

-
131. Optimizing information flow in small genetic networks. I. G Tkačik, A Walczak & W Bialek, *Phys Rev E* **80**, 031920 (2009); arXiv.org:0903.4491 [q-bio.MN] (2009).¹
 130. Thermodynamics of natural images. GJ Stephens, T Mora, G Tkačik & W Bialek, arXiv:0806.2694 [q-bio.NC] (2008).
 129. The neural basis for combinatorial coding in a cortical population response. LC Osborne, SE Palmer, SG Lisberger & W Bialek, *J Neurosci* **28**, 13522–13531 (2008).²
 128. Can we fit all of the data? W Bialek, T Gregor, DW Tank & EF Wieschaus, *Cell* **132**, 17–18 (2008).
 127. Toward a statistical mechanics of four letter words. GJ Stephens & W Bialek, arXiv.org:0801.0253 [q-bio.NC] (2008).
 126. Rediscovering the power of pairwise interactions. W Bialek & R Ranganathan, arXiv.org:0712.4397 [q-bio.QM] (2007).
 125. Cell biology: Networks, regulation, pathways. G Tkačik & W Bialek, in *Encyclopedia of Complexity and Systems Science*, RA Meyers, ed, pp 719–741 (Springer-Verlag, Berlin, 2009); arXiv.org:0712.4385 [q-bio.MN] (2007).
 124. Information and fitness. SF Taylor, N Tishby & W Bialek, arXiv.org:0712.4382 [q-bio.PE] (2007).
 123. Efficient representation as a design principles for neural coding and computation. W Bialek, RR de Ruyter van Steveninck & N Tishby, arXiv.org:0712.4381 [q-bio.NC] (2007).³
 122. Faster solutions of the inverse pairwise Ising problem. T Broderick, M Dudík, G Tkačik, RE Schapire & W Bialek, arXiv:0712.2437 [q-bio.QM] (2007).
 121. Diffusion, dimensionality and noise in transcriptional regulation. G Tkačik & W Bialek, *Phys Rev E* **79**, 051901 (2009);⁴ arXiv:0712.1852 [q-bio.MN] (2007).
 120. Information capacity of genetic regulatory elements. G Tkačik, CG Callan Jr & W Bialek, *Phys Rev E* **78**, 011910 (2008); arXiv:0709.4209 [q-bio.MN] (2007).
 119. Dimensionality and dynamics in the behavior of *C. elegans*. GJ Stephens, B Johnson-Kerner, W Bialek & WS Ryu, *PLoS Comp Bio* **4**, e1000028 (2008); arXiv:0705.1548 [q-bio.OT] (2007).

¹References to the physics e-print archive, <http://arXiv.org>, are given when available. If there is no other pointer, then this is a primary reference; for other work there may be slight differences between the e-print and conventional print versions. Since almost all of my papers are now deposited on the archive before journal publication, more recent papers are ordered by the date of the archive submission.

²For a preliminary account see Combinatorial coding in neural populations, arXiv:0803.3837 [q-bio.NC] (2008).

³A preliminary account appears in the *Proceedings of the International Symposium on Information Theory 2006*, but this seems to be available only on CDs distributed to meeting attendees (!).

⁴See also the accompanying commentary by R Metzler, *Physics* **2**, 36 (2009).

118. Information flow and optimization in transcriptional regulation. G Tkačik, CG Callan Jr & W Bialek, *Proc Nat'l Acad Sci (USA)* **105**, 12265–12270 (2008); arXiv:0705.0313 [q-bio.MN] (2007).
117. Neural decision boundaries for maximal information transmission. T Sharpee & W Bialek, *PLoS One* **2**, e646 (2007); arXiv:q-bio.NC/0703046 (2007).
116. The role of input noise in transcriptional regulation. G Tkačik, T Gregor & W Bialek, *PLoS One* **3**, e2774 (2008); arXiv:q-bio.MN/0701002 (2007).
115. Neural coding of a natural stimulus ensemble: Information at sub-millisecond resolution. I Nemenman, GD Lewen, W Bialek & RR de Ruyter van Steveninck, *PLoS Comp Bio* **4**, e1000025 (2008); arXiv:q-bio.NC/0612050 (2006).
114. Time course of precision in smooth pursuit eye movements of monkeys. LC Osborne, SS Hohl, W Bialek & SG Lisberger, *J Neurosci* **27**, 2987–2998 (2007).
113. Ising models for networks of real neurons. G Tkačik, E Schneidman, MJ Berry II & W Bialek, arXiv:q-bio.NC/0611072 (2006).
112. Probing the limits to positional information. T Gregor, DW Tank, EF Wieschaus & W Bialek, *Cell* **130**, 153–164 (2007).⁵
111. Stability and nuclear dynamics of the Bicoid morphogen gradient. T Gregor, EF Wieschaus, AP McGregor, W Bialek & DW Tank, *Cell* **130**, 141–152 (2007).
110. Cooperativity, sensitivity and noise in biochemical signaling. W Bialek & S Setayeshgar, *Phys Rev Lett* **100**, 258101 (2008); arXiv:q-bio.MN/0601001 (2006).
109. Synergy from silence in a combinatorial neural code. E Schneidman, JL Puchalla, RA Harris, W Bialek & MJ Berry II, arXiv:q-bio.NC/0607017 (2006).
108. Weak pairwise correlations imply strongly correlated network states in a neural population. E Schneidman, MJ Berry II, R Segev & W Bialek, *Nature* **440**, 1007–1012 (2006); arXiv:q-bio.NC/0512013 (2005).
107. Should you believe that this coin is fair? W Bialek, arXiv:q-bio.NC/0508044 (2005).
106. Diffusion and scaling during early embryonic pattern formation. T Gregor, W Bialek, DW Tank, RR de Ruyter van Steveninck, DW Tank & EF Wieschaus, *Proc Nat'l Acad Sci (USA)* **102**, 18403–18407 (2005).
105. Information based clustering. N Slonim, GS Atwal, G Tkačik & W Bialek, *Proc Nat'l Acad Sci (USA)* **102**, 18297–18302 (2005); arXiv:q-bio.QM/0511043. See also Supplementary material, arXiv:q-bio.QM/0511042 (2005).
104. A sensory source for motor variation. LC Osborne, SG Lisberger & W Bialek, *Nature* **437**, 412–416 (2005).
103. Features and dimensions: Motion estimation in fly vision. W Bialek & R de Ruyter van Steveninck, arXiv:q-bio/0505003 (2005).

⁵See also the accompanying commentary on this and the next article by MC Gibson, *Cell* **130**, 14-15 (2007).

102. Estimating mutual information and multi-information in large networks. N Slonim, GS Atwal, G Tkačik & W Bialek, arXiv:cs.IT/0502017 (2005).
101. Physical limits to biochemical signaling. W Bialek & S Setayeshgar, *Proc Nat'l Acad Sci (USA)* **102**, 10040–10045 (2005); arXiv:physics/0301001 (2003).
100. How many clusters? An information theoretic perspective. S Still & W Bialek, *Neural Comp* **16**, 2483–2506 (2004); arXiv:physics/0303011 (2003).
99. Entropy and information in neural spike trains: Progress on the sampling problem. I Nemenman, W Bialek & R de Ruyter van Steveninck, *Phys Rev E* **69**, 056111 (2004); arXiv:physics/0306063 (2003).
98. Time course of information about motion direction in visual area MT of macaque monkeys. LC Osborne, W Bialek & SG Lisberger, *J Neurosci* **24**, 3210–3222 (2004).
97. Geometric clustering using the information bottleneck method. S Still, W Bialek & L Bottou, in *Advances in Neural Information Processing 16*, S Thrun, L Saul & B Schölkopf, eds, pp 1165–1172 (MIT Press, Cambridge, 2004).
96. Optimal manifold representation of data: An information theoretic perspective. DV Chigirev & W Bialek, in *Advances in Neural Information Processing 16*, S Thrun, L Saul & B Schölkopf, eds, pp 161–168 (MIT Press, Cambridge, 2004).
95. Ambiguous model learning made unambiguous with $1/f$ priors. GS Atwal & W Bialek, in *Advances in Neural Information Processing 16*, S Thrun, L Saul & B Schölkopf, eds, pp 1205–1212 (MIT Press, Cambridge, 2004); arXiv:q-bio.OT/0512040 (2005).
94. Introductory science and mathematics education for 21st century biologists. W Bialek & D Botstein, *Science* **303**, 788–790 (2004).
93. Analyzing neural responses to natural signals: Maximally informative dimensions. T Sharpee, NC Rust & W Bialek, *Neural Comp* **16**, 223–250 (2004); arXiv:physics/0212110 (2002).⁶
92. Spike sorting in the frequency domain with overlap detection. D Rinberg, W Bialek, H Davidowitz & N Tishby, arXiv:physics/0306056 (2003).
91. Synergy, redundancy, and independence in population codes. E Schneidman, W Bialek & MJ Berry II, *J Neurosci* **23**, 11539–11553 (2003).
90. Network information and connected correlations. E Schneidman, S Still, MJ Berry II & W Bialek, *Phys Rev Lett* **91**, 238701 (2003); arXiv:physics/0307072 (2003).
89. The information content of receptive fields. TL Adelman, W Bialek & RM Olberg, *Neuron* **40**, 822–833 (2003).
88. Computation in single neurons: Hodgkin and Huxley revisited. B Agüera y Arcas, AL Fairhall & W Bialek, *Neural Comp* **15**, 1715–1749 (2003); arXiv:physics/0212113 (2002).⁷

⁶For a preliminary account see Maximally informative dimensions: Analyzing neural responses to natural signals, in *Advances in Neural Information Processing 15*, S Becker, S Thrun & K Obermayer, eds, pp 261–268 (MIT Press, Cambridge, 2003); arXiv:physics/0208057 (2002).

⁷For a preliminary account see What can a single neuron compute?, in *Advances in Neural Information Processing 13*, TK Leen, TG Dietterich & V Tresp, eds, pp 75–81 (MIT Press, Cambridge, 2001).

87. An information theoretic approach to the functional classification of neurons. E Schneidman, W Bialek & MJ Berry II, in *Advances in Neural Information Processing 15*, S Becker, S Thrun & K Obermayer, eds, pp 197–204 (MIT Press, Cambridge, 2003); arXiv:physics/0212114 (2002).
86. Adaptive spike coding. A Fairhall & W Bialek, in *The Handbook of Brain Theory and Neural Networks, Second Edition*, MA Arbib, ed, pp 90–94 (MIT Press, Cambridge, 2002).
85. Statistical properties of spike trains: Universal and stimulus–dependent aspects. N Brenner, O Agam, W Bialek & RR de Ruyter van Steveninck, *Phys Rev E* **66**, 031907 (2002); arXiv:physics/9902061 (1999).⁸
84. Thinking about the brain. W Bialek, in *Physics of Biomolecules and Cells: Les Houches Session LXXV*, H Flyvbjerg, F Jülicher, P Ormos & F David, eds, pp 485–577 (EDP Sciences, Les Ulis; Springer–Verlag, Berlin, 2002); arXiv:physics/0205030 (2002).
83. Entropy and inference, revisited. I Nemenman, F Shafee & W Bialek, in *Advances in Neural Information Processing 14*, TG Dietterich, S Becker & Z Ghahramani, eds, pp 471–478 (MIT Press, Cambridge, 2002); arXiv:physics/0108025 (2001).
82. Spike timing and the coding of naturalistic sounds in a central auditory area of song-birds. BD Wright, K Sen, W Bialek & AJ Doupe, in *Advances in Neural Information Processing 14*, TG Dietterich, S Becker & Z Ghahramani, eds, pp 309–316 (MIT Press, Cambridge, 2002); arXiv:physics/0201027 (2002).
81. Timing and counting precision in the blowfly visual system. R de Ruyter van Steveninck & W Bialek, in *Models of Neural Networks IV: Early Vision and Attention*, JL van Hemmen, J Cowan & E Domany, eds, pp 313–365 (Springer–Verlag, Berlin, 2002); arXiv:physics/0202014 (2002).
80. Occam factors and model–independent Bayesian learning of continuous distributions. I Nemenman & W Bialek, *Phys Rev E* **65**, 026137 (2002); arXiv:cond–mat/0009165 (2000).⁹
79. Complexity through nonextensivity. W Bialek, I Nemenman & N Tishby, *Physica A* **302**, 89–99 (2001); arXiv:physics/0103076 (2001).
78. Efficiency and ambiguity in an adaptive neural code. AL Fairhall, GD Lewen, W Bialek, & RR de Ruyter van Steveninck, *Nature* **412**, 787–792 (2001).¹⁰
77. Neural coding of naturalistic motion stimuli. GD Lewen, W Bialek & RR de Ruyter van Steveninck, *Network* **12**, 317–329 (2001); arXiv:physics/0103088 (2001).

⁸For a preliminary account see Universal statistical behavior of neural spike trains, *Phys Rev Lett* **81**, 4000–4003 (1998); arXiv:physics/9801026 (1998).

⁹For a preliminary account see Learning continuous distributions: Simulations with a field theoretic prior, in *Advances in Neural Information Processing 13*, TK Leen, TG Dietterich & V Tresp, eds, pp 287–293 (MIT Press, Cambridge, 2001).

¹⁰See also the accompanying commentary by P. Reinagel, *Nature* **412**, 776–777 (2001). For a preliminary account see Multiple timescales of adaptation in a neural code, in *Advances in Neural Information Processing 13*, TK Leen, TG Dietterich & V Tresp, eds, pp 124–130 (MIT Press, Cambridge, 2001).

76. Predictability, complexity and learning. W Bialek, I Nemenman & N Tishby, *Neural Comp* **13**, 2409–2463 (2001); arXiv:physics/0007070 (2000).¹¹
75. Universality and individuality in a neural code. E Schneidman, N Brenner, N Tishby, RR de Ruyter van Steveninck, & W Bialek, in *Advances in Neural Information Processing 13*, TK Leen, TG Dietterich & V Tresp, eds, pp 159–165 (MIT Press, Cambridge, 2001); arXiv:physics/0005043 (2000).
74. Stability and noise in biochemical switches. W Bialek, in *Advances in Neural Information Processing 13*, TK Leen, TG Dietterich & V Tresp, eds, pp 103–109 (MIT Press, Cambridge, 2001); arXiv:cond-mat/0005235 (2000).
73. Real time encoding of motion: Answerable questions and questionable answers from the fly’s visual system. R de Ruyter van Steveninck, A Borst & W Bialek, in *Processing Visual Motion in the Real World: A Survey of Computational, Neural and Ecological Constraints*, JM Zanker & J Zeil, eds, pp 279–306 (Springer-Verlag, Berlin, 2001); arXiv:physics/0004060 (2000).
72. Adaptive rescaling optimizes information transmission. N Brenner, W Bialek & R de Ruyter van Steveninck, *Neuron* **26**, 695–702 (2000).¹²
71. Synergy in a neural code. N Brenner, SP Strong, R Koberle, W Bialek & RR de Ruyter van Steveninck, *Neural Comp* **12**, 1531–1552 (2000); arXiv:physics/9902067 (1999).
70. Potenzialità e limitazioni nella misura della transmission dell’informazione neuronale. W Bialek, in *Frontiere Della Vita, Vol. III: Sistemi Intelligenti*, pp 617–629 (Istituto della Enciclopedia Italiana, 2000).¹³
69. The information bottleneck method. N Tishby, FC Pereira & W Bialek, in *Proceedings of the 37th Annual Allerton Conference on Communication, Control and Computing*, B Hajek & RS Sreenivas, eds, pp 368–377 (University of Illinois, 1999); arXiv:physics/0004057 (2000).
68. Adaptation and optimal chemotactic strategy for *E. Coli.*. SP Strong, B Freedman, W Bialek & R Koberle, *Phys Rev E* **57**, 4604–4617 (1998); arXiv:adap-org/9706001 (1997).
67. On the application of information theory to neural spike trains. SP Strong, RR de Ruyter van Steveninck, W Bialek & R Koberle, in *Pacific Symposium on Biocomputing ’98*, RB Altman, AK Dunker, L Hunter & TE Klein, eds, pp 621–632 (World Scientific, Singapore, 1998).
66. Entropy and information in neural spike trains. SP Strong, R Koberle, RR de Ruyter van Steveninck & W Bialek, *Phys Rev Lett* **80**, 197–200 (1998); arXiv:cond-mat/9603127 (1996).

¹¹For a preliminary account see Predictive information, W Bialek & N Tishby; cond-mat/9902341 (1999).

¹²See also the accompanying commentary by M DeWeese, *Neuron* **26**, 546–548 (2000).

¹³From an English manuscript, Prospects and pitfalls in the measurement of neural information transmission. English edition: *Frontiers of Life, Vol. III: Intelligent Systems* (Academic Press, San Diego, 2002).

65. *Spikes: Exploring the Neural Code*. F Rieke, D Warland, R de Ruyter van Steveninck & W Bialek (MIT Press, Cambridge, 1997).¹⁴
64. Statistical mechanics and sensory signal processing. W Bialek, in *Physics of Biological Systems: From Molecules to Species*, H Flyvbjerg, J Hertz, MH Jensen, OG Mouristen & K Sneppen, eds, pp 252–280 (Springer–Verlag, Berlin, 1997).
63. Reproducibility and variability in neural spike trains. RR de Ruyter van Steveninck, GD Lewen, SP Strong, R Koberle & W Bialek, *Science* **275**, 1805–1808 (1997).
62. Adaptation of retinal processing to image contrast and spatial scale. S Smirnakis, MJ Berry II, DK Warland, W Bialek & M Meister, *Nature* **386**, 69–73 (1997).
61. Adaptive movement computation by the blowfly visual system. RR de Ruyter van Steveninck, W Bialek, M Potters, RH Carlson & GD Lewen in *Natural and Artificial Parallel Computation: Proceedings of the Fifth NEC Research Symposium*, DL Waltz, ed, 21–41 (SIAM, Philadelphia, 1996).
60. Field theories for learning probability distributions. W Bialek, CG Callan & SP Strong, *Phys Rev Lett* **77**, 4693–4697 (1996); arXiv:cond-mat/9607180 (1996).
59. Optimality and adaptation in motion estimation by the blowfly visual system. RR de Ruyter van Steveninck & W Bialek, *Proceedings of the IEEE 22nd Annual Northeast Bioengineering Conference*, 40–41 (1996).
58. Naturalistic stimuli increase the rate and efficiency of information transmission by primary auditory neurons. F Rieke, DA Bodnar & W Bialek, *Proc R. Soc Lond. Ser. B* **262**, 259–265 (1995).
57. Reliability and statistical efficiency of a blowfly movement-sensitive neuron. R de Ruyter van Steveninck & W Bialek, *Phil Trans R. Soc Lond.* **348**, 321–340 (1995).¹⁵
56. Random switching and optimal processing in the perception of ambiguous signals. W Bialek & M DeWeese, *Phys Rev Lett* **74**, 3077–3080 (1995).
55. Information flow in sensory neurons. M. DeWeese & W Bialek, *Il Nuovo Cimento* **17D**, 733–741 (1995).
54. Statistical adaptation and optimal estimation in movement computation by the blowfly visual system. RR de Ruyter van Steveninck, W Bialek, M Potters & RH Carlson, in *Proc IEEE Conf Sys Man Cybern*, 302–307 (1994).
53. Statistical mechanics and visual signal processing. M Potters & W Bialek, *J Phys I France* **4**, 1755–1775 (1994); arXiv:cond-mat/9401072 (1994).
52. Statistics of natural images: Scaling in the woods. DL Ruderman & W Bialek, *Phys Rev Lett* **73**, 814–817 (1994).¹⁶

¹⁴Reviews include: A King, *The London Times Higher Education Supplement* 17 October 1997, p. 35; A Zador, *Science* **277**, 772 (1997); LF Abbott, *Neuron* **19**, 5 (1997); M Abeles, *Trends Neurosci.* **20**, 496 (1997).

¹⁵For a preliminary account see Statistical reliability of a blowfly movement-sensitive neuron, in *Advances in Neural Information Processing 4*, J Moody, SJ Hanson & RP Lippman, eds, pp 27–34, (Morgan Kaufmann, San Mateo CA, 1992).

¹⁶For a preliminary account see *Advances in Neural Information Processing 6*, JD Cowan, G Tesauro & J Alspector, eds, pp 551–558 (Morgan Kaufmann, San Mateo CA, 1994).

51. Properties and origins of protein secondary structure. N Socci, W Bialek & JN Onuchic, *Phys, Rev E* **49**, 3400–3443 (1994); arXiv:cond-mat/9402010 (1994).
50. Visual computation: A fly’s eye view. W Bialek, M Potters, DL Ruderman & R de Ruyter van Steveninck, in *Cognitive Processing for Vision and Voice, Proceedings of the Fourth NEC Research Symposium*, T Ishiguro, ed, pp 7–26, (SIAM, Philadelphia, 1993).
49. Non-phase-locked auditory cells and envelope detection. F Rieke, W Yamada, E Lewis & W Bialek, in *Analysis and Modeling of Neural Systems 2*, F Eeckman, ed, pp 255–263 (Kluwer Academic, 1993).
48. Bits and brains: Information flow in the nervous system. W Bialek, M DeWeese, F Rieke & D Warland, *Physica A* **200**, 581–593 (1993).
47. Optimal real-time signal processing in the nervous system. W Bialek, in *Analysis and Modeling of Neural Systems 2*, F Eeckman, ed, pp 5–28 (Kluwer Academic, 1993).
46. Virtual transitions in nonadiabatic condensed phase reactions. JS Joseph & W Bialek, *J Phys Chem* **97**, 3245–3256 (1993).
45. Coding efficiency and information rates in sensory neurons. F Rieke, D Warland & W Bialek, *Europhys. Lett* **22**, 151–156 (1993).¹⁷
44. Statistical mechanics for a network of spiking neurons. L Kruglyak & W Bialek, *Neural Comp* **5**, 21–31 (1993).
43. *Princeton Lectures on Biophysics*. W Bialek, ed (World Scientific, Singapore, 1992).
42. Optimal signal processing in the nervous system. W Bialek, in [43], pp 321–401 (1992).
41. Reliability and information transmission in spiking neurons. W Bialek & F Rieke, *Trends Neurosci.* **15**, 428–434 (1992).
40. Real-time coding of complex sounds in the auditory nerve. F Rieke, W Yamada, K Moortgat, ER Lewis, & W Bialek, in *Auditory Physiology and Perception: Proceedings of the 8th International Conference on Hearing*, Y Cazals, L Demany & K Horner, eds, pp 315–322 (Pergamon, 1992).
39. Seeing beyond the Nyquist limit. DL Ruderman & W Bialek, *Neural Comp* **4**, 682–690 (1992).¹⁸
38. A new look at the primary charge separation in bacterial photosynthesis. SS Skourtis, AJR DaSilva, W Bialek & JN Onuchic, *J Phys Chem* **96**, 8034–8041 (1992).
37. Vibrationally enhanced tunneling as a mechanism for enzymatic hydrogen transfer. WJ Bruno & W Bialek, *Biophys J* **63**, 689–699 (1992).
36. Virtual intermediates in photosynthetic electron transfer. JS Joseph & W Bialek, *Biophys J* **63**, 397–411 (1992).

¹⁷For a preliminary account see Measuring the coding efficiency of sensory neurons, in *Analysis and Modeling of Neural Systems 2*, F Eeckman, ed, pp 29–38 (Kluwer Academic, 1993).

¹⁸Reprinted in *Neural Codes and Distributed Representations: Foundations of Neural Computation*, LF Abbott & TJ Sejnowski, eds (MIT Press, Cambridge, 1999).

35. Bleaching of the bacteriochlorophyll monomer: Can absorption kinetics distinguish virtual from two-step transfer? JS Joseph, WJ Bruno & W Bialek, *J Phys Chem* **95**, 6242–6247 (1991).
34. Reading a neural code. W Bialek, F Rieke, RR de Ruyter van Steveninck & D Warland, *Science* **252**, 1854–1857 (1991).¹⁹
33. Reading between the spikes in the cricket cercal afferent system. D Warland, M Landolfa, JP Miller & W Bialek, in *Analysis and Modeling of Neural Systems*, F Eeckman, ed, pp 327–333 (Kluwer Academic, 1991).
32. Optimal sampling of natural images: A design principle for the visual system? W Bialek, DL Ruderman & A Zee, in *Advances in Neural Information Processing 3*, R Lippman, J Moody & D Touretzky, eds, pp 363–369 (Morgan Kaufmann, San Mateo CA, 1991).
31. Analog computation at a critical point: A novel function for neuronal oscillations? L Kruglyak & W Bialek, in *Advances in Neural Information Processing 3*, R Lippman, J Moody & D Touretzky, eds, pp 137–143 (Morgan Kaufmann, San Mateo CA, 1991).
30. Optimal filtering in the salamander retina. F Rieke, WG Owen & W Bialek, in *Advances in Neural Information Processing 3*, R Lippman, J Moody & D Touretzky, eds, pp 377–383 (Morgan Kaufmann, San Mateo CA, 1991).²⁰
29. Theoretical physics meets experimental neurobiology. W Bialek, in *1989 Lectures in Complex Systems, SFI Studies in the Sciences of Complexity, Lect. Vol. II*, E Jen, ed, pp 513–595 (Addison–Wesley, Menlo Park CA, 1990).
28. Biomolecular dynamics—Quantum or classical?: Results for photosynthetic electron transfer. JN Onuchic, RF Goldstein & W Bialek, in *Perspectives in Photosynthesis: Proceedings of the 22nd Jerusalem Symposium on Quantum Chemistry and Biochemistry*, J Jortner & B Pullman, eds, pp 185–210 (Kluwer Academic, Dordrecht, 1990).
27. Temporal filtering in retinal bipolar cells: Elements of an optimal computation? W Bialek & WG Owen, *Biophys J* **58**, 1227–1233 (1990).
26. Non–Boltzmann dynamics in networks of spiking neurons. MC Crair & W Bialek, in *Advances in Neural Information Processing 2*, D. Touretzky, ed, pp 109–116 (Morgan Kaufmann, San Mateo CA, 1990).
25. Coding and computation with neural spike trains. W Bialek & A Zee, *J Stat Phys* **59**, 103–115 (1990).
24. Quantum and classical dynamics in biochemical reactions. W Bialek, WJ Bruno, JS Joseph & JN Onuchic, *Photosyn. Res.* **22**, 17–25 (1989).
23. Optimal performance of a feed–forward network at statistical discrimination tasks. W Bialek, R Scalettar & A Zee, *J Stat Phys* **57**, 141–156 (1989).

¹⁹Reprinted in *Biology and Computation: A Physicist's Choice*, H Gutfreund & G Toulouse, eds (World Scientific, Signapore, 1994). For a preliminary account see *Advances in Neural Information Processing 2*, D Touretzky, ed, pp 36–43 (Morgan Kaufmann, San Mateo CA, 1990).

²⁰See also *Analysis and Modeling of Neural Systems*, F Eeckman, ed, pp 231–237 (Kluwer Academic, 1991).

22. Understanding the efficiency of human perception. W Bialek & A Zee, *Phys Rev Lett* **61**, 1512–1515 (1988).
21. Real-time performance of a movement sensitive neuron in the blowfly visual system: Coding and information transfer in short spike sequences. R de Ruyter van Steveninck & W Bialek, *Proc R. Soc London Ser. B* **234**, 379–414 (1988).
20. Protein dynamics and reaction rates: Mode-specific chemistry in large molecules? W Bialek & JN Onuchic, *Proc Nat'l Acad Sci (USA)* **85**, 5908–5912 (1988).
19. Physical limits to sensation and perception. W Bialek, *Ann Rev Biophys Biophys Chem* **16**, 455–478 (1987).
18. Statistical mechanics and invariant perception. W Bialek & A Zee, *Phys Rev Lett* **58**, 741–744 (1987).
17. Tunneling spectroscopy of a macroscopic variable. W Bialek, S Chakravarty & S Kivelson, *Phys Rev B* **35**, 120–123 (1987).
16. Simple models for the dynamics of biomolecules: How far can we go? W Bialek, RF Goldstein & S Kivelson, in *Structure, Dynamics and Function of Biomolecules: The First EBSA Workshop*, A Ehrenberg, R Rigler, A Gräslund, & LJ Nilsson, eds, pp 65–69 (Springer-Verlag, Berlin, 1987).
15. Protein dynamics, tunneling, and all that. W Bialek & RF Goldstein, *Phys Scr.* **34**, 273–282 (1986).
14. Protein dynamics and reaction rates: Are simple models useful? RF Goldstein & W Bialek, *Comments Mol. Cell. Biophys* **3**, 407–438 (1986).
13. Macroscopic T non-conservation: Prospects for a new experiment. W Bialek, J Moody & F Wilczek, *Phys Rev Lett* **56**, 1623–1626 (1986).
12. *The Vertebrate Inner Ear*. ER Lewis, EL Leverenz & W Bialek (CRC Press, Boca Raton, 1985).
11. Quantum noise and the threshold of hearing. W Bialek & A Schweitzer, *Phys Rev Lett* **54**, 725–728 (1985). Erratum **56**, 996 (1986).
10. Do vibrational spectroscopies uniquely describe protein dynamics?: The case for myoglobin. W Bialek & RF Goldstein, *Biophys J* **48**, 1027–1044 (1985).²¹
9. Quantum limits to oscillator stability: Theory and experiments on an acoustic emission from the human ear. W Bialek & HP Wit, *Phys Lett A* **104**, 173–178 (1984).
8. Phonon super-radiance. W Bialek, *Phys Lett A* **103**, 349–352 (1984).
7. Quantum noise and active feedback. W Bialek *Phys Rev D* **28**, 2096–2098 (1983).
6. Vibronically coupled two-level systems: Radiationless transitions in the slow regime. RF Goldstein & W Bialek, *Phys Rev B* **27**, 7431–7439 (1983).

²¹For a preliminary account see Protein vibrations can markedly affect reaction kinetics: Interpretation of Myoglobin-CO recombination, in *Protein Structure: Molecular and Electronic Reactivity*, RH Austin, E Buhks, B Chance, D DeVault, PL Dutton, H Frauenfelder & VI Gol'danskii, eds, pp 187–199 (Springer-Verlag, Berlin, 1987).

5. *Quantum effects in the dynamics of biological systems*. Doctoral Dissertation (University of California, Berkeley, 1983).
4. Thermal and quantum noise in the inner ear. W Bialek, in *Mechanics of Hearing*, E de Boer & MA Viergever, eds, pp 185–192 (Nijhof, the Hague, 1983).
3. Thermal noise and active processes in the inner ear: Relating theory to experiment. W Bialek, in *Hearing: Physiological Bases and Psychophysics*, R Klinke & R Hartmann, eds, pp 51–57 (Springer–Verlag, Berlin, 1983).
2. *Kinetics and mechanism of force production in muscle*. Undergraduate Honors Thesis (University of California, Berkeley, 1979).
1. Contraction of glycerinated muscle fibers as a function of the ATP concentration. R Cooke & W Bialek, *Biophys J* **28**, 241–258 (1979).