-85.

Zylberberg, J. and DeWeese, M.R. (2013). Sparse coding models can exhibit decreasing sparseness while learning sparse codes for natural images. Public Library of Science Computational Biology. 9(8):e1003182.

Zulkowski, P.R., Sivak, D.A. and DeWeese, M.R. (2013). Optimal control of transitions between nonequilibrium steady states. Public Library of Science ONE. 8(12):e82754.

Rodgers, C. and DeWeese, M.R. (2014). Neural correlates of task switching in prefrontal cortex and primary auditory cortex in a novel stimulus selection task for rodents. Neuron. 82(5), p1157–1170.

Zulkowski, P.R. and DeWeese, M.R. (2014) Optimal finite-time erasure of a classical bit. Physical Review E. 89(5):052140.