CURRICULUM VITAE
SARA A. SOLLA

Professor, Department of Neuroscience
Feinberg School of Medicine
Northwestern University (since May 1997)

Professor, Department of Physics & Astronomy
Northwestern University (since May 1997)

ADDRESS

DEGREES Ph.D. Physics, 1982, University of Washington.
M.Sc. Physics, 1974, University of Buenos Aires.

PERSONAL

OTHER POSITIONS

Lecturer, Department of Physics, National University of Technology, Buenos Aires, Argentina – September 1974-September 1976.

Teaching Assistant, Department of Physics, University of Washington, Seattle, Washington – September 1976-August 1977.

Predoctoral Associate, Department of Physics, University of Washington, Seattle, Washington – September 1977-February 1982.

Postdoctoral Associate, Laboratory of Atomic and Solid State Physics, Cornell University, Ithaca, New York – March 1982-May 1984.

Lecturer, Department of Physics, Cornell University, Ithaca, New York – June-August 1984.

Postdoctoral Associate, IBM T.J. Watson Research Center, Yorktown Heights, New York – September 1984-March 1986.

Member of Technical Staff, AT&T Bell Laboratories, Holmdel, New Jersey – April 1986-December 1995.

Senior Member of Technical Staff, AT&T Labs - Research, Holmdel, New Jersey – January 1996-April 1997.

Visiting Scientist, Department of Physics, Boston University, Boston, Massachusetts – September-November 1985.

Visiting Professor, Ecole Normale Supérieure and Ecole Nationale de l'Eléctronique et ses Applications, Paris, France – January 1986.

Visiting Professor, Center for Telecommunication Research, Columbia University, New York, New York – September 1987-May 1988.

Visiting Professor, NORDITA and NBI/CONNECT, Copenhagen, Denmark – October-November 1988, March-August 1990, January-August 1992, May-August 1993, July 1994-December 1995, October-November 1997, September-October 1998.

Visiting Scientist, Center for Studies in Physics and Biology, Rockefeller University, New York, New York – March-May 1994.

Adjunct Professor, Rockefeller University, New York, New York – May 1998-August 2003.

Visiting Professor, Bernstein Center for Computational Neuroscience, Max Planck Institute for Dynamics and Self-organization, Gttingen, Germany – July to December 2010.

OTHER ACTIVITIES

Associate Editor of the International Journal of Neural Systems. Member of the Advisory Board for Chaos (American Institute of Physics).

Editor (with M. I. Jordan) of the Neural Information Processing Series (The MIT Press) from 1999 to 2005.

Program Committee Member for the 1990 Conference on Neural Information Processing Systems, the 1991 International Joint Conference on Neural Networks, the 1991 Conference on Neural Information Processing Systems, the 1994 Workshop on Computational Learning Theory, the 1995 International Conference on Artificial Neural Networks, the 1996 International Conference on Artificial Neural Networks, the 1996 International Conference on Neural Information Processing, the 1996 Conference on Neural Information Processing Systems, the 1997 International Conference on Artificial Neural Networks, the 1998 Snowbird Workshop on Machines that Learn.

Member of the Program Committee for the Snowbird Workshop on Learning from 1999 to 2012.

Member of the Advisory Board for the NIPS (Neural Information Processing Systems) Foundation since 2000.

Director of the International Workshop on the Theory of Disordered Biological Models, Bogotá, Colombia, September 1987, and the Second International Workshop on Neural Net-

works and Cellular Automata, Bogotá, Colombia, November 1989.

Organizer of the workshop on 'The Dynamics of On-Line Learning' at the 1995 Conference on Neural Information Processing Systems.

Program Chair of the 1998 Conference on Neural Information Processing Systems; General Chair of the 1999 Conference on Neural Information Processing Systems.

Director of the School on Neural Information Processing, International Centre for Theoretical Physics, Trieste, Italy, May 1999.

Resident Faculty at the course on Methods in Computational Neuroscience, Marine Biological Laboratory, Woods Hole, Massachusetts, since 1999.

Member of the Advisory Board at the Kavli Institute for Theoretical Physics (University of California at Santa Barbara), from September 2005 to August 2008; member of the Steering Committee at the Kavli Institute for Theoretical Physics (University of California at Santa Barbara), from September 2005 to August 2007.

Member of the International Advisory Board of the Goettingen Graduate School for Neurosciences and Molecular Biosciences since 2008.

Organizer (with K. Kosik, A. Koulakov, G. Lemke, and S. Wang) of the KITP program on Anatomy, Development and Evolution of the Brain in 2008.

Organizer (with J.A. Hertz and Y. Roudi) of the workshop on Statistical Mechanics and Inference at the Kavli Institute for Systems Neuroscience in Trondheim, Norway in 2011.

Organizer (with E. Shea-Brown) of the workshop on Mathematical Challenges in Neural Network Dynamics at the Mathematical Biosciences Institute, Ohio State University in 2012.

Member of the Executive Committee of the Division of Biological Physics of the American Physical Society, from 2015 to 2018.

Fellow of the American Physical Society since 2014.

Simons Distinguished Visiting Scholar at the Kavli Institute for Theoretical Physics (University of California at Santa Barbara) since 2014.

Member of the Scientific Council of the International Centre for Theoretical Physics since 2022.

Member of the American Academy of Arts and Sciences since 2022.

Fellow of the Network Science Society since 2025.

Member of the American Physical Society, the American Association for the Advancement of Science, the Association for Women in Science, the International Neural Networks Society, and the New York Academy of Sciences.

Reviewer of grant proposals submitted to the National Science Foundation, the National Institute of Health, the Israel Science Foundation, and the Bernstein Centers for Computational Neuroscience.

Journal referee for the Physical Review, Physical Review Letters, Europhysics Letters, Journal of Physics, Chaos, Network, Neural Networks, the International Journal of Neural Systems, Neural Computation, IEEE Transactions, Biological Cybernetics, Cerebral Cortex, Journal of Neurophysiology, Journal of Neuroscience, Network, Neurocomputing, Machine Learning, Frontiers in Computational Neuroscience, eLife, Science, Nature, Nature Neuroscience, Nature Biotechnology, the Proceedings of the National Academy of Sciences, and the Proceedings of the Royal Society.

Frequent invited speaker, over 800 presentations at international conferences, seminars and colloquia. A detailed list is available upon request.

SELECTED PUBLICATIONS

"Collapse of Loaded Fractal Trees" [7] is an application of percolation theory to the problem of crack propagation; a self-similar description leads to a novel characterization of macroscopic fracture as a phase transition. This work predates the much publicized work on Self Organized Criticality.

"Memory Networks with Asymmetric Bonds" [12] and the following paper [13] establish the first generalization of the original Hopfield networks into the more realistic scenario of memory networks unconstrained by the requirement of symmetric interactions.

"Automatic Learning, Rule Extraction, and Generalization" [15] is the first in a series of papers that set up a statistical framework for the investigation of learning and the emergence of generalization ability in multilayer neural networks.

"Optimal Brain Damage" [20] provides a novel, systematic, principled, and subsequently widely used algorithm for controlling the capacity of a multilayer neural network through pruning of its less relevant connections. In the rapidly changing field of Machine Learning, where the shelf life of papers is at most five years, this paper continues to be widely cited 30 years after it was written.

"Exhaustive Learning" [21] continues to develop a description of supervised learning based on the statistical properties of the space of weights that characterize the strength of the connections among neurons. For the first time, the emergence of generalization ability is quantitatively shown to be the consequence of an entropy reduction process.

"A Statistical Approach to Learning and Generalization in Layered Neural Networks" [25]; together with [18], [19], [24], [30], and [34], this paper provides the foundation for and develops in full a consistent statistical mechanics theory for supervised learning. As opposed to the then prevailing framework based on the dynamics of stochastic gradient descent, this paper lays a rigorous foundation based on the maximum likelihood principle of statistical inference.

"Eigenvalues of Covariance Matrices: Application to Neural Network Learning" [28] and the preceding paper [27], both still frequently cited, begin an investigation of the dynamical properties of gradient descent learning algorithms for the simple case of linear neural networks.

"Learning in Linear Neural Networks: the Validity of the Annealed Approximation" [33] also focuses on the simplified models provided by linear neural networks in order to establish the validity of an approximation widely used to investigate the properties of more complicated and otherwise intractable models.

"Supervised Learning from Clustered Input Examples" [37] and subsequent papers [44], [45], and [51] introduce and solve a novel learning scenario in which a natural clustering of the data in input space is allowed to compete with the partition induced by a binary classification.

"Exact Solution for On-Line Learning in Multilayer Neural Networks" [38] and subsequent papers [39], [40], [41], [43], [46], [47], [48], and [52] propose and develop a novel approach for studying the dynamics of gradient descent learning in nonlinear multilayer neural networks of arbitrary complexity; the method provides the first analytic solution for learning in multilater networks and has been applied to the analysis of a variety of increasingly realistic learning scenarios.

"A Bayesian Approach to Learning in Neural Network" [42] summarizes the Gibbsian formulation of supervised learning and establishes its fundamental connection to Bayesian inference.

"Optimal Bayesian OnLine Learning" [51] and related papers [49], [54], and [55], combine an information-theoretical approach and the cavity method to develop a systematic approximation to the problem of optimal online learning.

"Dopamine Induced Bistability Enhances Signal Processing in Spiny Neurons" [60] and related papers [59], [62] and [65], put forward a biophysics based and integrated description of the role of dopaminergic modulation in both the basal ganglia and the cortex, and propose mechanisms for the gating of salient information onto working memory and its subsequent preservation against distractors.

"Neural Primitives for Motor Control" [63] and its companion [72] propose a conceptual framework for an integrated description of the neural control of movement.

"Self-Sustained Activity and Failure in a Small-World Network of Excitable Neurons" [61], together with [68], provide a detailed analysis of a neural network model with complex topology and identify a regime of sustained recurrent activity nonexistent in either regular or random networks. This work attracted strong attention; it was reviewed in 'New Scientist' (May 22, 2004), selected for the 'Virtual Journal of Biological Physics Research' (May 15, 2004), and featured in the Science and Technology section of the Chicago Sun-Times (July 21, 2004).

"Biomimetic Brain Machine Interfaces for the Control of Movement" [70], together with [64] and [69], begin a series of papers that gradually develop our approach to the investigation of sensorimotor integration through the implementation of brain-machine interfaces. Subse-

quent work on this topic includes papers [73], [74], [76], [78], [79], [80], and [87].

"Encoding of Vibrissal Sensory Input in the Trigeminal Ganglion System" [81], together with [82] and [91] are part of an ongoing collaboration with Mitra Hartmann. Novel and sophisticated analysis techniques based on adaptations of Generalized Linear Models have been applied to Hartmann's empirical data and elastic models of the rat's whiskers.

"Neural Manifolds for the Control of Movement" [83], [84], [85], [87], [89], and [92] are part of an ongoing project in which low-dimensional cortical dynamics are identified as the foundation of neural population activity. This highly visible and high impact work has triggered considerable activity within the theoretical neuroscience community in order to identify the biophysical principles that underlie the emergence and stability of these ubiquitous manifolds as well as their role in neural information processing.

PUBLICATIONS - ARTICLES

1. Critical and Thermodynamic Properties of the Bond-Dilute Planar Model in Two Dimensions. Ph.D. Dissertation, University of Washington, 1982. Thesis supervisor: Prof. E. K. Riedel.
2. Vortex Excitations and Specific Heat of the Planar Model in Two Dimensions (with E. K. Riedel), Phys. Rev. B 23, 6008 (1981).
3. Monte Carlo Studies of a Laplacian Roughening Model for Two Dimensional Melting (with K. J. Strandburg and G. V. Chester), Phys. Rev. B 28, 2717 (1983).
4. Percolative Conductivity in Thin Films (with N. W. Ashcroft), Materials Science Center Report, Cornell University (1983).
5. Helicity Moduli of Three Dimensional Dilute XY Models (with A. Garg, R. Pandit, and C. Ebner), Phys. Rev. B 30, 106 (1984).
6. A Renormalization Group Model for the Stick-Slip Behavior of Faults (with R. F. Smalley and D. L. Turcotte), J. Geophys. Res. 90, 1894 (1985).
7. Collapse of Loaded Fractal Trees (with D. L. Turcotte and R. F. Smalley), Nature 313, 6004 (1985).
8. Two Dimensional Pressure of He^4 Monolayers: First Order Melting of the Incommensurate Solid (with K. J. Strandburg, R. M. Suter, N. J. Colella, P. M. Horn, R. J. Birgeneau, S. G. J. Mochrie, E. D. Specht, K. L. D'Amico, and D. E. Moncton), Phys. Rev. Lett. 55, 2226 (1985).
9. Configuration Space Analysis for Optimization Problems (with G. B. Sorkin and S. R. White), in *Disordered Systems and Biological Organization*, ed. by E. Bienenstock, F. Fogelman Soulie, and G. Weisbuch (Springer-Verlag, Berlin, 1986).
10. Crack Propagation and Onset of Failure, in *On Growth and Form, Fractal and Non-fractal Patterns in Physics*, ed. by H. E. Stanley and N. Ostrowsky (Martinus Nijhoff, Dordrecht, 1986).

11. Collapse of Loaded Fractal Trees, in *Fractals in Physics*, ed. by L. Pietronero and E. Tosatti (North-Holland, Amsterdam, 1986).

12. Memory Networks with Asymmetric Bonds (with J. A. Hertz and G. Grinstein), in *Neural Networks for Computing*, ed. by J. S. Denker (Am. Inst. of Phys., New York, 1986).

13. Irreversible Spin Glasses and Neural Networks (with J. A. Hertz and G. Grinstein), in *Heidelberg Colloquium on Glassy Dynamics*, ed. by L. v. Hemmen and I. Morgensten (Springer-Verlag, Berlin, 1987).

14. Building a Hierarchy with Neural Networks: an Example - Image Vector Quantization (with L. D. Jackel, R. E. Howard, J. S. Denker, and W. Hubbard), Applied Optics 26, 5081 (1987).

15. Automatic Learning, Rule Extraction, and Generalization (with J. S. Denker, D. B. Schwartz, B. S. Wittner, R. E. Howard, L. D. Jackel, and J. J. Hopfield), Complex Systems 1, 877 (1987).

16. Accelerated Learning in Layered Neural Networks (with E. Levin and M. Fleisher), Complex Systems 2, 625 (1988).

17. Learning and Generalization in Layered Neural Networks: the Contiguity Problem, in *Neural Networks: from Models to Applications*, ed. by L. Personnaz and G. Dreyfus, (I.D.S.E.T., Paris, 1989).

18. Consistent Inference of Probabilities in Layered Networks: Predictions and Generalization (with N. Tishby and E. Levin) in *Proceedings of the International Joint Conference on Neural Networks* (IEEE, New York, 1989).

19. A Statistical Approach to Learning and Generalization in Layered Neural Networks (with E. Levin and N. Tishby), in *Proceedings of the Second Annual Workshop on Computational Learning Theory*, ed. by R.Rivest, D. Haussler, and M. K. Warmuth (Morgan Kaufmann, California, 1989).

20. Optimal Brain Damage (with Y. and J. S. Denker), in *Advances in Neural Information Processing Systems 2*, ed. by D. S. Touretzky (Morgan Kaufmann, California, 1990).

21. Exhaustive Learning (with D. B. Schwartz, V. K. Samalam, and J. S. Denker), Neural Computation 2, 374 (1990).

22. Hardware Requirements for Neural-Network Optical Character Recognition (with L. D. Jackel, B.Boser, J. S. Denker, H. P. Graf, Y. Le Cun, I. Guyon, D. Henderson, R. E. Howard, and W. Hubbard), in *Proceedings of the International Joint Conference on Neural Networks* (IEEE, New York, 1990).

23. Optical Character Recognition and Neural-Net Chips (with Y. Le Cun, L. D. Jackel, H. P. Graf, B. Boser, J. S. Denker, I. Guyon, D.Henderson, R. E. Howard, and W.Hubbard), in *Proceedings of the International Neural Network Conference* (Kluwer, Dordrecht, 1990).

24. Supervised Learning and Generalization, in *Neural Networks: Biological Computers or Electronic Brains* (Springer-Verlag, Paris, 1990).

25. A Statistical Approach to Learning and Generalization in Layered Neural Networks (with E. Levin and N. Tishby), Proc. of the IEEE 78, 1568 (1990).

26. Neural Network Implementation of Admission Control (with R. A. Milito and I. Guyon), in *Advances in Neural Information Processing Systems 3*, ed. by R. P. Lippmann, J. E. Moody, and D. S. Touretzky (Morgan Kaufmann, California, 1991).

27. Second Order Properties of Error Surfaces: Learning Time and Generalization (with Y. Le Cun and I. Kanter), in *Advances in Neural Information Processing Systems 3*, ed. by R. P. Lippmann, J. E. Moody and D. S. Touretzky (Morgan Kaufmann, California, 1991).

28. Eigenvalues of Covariance Matrices: Application to Neural Network Learning (with Y. Le Cun and I. Kanter), Phys. Rev. Lett. 66, 2396 (1991).

29. Constrained Neural Networks for Pattern Recognition (with Y. Le Cun), in *Neural Networks: Concepts, Applications, and Implementations 4*, ed. by P. Antognetti and V. Milutinović (Prentice Hall, New Jersey, 1991).

30. Supervised Learning: a Theoretical Framework, in *Proceedings of the 1990 Workshop on Nonlinear Modeling and Forecasting*, ed. by M. Casdagli and S. Eubank (Addison-Wesley, California, 1991).

31. Structural Risk Minimization for Character Recognition (with I. Guyon, V. Vapnik, B. Boser, and L. Bottou), in *Advances in Neural Information Processing Systems 4*, ed. by J. E. Moody, S. J. Hanson, and R. P. Lippmann (Morgan Kaufmann, California, 1992).

32. Capacity Control in Classifiers for Pattern Recognition, in *Neural Networks for Signal Processing 2* (IEEE, New Jersey, 1992).

33. Learning in Linear Neural Networks: the Validity of the Annealed Approximation (with E. Levin), Phys. Rev. A 46, 2124 (1992).

34. A Theory of Supervised Learning, in *Neural Networks: from Biology to High Energy Physics*, ed. by O. Benhar, C. Bosio, P. del Guidice, and E. Tabet (ETS, Pisa, 1992).

35. Capacity Control in Linear Classifiers for Pattern Recognition (with I. Guyon, V. Vapnik, L. Bottou, and B. Boser), in *Proceedings of the 11th IAPR International Conference on Pattern Recognition* (1993).

36. Learning Curves: Asymptotic Values and Rate of Convergence (with C. Cortes, L. D. Jackel, and V. Vapnik), in *Advances in Neural Information Processing Systems 6*, ed. by J. D. Cowan, G. Tesauro, and J. Alspector (Morgan Kaufmann, California, 1994).

37. Supervised Learning from Clustered Input Examples (with C. Marangi and M. Biehl), Europhys. Lett. 30, 117 (1995).

38. Exact Solution for On-Line Learning in Multilayer Neural Networks (with D. Saad), Phys. Rev. Lett. 74, 4337 (1995).

39. On-Line Learning of Unrealizable and Overrealizable Tasks (with D. Saad), in *Proc. of the 1995 International Conference on Artificial Neural Networks* (EC2 & Cie, Paris, 1995).

40. On-Line Learning of Realizable Tasks (with D. Saad), in *Proc. of the 1995 International Conference on Artificial Neural Networks* (EC2 & Cie, Paris, 1995).

41. On-Line Learning in Soft Committee Machines (with D. Saad), Phys. Rev. E 52, 4225 (1995).

42. A Bayesian Approach to Learning in Neural Networks, Intl. J. of Neural Systems 6, 161 (1995).

43. Dynamics of On-Line Gradient Descent Learning for Multilayer Neural Networks (with D. Saad), in *Advances in Neural Information Processing Systems 8*, ed. by D. S. Touretzky, M. C. Mozer, and M. E. Hasselmo (The MIT Press, Massachusetts, 1996).

44. On-Line Learning from Clustered Input Examples (with P. Riegler, M. Biehl, and C. Marangi), in *Proc. of the 7th Italian Workshop on Neural Nets*, ed. by M. Marinaro and R. Tagliaferri (World Scientific, Singapore, 1996).

45. Off-Line Learning from Clustered Input Examples (with C. Marangi, M. Biehl, and P. Riegler), in *Proc. of the 7th Italian Workshop on Neural Nets*, ed. by M. Marinaro and R. Tagliaferri (World Scientific, Singapore, 1996).

46. The Dynamics of On-Line Learning, in *Progress in Neural Information Processing*, ed. by S. Amari, L. Xu, L. Chan, I. King, and K. Leung (Springer, Singapore, 1996).

47. Learning with Noise and Regularizers in Multilayer Neural Networks (with D. Saad), in *Advances in Neural Information Processing Systems 9*, ed. by M. C. Mozer, M. I. Jordan, and T. Petsche (The MIT Press, Massachusetts, 1997).

48. On-Line Learning in Multilayer Neural Networks (with D. Saad), in *Mathematics of Neural Networks - Models, Algorithms and Applications*, ed. by S. W. Ellacott, J. C. Mason and I. J. Anderson (Bookseries on Operations Research/Computer Science Interfaces, Kluwer, Boston, 1997).

49. Bayesian OnLine Learning in the Perceptron (with O. Winther), in *European Symposium on Artificial Neural Networks (ESANN'97)*, ed. by M. Verleysen (D Facto, Brussels, 1997).

50. Universal Distribution of Saliencies for Pruning in Layered Neural Networks (with J. Gorodkin, L. K. Hansen, and B. Lautrup), Intl. J. of Neural Systems 8, 489 (1997).

51. Optimal Bayesian OnLine Learning (with O. Winther), in *Theoretical Aspects of Neural Computation*, ed. by K-Y. M. Wong, I. King, and D-Y. Yeung (Springer-Verlag, Singapore, 1998).

52. An Exact Solution for On-Line Learning of Smooth Functions, in *Theoretical Aspects of Neural Computation*, ed. by K-Y. M. Wong, I. King, and D-Y. Yeung (Springer-Verlag, Singapore, 1998).

53. Multi-locus Nonparametric Linkage Analysis of Complex Trait Loci with Neural Networks (with P. Lucek, J. Hanke, J. Reich, and J. Ott), Hum. Hered. 48, 275 (1998).

54. Optimal Perceptron Learning: an Online Bayesian Approach (with O. Winther), in *On-Line Learning in Neural Networks*, ed. by D. Saad (Cambridge University Press, Cambridge, 1998).

55. Optimal Online Learning: a Bayesian Approach (with O. Winther), Comp. Phys. Comm. 121-122, 94 (1999).

56. Consistent and Minimal Springback Using a Stepped Binder Force Trajectory and Neural Network Control (with J. Cao and B. Kinsey), J. Eng. Mater. Tech. 122, 113 (2000).

57. Attractor Neural Networks, in *Fundamental Neuroscience, 2nd edition*, ed. by L. R. Squire, J. L. Roberts, N. C. Spitzer, M. J. Zigmond, S. K. McConnell, and F. E. Bloom (Academic Press, San Diego, 2002).

58. Prediction of EMG from Multiple Electrode Recordings in Primary Motor Cortex (with E. A. Pohlmeyer, L. E. Miller, F. A. Mussa-Ivaldi, E. J. Perreault, and D. T. Westwick), in *Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2197 (2003).

59. Modulation of Striatal Single Unit Responses by Expected Reward: a Cellular Model of Medium Spiny Neurons Exhibiting Dopamine Induced Bistability (with A. J. Gruber, D. J. Surmeier, and J. C. Houk), J. Neurophysiol. 90, 1095 (2003).

60. Dopamine Induced Bistability Enhances Signal Processing in Spiny Neurons (with A. J. Gruber and J. C. Houk), in *Advances in Neural Information Processing Systems 15*, ed. by S. Becker, S. Thrun, and K. Obermayer (The MIT Press, Massachusetts, 2003).

61. Self-Sustained Activity and Failure in a Small-World Network of Excitable Neurons (with A. Roxin and H. Riecke), Phys. Rev. Lett. 92, 198101 (2004).

62. Dopamine Modulation in a Basal Ganglio-Cortical Network Implements Saliency-Based Gating of Working Memory (with A. J. Gruber, P. Dayan, and B. S. Gutkin), in *Advances in Neural Information Processing Systems 16*, ed. by S. Thrun, L. Saul, and B. Schölkopf (The MIT Press, Massachusetts, 2004).

63. Neural Primitives for Motion Control (with F. A. Mussa-Ivaldi), IEEE J. Ocean. Eng. 29:3, 640 (2004).

64. Identification of Multiple-Input Systems with Highly Coupled Inputs: Application to EMG Prediction from Multiple Intra-Cortical Electrodes (with D. T. Westwick, E. A. Pohlmeyer, L. E. Miller, and E. J. Perreault), Neural Comput. 18:2, 329 (2005).

65. Dopamine Modulation in the Basal Ganglia Locks the Gate to Working Memory (with A. J. Gruber, P. Dayan, and B. S. Gutkin), J. Comp. Neurosci. 20, 153 (2006).

66. How Do Neurons Look at the World?, PLoS Biol. 4:4, e122 (2006).

67. Amplification in the Auditory Periphery: The Effect of Coupling Tuning Mechanisms (with K. A. Montgomery and M. Silber), Phys. Rev. E 75:5, 051924 (2007).

68. Multiple Attractors, Long Chaotic Transients, and Failure in Small-World Networks of Excitable Neurons (with H. Riecke, A. Roxin, and S. Madruga), Chaos 17:2, 026110 (2007).

69. Prediction of Upper Limb Muscle Activity from Motor Cortical Discharge during Reaching (with E. A. Pohlmeyer, E. J. Perreault, and L. E. Miller), J. Neural Eng. 4:4, 369 (2007).

70. Biomimetic Brain Machine Interfaces for the Control of Movement (with A. H. Fagg, N. G. Hatsopoulos, V. de Lafuente, K. A. Moxon, S. Nemati, J. M. Rebesco, R. Romo, J. Reimer, D. Tkach, E. A. Pohlmeyer, and L. E. Miller), J. Neurosci. 27:44, 11842 (2007).

71. Top-Down Laminar Organization of the Excitatory Network in Motor Cortex (with N. Weiler, L. Wood, J. Yu, and G. M. G. Shepherd), Nat. Neurosci. 11:3, 360 (2008).

72. Models of Motor Control (with F. A. Mussa-Ivaldi), in *The Cambridge Handbook of Computational Psychology*, ed. by R. Sun (Cambridge University Press, Cambridge, 2008).

73. Toward a Biomimetic, Bidirectional, Brain Machine Interface (with A. H. Fagg, N. G. Hatsopoulos, B. M. London, J. Reimer, D. Wang, and L. E. Miller), IEEE Proc. in Eng. Med. Biol. 13, 3376 (2009).

74. Toward the Restoration of Hand Use to a Paralyzed Monkey: Brain-Controlled Functional Electrical Stimulation of Forearm Muscles (with E. A. Pohlmeyer, E. R. Oby, E. J. Perreault, K. L. Kilgore, R. F. Kirsch, and L. E. Miller), PLoS ONE 4, 1 (2009).

75. Evolutionary Expansion and Specialization of the PDZ Domains (with O. Sakarya, C. Conaco, Ö. Egecioglu, T. H. Oakley, and K. S. Kosik), Mol. Biol. Evol. 27:5, 1058 (2010).

76. Rewiring Neural Interactions by Micro-Stimulation (with J. M. Rebesco, I. H. Stevenson, K. P. Körding, and L. E. Miller), Front. Syst. Neurosci. 4, 39 (2010).

77. Statistical Physics and Neuroscience (ed. with N. Brunel, J. A. Hertz, and R. Zecchina), J. Stat. Mech. 3, P03001 (2013).

78. Multi-Electrode Stimulation in Somatosensory Cortex Increases Probability of Detection (with B. Zaami, R. Ruiz-Torres, and L. E. Miller), J. Neural Eng. 10, 056013 (2013).

79. Long-term Stability of Motor Cortical Activity: Implications for Brain Machine Interfaces and Optimal Feedback Control (with R. D. Flint, M. R. Scheid, Z. A. Wright, and M. M. Slutzky), J. Neurosci. 10, 3623 (2016).

80. Adaptive Neuron-to-EMG Decoder Training for FES Neuroprotheses (with C. Ethier, D. Acuna, and L. E. Miller), J. Neural Eng. 13, 046009 (2016).

81. Decoupling Kinematics and Mechanics Reveals Coding Properties of Trigeminal Ganglion Neurons in the Rat Vibrissal System (with N. E. Bush, C. L. Schroeder, J. A. Hobbs, A. E. T. Yang, L. A. Huet, and M. J. Z. Hartmann), eLife 5, e13969 (2016).

82. Whisking Mechanics and Active Sensing (with N. E. Bush, and M. J. Z. Hartmann), Curr. Opin. Neurobiol. 40, 178-188 (2016).

83. Neural Manifolds for the Control of Movement (with J. A. Gallego, M. G. Perich, and L. E. Miller), Neuron 94 (5), 978-984 (2017).

84. Cortical Population Activity Within a Preserved Neural Manifold Underlies Multiple Motor Behaviors (with J. A. Gallego, M. G. Perich, S. N. Naufel, C. Ethier, and L. E. Miller), Nat. Commun. 9 (1), 1-13 (2018).

85. Adversarial Domain Adaptation for Stable Brain-Machine Interfaces (with A. Farshchian, J. A. Gallego, J. P. Cohen, Y. Bengio, and L. E. Miller), International Conference on Learning Representations (2018).

86. In Vitro Validation of in Silico Identified Inhibitory Interactions (with H. Liu, D. Bridges, C. Randall, B. Wu, P. Hansma, X. Yan, K. S. Kosik, and K. Bouchard), J. Neurosci. Methods 321, 39-48 (2019).

87. Neural Networks for Modeling Neural Spiking in S1 Cortex (with A. Lucas, T. Tomlinson, N. Rohani, R. Chowdhury, A. K. Karsaggelos, and L. E. Miller), Front. Syst. Neurosci. 13, 13 (2019).

88. The Dynamics of Motor Learning through the Formation of Internal Models (with C. Pierella, M. Casadio, and F. A. Mussa-Ivaldi), PLoS Comput. Biol. 15 (12), e1007118 (2019).

89. Long-Term Stability of Cortical Population Dynamics Underlying Consistent Behavior (with J. A. Gallego, M. G. Perich, R. H. Chowdhury, and L. E. Miller), Nat. Neurosci. 23 (2), 260-270 (2020).

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