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HIGH SCHOOL:

Stuyvesant High School, Manhattan
First in Class of 1957

COLLEGE:

Dartmouth College, B.A.
First in Class of 1961
A.P. Sloan National Scholar
Phi Beta Kappa Prize
NSF Undergraduate Research Fellow

GRADUATE WORK:

Stanford University, M.S., 1961-1964
NSF Graduate Fellowship
Woodrow Wilson Graduate Fellowship

Rockefeller University, Ph.D., 1964-1967
Rockefeller University Graduate Fellowship

POST-GRADUATE ACTIVITIES:

1. Assistant Professor of Applied Mathematics, M.I.T., 1967-1969.
2. Senior Visiting Fellow of the Science Research Council of England, 1969.
3. Norbert Wiener Medal for Cybernetics, 1969.
4. A.P. Sloan Research Fellow, 1969-1971.
5. Associate Professor of Applied Mathematics, M.I.T., 1969-1975.
6. Professor of Mathematics, Psychology, and Biomedical Engineering, Boston University, 1975-.

7. Invited lectures in Australia, Austria, Belgium, Bulgaria, Canada, China, Denmark, England, Finland, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, The Netherlands, Norway, Qatar, Scotland, Singapore, Spain, Sweden, Switzerland, and throughout the United States.
8. Editor of the journals *Adaptive Behavior*; *Applied Intelligence*; *Behavioral and Brain Sciences* (Associate Editor for Computational Neuroscience); *Autism Open Access Journal*; *Behavioural Processes*; *Brains, Minds, and Media*; *Cognition and Brain Theory*; *Cognitive Brain Research*; *Cognitive Computation*, *Cognitive Neurodynamics*; *Cognitive Processing*; *Cognitive Science*; *Current Opinions in Cognitive Neurodynamics*; *IEEE Expert*; *IEEE Transactions on Neural Networks*; *Information Sciences*; *International Journal of Cognitive Science*; *International Journal of Humanoid Robotics*; *International Journal of Hybrid Intelligent Systems*; *International Journal of Neural Systems*; *International Journal of Uncertainty, Fuzziness, and Knowledge-Based Systems*; *Journal of Cognitive Neuroscience*; *Journal of Experimental Neuroscience*, *Journal of Mathematical Psychology*; *Journal of Theoretical Neurobiology*; *Mathematical Biosciences*; *Mind and Society*; *Neural Computation*; *Nonlinear Analysis*.
9. Editorial board member of the book series *Advanced Information and Knowledge Processing*, Springer-Verlag; *Mathematical Modeling: Theory and Applications*, Kluwer.
10. Founder and Editor-in-Chief of the journal *Neural Networks*, 1987-2010.
11. Founder and First President of the International Neural Network Society and member of the founding INNS Board of Governors, 1987-1988.
12. Founder and Director, Center for Adaptive Systems, Boston University, 1981-.
13. Principal Investigator, Boston Consortium for Behavioral and Neural Studies (Congressional Center of Excellence), 1986-1993.
14. Wang Professor of Cognitive and Neural Systems, Boston University, 1989-.
15. Founder and Chairman, Department of Cognitive and Neural Systems, Boston University, 1991-2007.
16. IEEE Neural Networks Pioneer Award, 1991.
17. Boston Computer Society Thinking Technology Award, 1992.
18. INNS Leadership Award, 1992.
19. Fellow, American Psychological Association (APA), 1994.

20. Principal Investigator, Center for Automated Vision and Sensing Systems (Congressional Center of Excellence), 1995-2000.
21. Fellow, Society of Experimental Psychologists (SEP), 1996.
22. Information Sciences Award, Association for Intelligent Machinery, 2000.
23. Principal Investigator, Center for Intelligent Biomimetic Image Processing and Classification (Congressional Center of Excellence), 2001-2007.
24. Charles River Laboratories prize, Society for Behavioral Toxicology, 2002.
25. Fellow, American Psychological Society (APS), 2002.
26. Membership in Acoustical Society of America, American Association for the Advancement of Science, American Mathematical Society, American Psychological Association, American Society for Engineering Education, Association for Behavior Analysis, Association for Psychological Science, Association for Research in Vision and Ophthalmology, Association for the Advancement of Artificial Intelligence, Biologically Inspired Cognitive Architectures Society, Cognitive Neuroscience Society, Cognitive Science Society, European Neural Network Society, International Neural Network Society, Memory Disorders Research Society, New York Academy of Sciences, Optical Society of America, Organization for Computational Neuroscience, Psychonomic Society, Schizophrenia International Research Society, Sigma Xi, Society for Artificial Neural Networks in Medicine and Biology, Society for Computational Modeling of Associative Learning, Society for Industrial and Applied Mathematics, Society for Mathematical Biology, Society for Mathematical Psychology, Society for Neuroscience, SPIE, Vision Sciences Society.
27. INNS Helmholtz Award, 2003.
28. Principal Investigator, Founding Director and Chairman of the Governing Board, CELEST: Center of Excellence for Learning in Education, Science, and Technology (an NSF Science of Learning Center), 2004-2009.
29. IEEE Fellow, 2005.
30. American Educational Research Association (AERA) Inaugural Fellow, 2008.
31. Advisory Board member for the new Springer journal *Cognitive Computation*, 2009.
32. Member, Rafik B. Hariri Institute for Computing and Computational Science and Engineering, Boston University, 2011.
33. Steering Committee, Center for Computational Neuroscience and Neural Technology (CompNet), Boston University, 2011.

34. INNS Fellow, 2012.
35. Norman Anderson Lifetime Achievement Award of the Society of Experimental Psychologists, 2015.
36. IEEE Frank Rosenblatt Award in computational neuroscience, 2017.
37. Fellow, Psychonomic Society, 2017.
38. Donald O. Hebb award in biological learning of the International Neural Network Society, 2019.

PATENTS

1. Carpenter, G.A. and Grossberg, S., U.S. Patent #5,142,590: Pattern recognition system. Filed: November 27, 1985. Issued: August 25, 1992. European Patent #0244483; Issued: July 15, 1992.
2. Carpenter, G.A. and Grossberg, S., U.S. Patent #4,914,708 and #5,133,021: System for self-organization of stable category recognition codes for analog patterns. Filed: June 19, 1987. Issued: April 3, 1990 and July 21, 1992.
3. Carpenter, G.A. and Grossberg, S., U.S. Patent #5,311,601: Pattern recognition system with variable selection weights. Filed: January 12, 1990. Issued: May 10, 1994.
4. Carpenter, G.A., Grossberg, S., and Reynolds, J.H., U.S. Patent #5,214,715: Predictive self-organizing neural network. Filed: January 31, 1991. Issued: May 25, 1993.
5. Carpenter, G.A., Grossberg, S., and Rosen, D.B., U.S. Patent #5,157,738: Rapid category learning and recognition system. Filed: December 19, 1990. Issued: October 20, 1992.
6. Grossberg, S. and Cohen, M.A., U.S. Patent #5,040,214: Pattern learning and recognition apparatus in a computer system. Filed: March 8, 1989. Issued: August 13, 1991.
7. Grossberg, S. and Mingolla, E., U.S. Patent #4,803,736: Neural networks for machine vision. Filed: July 23, 1987. Issued: February 7, 1989.

LIST OF PUBLICATIONS

BOOKS AND JOURNAL SPECIAL ISSUES

1. Editor, **Mathematical psychology and psychophysiology**. Providence, RI: American Mathematical Society, 1981 (co-distributed by Erlbaum Associates).
2. **Studies of mind and brain: Neural principles of learning, perception, development, cognition, and motor control**. Norwell, MA: Kluwer Academic Publishers, 1982.

3. **Neural dynamics of adaptive sensory-motor control: Ballistic eye movements** (with M. Kuperstein). Amsterdam: North-Holland, 1986.
4. **The adaptive brain, I: Cognition, learning, reinforcement, and rhythm**. Amsterdam: North-Holland, 1987.
5. **The adaptive brain, II: Vision, speech, language, and motor control**. Amsterdam: North-Holland, 1987.
6. **Neural networks** (with G.A. Carpenter). Optical Society of America, Special Issue of *Applied Optics*, 1987.
7. **Neural networks and natural intelligence**. Cambridge, MA: MIT Press, 1988.
8. **Neural dynamics of adaptive sensory-motor control: Expanded edition** (with M. Kuperstein). Elmsford, NY: Pergamon Press, 1989.
9. **Neural network models of conditioning and action** (with M. Commons and J. Staddon). Hillsdale, NJ: Erlbaum, 1991.
10. **Pattern recognition by self-organizing neural networks** (with G.A. Carpenter). Cambridge, MA: MIT Press, 1991.
11. **Neural networks for vision and image processing** (with G.A. Carpenter). Cambridge, MA: MIT Press, 1992.
12. **Models of neurodynamics and behavior** (with J.G. Taylor). Tarrytown, NY: Elsevier Science Inc., 1994. Special Issue of *Neural Networks*.
13. **Neural networks for automatic target recognition** (with H. Hawkins and A. Waxman). Tarrytown, NY: Elsevier Science Inc., 1995. Special Issue of *Neural Networks*.
14. **Neural control and robotics: Biology and technology** (with R. Brooks and L. Optican). Oxford, UK: Elsevier Science Ltd., 1998. Special Issue of *Neural Networks*.
15. **Spiking neurons in neuroscience and technology** (with W. Maass and H. Markram). Exeter, UK: Elsevier Science Ltd., 2001. Special Issue of *Neural Networks*.
16. **Vision and brain** (with D. Field and L. Finkel). Exeter, UK: Elsevier Science Ltd., 2004. Special Issue of *Neural Networks*.
17. **Social cognition: From babies to robots** (with A. Meltzoff, J. Movellan, and N. Newcombe). Oxford UK: Elsevier Science Ltd., 2010. Special Issue of *Neural Networks*.
18. **Conscious MIND, Resonant BRAIN: How Each Brain Makes a Mind**. New York:

Oxford University Press.

<https://www.amazon.com/Conscious-Mind-Resonant-Brain-Makes/dp/0190070552>

ARTICLES

1. Nonlinear difference-differential equations in prediction and learning theory. *Proceedings of the National Academy of Sciences*, 1967, **58**, 1329-1334.
2. A prediction theory for some nonlinear functional-differential equations, I: Learning of lists. *Journal of Mathematical Analysis and Applications*, 1968, **21**, 643-694.
3. A prediction theory for some nonlinear functional-differential equations, II: Learning of patterns. *Journal of Mathematical Analysis and Applications*, 1968, **22**, 490-522.
4. Global ratio limit theorems for some nonlinear functional differential equations, I. *Bulletin of the American Mathematical Society*, 1968, **74**, 93-100.
5. Global ratio limit theorems for some nonlinear functional differential equations, II. *Bulletin of the American Mathematical Society*, 1968, **74**, 101-105.
6. Some nonlinear networks capable of learning a spatial pattern of arbitrary complexity. *Proceedings of the National Academy of Sciences*, 1968, **59**, 368-372.
7. Some physiological and biochemical consequences of psychological postulates. *Proceedings of the National Academy of Sciences*, 1968, **60**, 758-765.
8. On the global limits and oscillations of a system of nonlinear differential equations describing a flow of a probabilistic network. *Journal of Differential Equations*, 1969, **5**, 531-563.
9. On variational systems of some nonlinear difference-differential equations. *Journal of Differential Equations*, 1969, **6**, 544-577.
10. Embedding fields: A theory of learning with physiological implications. *Journal of Mathematical Psychology*, 1969, **6**, 209-239.
11. On learning, information, lateral inhibition, and transmitters. *Mathematical Biosciences*, 1969, **4**, 255-310.
12. On the production and release of chemical transmitters and related topics in cellular control. *Journal of Theoretical Biology*, 1969, **22**, 325-364.
13. On the serial learning of lists. *Mathematical Biosciences*, 1969, **4**, 201-253.
14. Some networks that can learn, remember, and reproduce any number of complicated space-time patterns, I. *Journal of Mathematics and Mechanics*, 1969, **19**, 53-91.

15. On learning of spatiotemporal patterns by networks with ordered sensory and motor components, I: Excitatory components of the cerebellum. *Studies in Applied Mathematics*, 1969, **48**, 105-132.
16. On learning and energy-entropy dependence in recurrent and nonrecurrent signed networks. *Journal of Statistical Physics*, 1969, **1**, 319-350.
17. A global prediction (or learning) theory for some nonlinear functional-differential equations. In J.A. Nohel (Ed.), **Studies in applied mathematics, advances in differential and integral equations**, Vol. 5. Philadelphia: SIAM, 1969, pp.64-70.
18. Learning and energy-entropy dependence in some nonlinear functional-differential systems. *Bulletin of the American Mathematical Society*, 1969, **75**, 1238-1242.
19. Some networks that can learn, remember, and reproduce any number of complicated space-time patterns, II. *Studies in Applied Mathematics*, 1970, **49**, 135-166.
20. Neural pattern discrimination. *Journal of Theoretical Biology*, 1970, **27**, 291-337.
21. Schizophrenia: Possible dependence of associational span, bowing, and primacy vs. recency on spiking threshold (with J. Pepe). *Behavioral Science*, 1970, **15**, 359-362.
22. Embedding fields: Underlying philosophy, mathematics, and applications to psychology, physiology, and anatomy. *Journal of Cybernetics*, 1971, **1**, 28-50.
23. Spiking threshold and overarousal effects in serial learning (with J. Pepe). *Journal of Statistical Physics*, 1971, **3**, 95-125.
24. Functional-differential systems and pattern learning. In D. Chillingsworth (Ed.), **Lecture notes in mathematics**, Vol. 206. Berlin: Springer-Verlag, 1971, pp.147-150.
25. On the dynamics of operant conditioning. *Journal of Theoretical Biology*, 1971, **33**, 225-255.
26. Pavlovian pattern learning by nonlinear neural networks. *Proceedings of the National Academy of Sciences*, 1971, **68**, 828-831.
27. Neural expectation: Cerebellar and retinal analogs of cells fired by learnable or unlearned pattern classes. *Kybernetik*, 1972, **10**, 49-57.
28. A neural theory of punishment and avoidance, I: Qualitative theory. *Mathematical Biosciences*, 1972, **15**, 39-67.
29. A neural theory of punishment and avoidance, II: Quantitative theory. *Mathematical Biosciences*, 1972, **15**, 253-285.

30. Pattern learning by functional-differential neural networks with arbitrary path weights. In K. Schmitt (Ed.), **Delay and functional-differential equations and their applications**. New York: Academic Press, 1972, pp.121-160.
31. Contour enhancement, short-term memory, and constancies in reverberating neural networks. *Studies in Applied Mathematics*, 1973, **52**, 217-257.
32. Classical and instrumental learning by neural networks. In R. Rosen and F. Snell (Eds.), **Progress in theoretical biology**. New York: Academic Press, 1974, pp.217-257.
33. A neural model of attention, reinforcement, and discrimination learning. *International Review of Neurobiology*, 1975, **18**, 263-327.
34. Some developmental and attentional biases in the contrast enhancement and short-term memory of recurrent neural networks (with D. Levine). *Journal of Theoretical Biology*, 1975, **53**, 341-380.
35. Pattern formation, contrast control, and oscillations in the short-term memory of shunting on-center off-surround networks (with S.A. Elias). *Biological Cybernetics*, 1975, **20**, 69-98.
36. On the development of feature detectors in the visual cortex with applications to learning and reaction-diffusion systems. *Biological Cybernetics*, 1976, **21**, 145-159.
37. On visual illusions in neural networks: Line neutralization, tilt aftereffect, and angle expansion (with D. Levine). *Journal of Theoretical Biology*, 1976, **61**, 477-504.
38. Adaptive pattern classification and universal recoding, I: Parallel development and coding of neural feature detectors. *Biological Cybernetics*, 1976, **23**, 121-134.
39. Adaptive pattern classification and universal recoding, II: Feedback, expectation, olfaction, and illusions. *Biological Cybernetics*, 1976, **23**, 187-202.
40. Redundant information in auditory and visual modalities: Inferring decision-related processes from the P300 component (with E. Donchin, K. Squires, and N. Squires). *Journal of Experimental Psychology*, 1977, **3**, 299-315.
41. Pattern formation by the global limits of a nonlinear competitive interaction in n dimensions. *Journal of Mathematical Biology*, 1977, **4**, 237-256.
42. A theory of human memory: Self-organization and performance of sensory-motor codes, maps, and plans. In R. Rosen and F. Snell (Eds.), **Progress in theoretical biology, Volume 5**. New York: Academic Press, 1978, pp.233-374.
43. Communication, memory, and development. In R. Rosen and F. Snell (Eds.), **Progress in theoretical biology, Volume 5**. New York: Academic Press, 1978, pp.183-232.

44. A theory of visual coding, memory, and development. In E. Leeuwenberg and H. Buffart (Eds.), **Formal theories of visual perception**. New York: Wiley Press, 1978.
45. Behavioral contrast in short-term memory: Serial binary memory models or parallel continuous memory models? *Journal of Mathematical Psychology*, 1978, **3**, 199-219.
46. Competition, decision, and consensus. *Journal of Mathematical Analysis and Applications*, 1978, **66**, 470-493.
47. Do all neural models really look alike? *Psychological Review*, 1978, **85**, 592-596.
48. Decisions, patterns, and oscillations in nonlinear competitive systems with applications to Volterra-Lotka systems. *Journal of Theoretical Biology*, 1978, **73**, 101-130.
49. Adaptive pattern classification and universal recoding: Parallel development and coding of neural feature detectors. In R. Trappl (Ed.), **Third European conference on cybernetics and systems research**. New York: Halstead Press, 1978, pp.375-383.
50. How does a brain build a cognitive code? *Psychological Review*, 1980, **87**, 1-51.
51. Biological competition: Decision rules, pattern formation, and oscillations. *Proceedings of the National Academy of Sciences*, 1980, **77**, 2338-2342.
52. Intracellular mechanisms of adaptation and self-regulation in self-organizing networks: The role of chemical transducers. *Bulletin of Mathematical Biology*, 1980, **42**, 365-396.
53. Human and computer rules and representations are not equivalent. *Behavioral and Brain Sciences*, 1980, **3**, 136-138.
54. Direct perception or adaptive resonance? *Behavioral and Brain Sciences*, 1980, **3**, 385.
55. Adaptive resonance in development, perception, and cognition. In S. Grossberg (Ed.), **Mathematical psychology and psychophysiology**. Providence, RI: American Mathematical Society, 1981.
56. Psychophysiological substrates of schedule interactions and behavioral contrast. In S. Grossberg (Ed.), **Mathematical psychology and psychophysiology**. Providence, RI: American Mathematical Society, 1981.
57. Adaptation and transmitter gating in vertebrate photoreceptors (with G.A. Carpenter). *Journal of Theoretical Neurobiology*, 1981, **1**, 1-42.
58. Processing of expected and unexpected events during conditioning and attention: A psychophysiological theory. *Psychological Review*, 1982, **89**, 529-572.

59. Associative and competitive principles of learning and development: The temporal unfolding and stability of STM and LTM patterns. In S.I. Amari and M. Arbib (Eds.), **Competition and cooperation in neural networks**. New York: Springer-Verlag, 1982.
60. Why do cells compete? Some examples from visual perception. *The UMAP Journal*, 1982, **3**, 103-121.
61. A psychophysiological theory of reinforcement, drive, motivation, and attention. *Journal of Theoretical Neurobiology*, 1982, **1**, 286-369.
62. The quantized geometry of visual space: The coherent computation of depth, form, and lightness. *Behavioral and Brain Sciences*, 1983, **6**, 625-657.
63. Reply to commentators on "The quantized geometry of visual space: The coherent computation of depth, form, and lightness". *Behavioral and Brain Sciences*, 1983, **6**, 676-692.
64. Absolute stability of global pattern formation and parallel memory storage by competitive neural networks (with M.A. Cohen). *Transactions IEEE*, 1983, **SMC-13**, 815-826.
65. Dynamic models of neural systems: Propagated signals, photoreceptor transduction, and circadian rhythms (with G.A. Carpenter). In J.P.E. Hodgson (Ed.), **Oscillations in mathematical biology**. New York: Springer-Verlag, 1983, pp.102-196.
66. A neural theory of circadian rhythms: The gated pacemaker (with G.A. Carpenter). *Biological Cybernetics*, 1983, **48**, 35-59.
67. Neural substrates of binocular form perception: Filtering, matching, diffusion, and resonance. In E. Basar, H. Flohr, H. Haken, and A.J. Mandell (Eds.), **Synergetics of the brain**. New York: Springer-Verlag, 1983.
68. Adaptation and gain normalization: A comment on Ullman and Schechtman (1982). *Proceedings of the Royal Society of London (B)*, 1983, **219**, 471-473.
69. Some global properties of binocular resonances: Disparity matching, filling-in, and figure-ground synthesis (with M.A. Cohen). In P. Dodwell and T. Caelli (Eds.), **Figural synthesis**. Hillsdale, NJ: Erlbaum, 1984, pp.117-151.
70. Some normal and abnormal behavioral syndromes due to transmitter gating of opponent processes. *Biological Psychiatry*, 1984, **19**, 1075-1118.
71. Some psychophysiological and pharmacological correlates of a developmental, cognitive, and motivational theory. In R. Karrer, J. Cohen, and P. Tueting (Eds.), **Brain and information: Event related potentials**. New York: New York Academy of Sciences, 1984, pp.58-142.

72. A neural theory of circadian rhythms: Aschoff's rule in diurnal and nocturnal mammals (with G.A. Carpenter). *American Journal of Physiology (Regulatory, Integrative, and Comparative Physiology)*, 1984, **247**, R1067-R1082.
73. Outline of a theory of brightness, color, and form perception. In E. Degreef and J. van Buggenhaut (Eds.), **Trends in mathematical psychology**. Amsterdam: North-Holland, 1984.
74. Absolute stability of pattern processing and parallel memory storage by competitive neural networks (with M.A. Cohen). In **Proceedings of the 1984 IEEE international conference on systems, man, and cybernetics**, 1984.
75. The microscopic analysis of behavior: Towards a synthesis of instrumental, perceptual, and cognitive ideas. *Behavioral and Brain Sciences*, 1984, **7**, 594-595.
76. Unitization, automaticity, temporal order, and word recognition. *Cognition and Brain Theory*, 1984, **7**, 263-283.
77. Neural dynamics of brightness perception: Features, boundaries, diffusion, and resonance (with M.A. Cohen). *Perception and Psychophysics*, 1984, **36**, 428-456.
78. Neuroethology and theoretical neurobiology. *Behavioral and Brain Sciences*, 1984, **7**, 388-390.
79. The role of learning in sensory-motor control. *Behavioral and Brain Sciences*, 1985, **8**, 155-157.
80. Neural dynamics of form perception: Boundary completion, illusory figures, and neon color spreading (with E. Mingolla). *Psychological Review*, 1985, **92**, 173-211.
81. A neural theory of circadian rhythms: Split rhythms, after-effects, and motivational interactions (with G.A. Carpenter). *Journal of Theoretical Biology*, 1985, **113**, 163-223.
82. The hypothalamic control of eating and circadian rhythms: Opponent processes and their chemical modulators. In N. Jaeger and L. Rensing (Eds.), **Temporal order**. New York: Springer-Verlag, 1985.
83. Neural dynamics of circadian rhythms: The mammalian hypothalamic pacemaker (with G.A. Carpenter). In J. Eisenfeld and C. DeLisi (Eds.), **Mathematics and computers in biomedical applications**. Amsterdam: Elsevier/North-Holland, 1985.
84. Neural dynamics of perceptual grouping: Textures, boundaries, and emergent segmentations (with E. Mingolla). *Perception and Psychophysics*, 1985, **38**, 141-171.

85. Category learning and adaptive pattern recognition: A neural network model (with G.A. Carpenter). In **Proceedings of the third Army conference on applied mathematics and computing**, 1985.
86. Nonlinear neural dynamics of visual segmentation (with E. Mingolla). In **Proceedings of the third Army conference on applied mathematics and computing**, 1985.
87. Four frames do not suffice. *Behavioral and Brain Sciences*, 1985, **8**, 294-295.
88. Cognitive self-organization and neural modularity. *Behavioral and Brain Sciences*, 1985, **8**, 18-19.
89. Brain metaphors, theories, and facts. *Behavioral and Brain Sciences*, 1986, **9**, 97-98.
90. Statistical mechanics of visual form perception: The resolution of uncertainty. In S. Diner, D. Farque, and G. Lochak (Eds.), **Dynamical systems: A renewal of mechanism**. Philadelphia: World Scientific Press, 1986, pp.201-221.
91. Adaptive compensation to changes in the oculomotor plant. In E. Keller and D. Zee (Eds.), **Adaptive processes in visual and oculomotor systems**. New York: Pergamon Press, 1986, pp.341-345.
92. The adaptive self-organization of serial order in behavior: Speech, language, and motor control. In E.C. Schwab and H.C. Nusbaum (Eds.), **Pattern recognition by humans and machines, Vol. 1: Speech perception**. New York: Academic Press, 1986, pp.187-294.
93. Neural dynamics of word recognition and recall: Attentional priming, learning, and resonance (with G.O. Stone). *Psychological Review*, 1986, **93**, 46-74.
94. Neural dynamics of speech and language coding: Developmental programs, perceptual grouping, and competition for short-term memory (with M.A. Cohen). *Human Neurobiology*, 1986, **5**, 1-22.
95. Neural dynamics of attention switching and temporal order information in short-term memory (with G.O. Stone). *Memory and Cognition*, 1986, **14**, 451-468.
96. Conditioning, expectancy, attention, and rhythm: The role of gated dipoles. In R. Campan and R. Zayan (Eds.), **Relevance of models and theories in ethology**. Privat, I.E.C., Toulouse, 1986, pp.109-123.
97. Adaptive resonance theory: Stable self-organization of neural recognition codes in response to arbitrary lists of input patterns (with G.A. Carpenter). **Proceedings of the Cognitive Science Society**, 1986.

98. Absolutely stable learning of recognition codes by a self-organizing neural network (with G.A. Carpenter). In J.S. Denker (Ed.), **Neural networks for computing**, Snowbird Conference Proceedings. New York: American Institute of Physics, 1986, pp.77-85.
99. Computer simulation of neural networks for perceptual psychology (with E. Mingolla). *Behavior Research Methods, Instruments, and Computers*, 1986, **18**, 601-607.
100. Cooperative self-organization of multiple neural systems during adaptive sensory-motor control. In D.M. Guthrie (Ed.), **Aims and methods in neuroethology**. Manchester University Press, 1987.
101. Neural dynamics of attentionally modulated Pavlovian conditioning: Blocking, inter-stimulus interval, and secondary reinforcement (with D.S. Levine). *Applied Optics*, 1987, **26**, 5015-5030.
102. Associative learning, adaptive pattern recognition, and cooperative-competitive decision making by neural networks (with G.A. Carpenter). In H. Szu (Ed.), **Optical and hybrid computing**. SPIE Proceedings, 1987.
103. The role of illusory figures in visual segmentation (with E. Mingolla). In S. Petry and G. Meyer (Eds.), **The perception of illusory contours**. New York: Springer-Verlag, 1987, pp.116-125.
104. Discovering order in chaos: Stable self-organization of neural recognition codes (with G.A. Carpenter). In S.H. Koslow, A.J. Mandell, and M.F. Shlesinger (Eds.), **Conference on perspectives in biological dynamics and theoretical medicine**, Annals of the New York Academy of Sciences, 1987.
105. Probing cognitive processes through the structure of event-related potentials during learning: An experimental and theoretical analysis (with J. P. Banquet). *Applied Optics*, 1987, **26**, 4931-4946.
106. Cortical dynamics of three-dimensional form, color, and brightness perception, I: Monocular theory. *Perception and Psychophysics*, 1987, **41**, 87-116.
107. Cortical dynamics of three-dimensional form, color, and brightness perception, II: Binocular theory. *Perception and Psychophysics*, 1987, **41**, 117-158.
108. A massively parallel architecture for a self-organizing neural pattern recognition machine (with G.A. Carpenter). *Computer Vision, Graphics, and Image Processing*, 1987, **37**, 54-115.
109. Neural dynamics of surface perception: Boundary webs, illuminants, and shape-from-shading (with E. Mingolla). *Computer Vision, Graphics, and Image Processing*, 1987, **37**, 116-165.

110. Masking fields: A massively parallel neural architecture for learning, recognizing, and predicting multiple groupings of patterned data (with M.A. Cohen). *Applied Optics*, 1987, **26**, 1866-1891.
111. Competitive learning: From interactive activation to adaptive resonance. *Cognitive Science*, 1987, **11**, 23-63.
112. Stable self-organization of sensory recognition codes: Is chaos necessary? *Behavioral and Brain Sciences*, 1987.
113. Neural dynamics of decision making under risk: Affective balance and cognitive-emotional interactions (with W. Gutowski). *Psychological Review*, 1987, **94**, 300-318.
114. Computing with neural networks: The role of symmetry (with G.A. Carpenter and M.A. Cohen). *Science*, 1987, **235**, 1226-1227.
115. A neural theory of preattentive visual information processing: Emergent segmentation, cooperative-competitive computation, and parallel memory storage (with E. Mingolla). In E. Clementi and S. Chin (Eds.), **Structure and dynamics of nucleic acids, proteins, and membranes**. New York: Plenum Press, 1986, pp.355-401.
116. Neural dynamics of attentionally-modulated Pavlovian conditioning: Conditioned reinforcement, inhibition, and opponent processing (with N.A. Schmajuk). *Psychobiology*, 1987, **15**, 195-240.
117. A neural network architecture for automatic trajectory formation and coordination of multiple effectors during variable-speed arm movements (with D. Bullock). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **IV**, 559-566.
118. ART 2: Self-organization of stable category recognition codes for analog input patterns (with G.A. Carpenter). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **II**, 727-736.
119. Invariant pattern recognition and recall by an attentive self-organizing ART architecture in a nonstationary world (with G.A. Carpenter). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **II**, 737-746.
120. Masking fields: A massively parallel architecture for learning, recognizing, and predicting multiple groupings of patterned data (with M.A. Cohen). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **II**, 787-794.
121. Recent developments in a neural model of real-time speech analysis and synthesis (with M.A. Cohen and D. Stork). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **IV**, 443-454.

122. Neural dynamics of decision making under risk: Affective balance theory (with W. Gutowski). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **III**, 31-38.
123. A computational model of how cortical complex cells multiplex information about position, contrast, orientation, spatial frequency, and disparity (with J. Marshall). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **IV**, 203-214.
124. A neural network architecture for preattentive vision: Multiple scale segmentation and regularization (with E. Mingolla). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **IV**, 177-184.
125. A neural network architecture for attentionally-modulated Pavlovian conditioning: Conditioned reinforcement, inhibition, and opponent processing (with N.A. Schmajuk). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **II**, 795-804.
126. A neural network architecture for brightness perception under constant and variable illumination conditions (with D. Todorovic). In M. Caudill and C. Butler (Eds.), **Proceedings of the IEEE international conference on neural networks**, 1987, **IV**, 185-192.
127. ART 2: Stable self-organization of pattern recognition codes for analog input patterns (with G.A. Carpenter). *Applied Optics*, 1987, **26**, 4919-4930.
128. Guest editor (with G.A. Carpenter) of *Applied Optics* special issue on Neural Networks, December, 1987.
129. Neural dynamics of category learning and recognition: Attention, memory consolidation, and amnesia (with G.A. Carpenter). In J. Davis, W. Newburgh, and E. Wegman (Eds.), **Brain structure, learning, and memory**. Boulder, CO: Westview Press, 1988, pp.233-290.
130. The ART of adaptive pattern recognition by a self-organizing neural network (with G.A. Carpenter). *Computer*, 1988, **21**, 77-88.
131. Predictive regulation of associative learning in a neural network by reinforcement and attentive feedback (with D. Levine and N.A. Schmajuk). *International Journal of Neurology*, 1988, **21/22**, 83-104.
132. Neural dynamics of planned arm movements: Emergent invariants and speed-accuracy properties during trajectory formation. (with D. Bullock). *Psychological Review*, 1988, **95**, 49-90.

133. Neural dynamics of 1-D and 2-D brightness perception: A unified model of classical and recent phenomena (with D. Todorovic). *Perception and Psychophysics*, 1988, **43**, 241-277.
134. Nonlinear neural networks: Principles, mechanisms, and architectures. *Neural Networks*, 1988, **1**, 17-61.
135. Self-organizing neural network architectures for real-time adaptive pattern recognition (with G.A. Carpenter). In H. Haken (Ed.), **Neural and synergetic computers**. New York: Springer-Verlag, 1988, pp.42-74.
136. Self-organizing neural architectures for eye movements, arm movements, and eye-arm coordination (with D. Bullock). In H. Haken (Ed.), **Neural and synergetic computers**. New York: Springer-Verlag, 1988, pp.197-228.
137. Speech perception and production by a self-organizing neural network (with M.A. Cohen and D.G. Stork). In Y.C. Lee (Ed.), **Evolution, learning, cognition, and advanced architectures**. Hong Kong: World Scientific Publishers, 1988, pp.217-231.
138. The VITE model: A neural command circuit for generating arm and articulator trajectories (with D. Bullock). In J.A.S. Kelso, A.J. Mandell, and M.F. Shlesinger (Eds.), **Dynamic patterns in complex systems**. Singapore: World Scientific Publishers, 1989.
139. A neural network architecture for preattentive vision (with E. Mingolla and D. Todorovic). *IEEE Transactions on Biomedical Engineering*, 1989, **36**, 65-84.
140. A model cortical architecture for the preattentive perception of 3-D form. In E.L. Schwartz (Ed.), **Computational neuroscience**. Cambridge, MA: Bradford Books, 1989.
141. Content-addressable memory storage by neural networks: A general model and global Liapunov method. In E.L. Schwartz (Ed.), **Computational neuroscience**. Cambridge, MA: Bradford Books, 1989.
142. Stereo boundary fusion by cortical complex cells: A system of maps, filters, and feedback networks for multiplexing distributed data (with J. Marshall). *Neural Networks*, 1989, **2**, 29-51.
143. Neural dynamics of adaptive timing and temporal discrimination during associative learning (with N.A. Schmajuk). *Neural Networks*, 1989, **2**, 79-102.
144. Invariant recognition of cluttered scenes by a self-organizing ART architecture: CORT-X boundary segmentation. (with G.A. Carpenter and C. Mehanian). *Neural Networks*, 1989, **2**, 169-181.
145. Neural network models of vector coding, learning, and trajectory formation during planned and reactive arm and eye movements. In M. Ito (Ed.), **Neural programming**. Basel: Karger, 1989.

146. VITE and FLETE: Neural modules for trajectory formation and postural control (with D. Bullock). In W. Hershberger (Ed.), **Volitional action**. Amsterdam: North-Holland, 1989, pp.253-297.
147. Book Review: Perceptrons. *AI Magazine*, 1989, **10**, 91-92.
148. A neural architecture for visual motion perception: Group and element apparent motion (with M. Rudd). *Neural Networks*, 1989, **2**, 421-450.
149. Solving the brightness-from-luminance problem: A neural architecture for invariant brightness perception (with D. Todorovic). In S.J. Hanson and C. Olson (Eds.), **Connectionist modelling and brain function: The developing interface**. Cambridge, MA: MIT Press, 1989, pp.393-420.
150. A neural architecture for visual motion perception: Group and element apparent motion (with M. Rudd). In **Proceedings of the IEEE/INNS international joint conference on neural networks**, 1989, **I**, 195-199.
151. Search mechanisms for adaptive resonance theory (ART) architectures (with G.A. Carpenter). In **Proceedings of the IEEE/INNS international joint conference on neural networks**, 1989, **I**, 201-205.
152. Classical conditioning: The role of interdisciplinary theory. *Behavioral and Brain Sciences*, 1989, **12**, 144-145.
153. Spinal network computations enable independent control of muscle length and joint compliance (with D. Bullock). In R. Eckmiller, G. Hartmann, and G. Hauske (Eds.), **Parallel processing in neural systems and computers**. Amsterdam: Elsevier, 1990, pp.349-356.
154. ART 3: Self-organization of distributed pattern recognition codes in neural network hierarchies (with G.A. Carpenter). In **Proceedings of the international neural network conference (Paris)**. Dordrecht: Kluwer Academic Publishing, 1990, pp.801-804.
155. Self-organizing neural architectures for vision, learning, and robotic control. In **Proceedings of the international neural network conference (Paris)**. Dordrecht: Kluwer Academic Publishing, 1990.
156. Self-organizing neural network architectures for real-time adaptive pattern recognition (with G.A. Carpenter). In S.F. Zornetzer, J.L. Davis, and C. Lau (Eds.), **An introduction to neural and electronic networks**. New York: Academic Press, 1990.
157. ART 3: Hierarchical search using chemical transmitters in self-organizing pattern recognition architectures (with G.A. Carpenter). *Neural Networks*, 1990, **3**, 129-150.

158. Neural FACADES: Visual representations of static and moving form-and-color-and-depth. *Mind and Language* (Special issue on Understanding Vision), 1990, **5**, 411-456.
159. Neural dynamics of category learning and recognition: Structural invariants, evoked potentials, and reinforcement (with G.A. Carpenter). In M. Commons, R. Herrnstein, S. Kosslyn, and D. Mumford (Eds.), **Computational and clinical approaches to pattern recognition and concept formation**. Hillsdale, NJ: Erlbaum, 1990.
160. Unitized recognition codes for parts and wholes: The unique cue in configural discriminations (with M.A. Cohen). In M. Commons, R. Herrnstein, S. Kosslyn, and D. Mumford (Eds.), **Computational and clinical approaches to pattern recognition and concept formation**. Hillsdale, NJ: Erlbaum, 1990.
161. Preattentive visual perception: Emergent segmentation and featural filling-in. In L. Spillmann and J.S. Werner (Eds.), **The neurophysiological foundations of visual perception**. New York: Academic Press, 1990.
162. Adaptive resonance theory: Neural network architectures for self-organizing pattern recognition (with G.A. Carpenter). In R. Eckmiller, G. Hartmann, and G. Hauske (Eds.), **Parallel processing in neural systems and computers**. Amsterdam: Elsevier, 1990, pp.383-389.
163. Motor skill development and neural networks for position code invariance under speed and compliance rescaling (with D. Bullock). In H. Block and B. Bertenthal (Eds.), **Sensory-motor organization and development in infancy and early childhood**. Dordrecht: Kluwer, 1990, pp.1-22.
164. Neural dynamics of motion segmentation: Direction fields, apertures, and resonant grouping (with E. Mingolla). In M. Caudill (Ed.), **Proceedings of the international joint conference on neural networks**, 1990, **I**, 11-14. Hillsdale, NJ: Erlbaum Associates.
165. Self-organizing neural architectures for motion perception, adaptive sensory-motor control, and associative mapping. In M. Caudill (Ed.), **Proceedings of the international joint conference on neural networks**, 1990, **II**, 26-29. Hillsdale, NJ: Erlbaum Associates.
166. ART 3 hierarchical search: Chemical transmitters in self-organizing pattern recognition architectures (with G.A. Carpenter). In M. Caudill (Ed.), **Proceedings of the international joint conference on neural networks**, 1990, **II**, 30-33. Hillsdale, NJ: Erlbaum Associates.
167. A self-regulating generator of sample-and-hold random training vectors (with P. Gaudiano). In M. Caudill (Ed.), **Proceedings of the international joint conference on neural networks**, 1990, **II**, 213-216. Hillsdale, NJ: Erlbaum Associates.
168. FLETE: An opponent neuromuscular design for factorization of length and tension (with D. Bullock). In M. Caudill (Ed.), **Proceedings of the international joint conference on neural networks**, 1990, **II**, 209-212. Hillsdale, NJ: Erlbaum Associates.

169. Attention and recognition learning by adaptive resonance. *Behavioral and Brain Sciences*, 1990, **13**, 241-242.
170. ART: Self-organizing neural networks for learning and memory of cognitive recognition codes (with G.A. Carpenter). In **Proceedings of the 12th annual conference of the Cognitive Science Society**. Hillsdale, NJ: Erlbaum Associates, 1990, pp.1032-1034.
171. Computational theories of visual perception (with R. Shapley, T. Caelli, M. Morgan, and T. Rentschler). In L.Spillmann and J.S. Werner (Eds.), **Visual perception: The neurophysiological foundations**. New York: Academic Press, 1990, pp.417-448.
172. Self-organizing neural network architectures for adaptive pattern recognition and robotics (with D. Bullock and G.A. Carpenter). In V. Milutinovic and P. Antognetti (Eds.), **Neural networks: Concepts, applications, and implementations**. Englewood Cliffs, NJ: Prentice Hall, 1991, pp.33-53.
173. Associative learning and selective forgetting in a neural network regulated by reinforcement and attentive feedback (with D.S. Levine and N.A. Schmajuk). In D.S. Levine and S.J. Leven (Eds.), **Motivation, emotion, and goal direction in neural networks**. Hillsdale, NJ: Erlbaum, 1991.
174. A neural network architecture for Pavlovian conditioning: Reinforcement, attention, forgetting, timing. In M. Commons, S. Grossberg, and J.E.R. Staddon (Eds.), **Neural network models of conditioning and action**. Hillsdale, NJ: Erlbaum, 1991, pp.69-122.
175. Attention, resonance, and transmitter dynamics in models of self-organizing cortical networks for recognition learning (with G.A. Carpenter). In A.V. Holden and V.I. Kryukov (Eds.), **Neurocomputers and attention, I: Neurobiology, synchronization, and chaos**. Manchester: Manchester University Press, 1991, pp.201-222.
176. Distributed hypothesis testing, attention shifts, and transmitter dynamics during the self-organization of brain recognition codes (with G.A. Carpenter). **Technical Report CAS/CNS TR-91-013**, Boston University. In H.G. Schuster (Ed.), **Nonlinear dynamics and neuronal networks**. New York: Springer-Verlag, 1991, pp.305-334.
177. ARTMAP: Supervised real-time learning and classification of nonstationary data by a self-organizing neural network (with G.A. Carpenter and J.H. Reynolds). **Technical Report CAS/CNS TR-91-001**, Boston University. *Neural Networks*, 1991, **4**, 565-588.
178. Why do parallel cortical systems exist for the perception of static form and moving form? *Perception and Psychophysics*, 1991, **49**, 117-141.
179. Vector associative maps: Unsupervised real-time error-based learning and control of movement trajectories (with P. Gaudiano). **Technical Report CAS/CNS TR-91-002**, Boston University. *Neural Networks*, 1991, **4**, 147-183.

180. Adaptive neural networks for control of movement trajectories invariant under speed and force rescaling (with D. Bullock). **Technical Report CAS/CNS TR-91-003**, Boston University. *Human Movement Science*, 1991, **10**, 3-53.
181. ART2-A: An adaptive resonance algorithm for rapid category learning and recognition (with G.A. Carpenter and D.B. Rosen). **Technical Report CAS/CNS TR-91-011**, Boston University. *Neural Networks*, 1991, **4**, 493-504.
182. Synchronized oscillations during cooperative feature linking in a cortical model of visual perception (with D. Somers). **Technical Report CAS/CNS TR-91-010**, Boston University. *Neural Networks*, 1991, **4**, 453-466.
183. Invariant recognition of cluttered scenes by a self-organizing ART architecture: Figure-ground separation (with L. Wyse). **Technical Report CAS/CNS TR-91-012**, Boston University. *Neural Networks*, 1991, **4**, 723-742.
184. A self-organizing ARTMAP neural architecture for supervised learning and pattern recognition (with G.A. Carpenter and J. Reynolds). In R. Mammone and Y. Zeevi (Eds.), **Neural networks: Theory and applications**. New York: Academic Press, 1991, pp.43-80.
185. Self-organization of spatial representations and arm trajectory controllers by vector associative maps energized by cyclic random generators (with P. Gaudiano). In A. Babloyantz (Ed.), **Self-organization, emerging properties and learning**. London: Plenum Press, 1991.
186. A neural theory of visual motion perception (with M. Rudd). In B. Blum (Ed.), **Channels in the visual nervous system: Neurophysiology, psychophysics, and models**. Tel Aviv: Freund Publishing Ltd., 1991.
187. Fuzzy ART: Fast stable learning and categorization of analog patterns by an adaptive resonance system (with G.A. Carpenter and D.B. Rosen). **Technical Report CAS/CNS TR-91-015**, Boston University. *Neural Networks*, 1991, **4**, 759-771.
188. A self-organizing ARTMAP neural architecture for supervised learning and pattern recognition (with G.A. Carpenter and J.H. Reynolds). In T. Kohonen, K. Makisara, O. Simula, and J. Kangas (Eds.), **Artificial neural networks, Volume 1**. Amsterdam: Elsevier/North-Holland, 1991, pp.31-36.
189. Synchronized oscillations during cooperative feature linking in visual cortex (with D. Somers). In T. Kohonen, K. Makisara, O. Simula, and J. Kangas (Eds.), **Artificial neural networks, Volume 1**. Amsterdam: Elsevier/North-Holland, 1991, pp.3-8.
190. Working memory networks for learning multiple groupings of temporally ordered events: Applications to 3-D visual object recognition (with G. Bradski and G.A. Carpenter). **Technical Report CAS/CNS TR-91-007**, Boston University. In **Proceedings of the**

- international joint conference on neural networks**, Seattle, 1991, **I**, 723-728. Piscataway, NJ: IEEE Service Center.
191. Preattentive texture segmentation and grouping by the boundary contour system (with D. Cruthirds, A. Gove, and E. Mingolla), **Technical Report CAS/CNS TR-91-008**, Boston University. In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **I**, 655-660.
 192. ARTMAP: A self-organizing neural network architecture for fast supervised learning and pattern recognition (with G.A. Carpenter and J.H. Reynolds). In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **I**, 863-868. Piscataway, NJ: IEEE Service Center.
 193. Fuzzy ART: An adaptive resonance algorithm for rapid, stable classification of analog patterns (with G.A. Carpenter and D.B. Rosen). **Technical Report CAS/CNS TR-91-006**, Boston University. In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **II**, 411-416. Piscataway, NJ: IEEE Service Center.
 194. ART 2-A: An adaptive resonance algorithm for rapid category learning and recognition (with G.A. Carpenter and D.B. Rosen). In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **II**, 151-156. Piscataway, NJ: IEEE Service Center.
 195. Synchronized oscillations during cooperative feature linking in visual cortex (with D. Somers). In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **II**, 249-254. Piscataway, NJ: IEEE Service Center.
 196. Invariant recognition of cluttered scenes by a self-organizing ART architecture: Figure-ground separation (with L. Wyse). In **Proceedings of the international joint conference on neural networks**, Seattle, 1991, **I**, 633-638. Piscataway, NJ: IEEE Service Center.
 197. A neural network architecture for fast on-line supervised learning and pattern recognition (with G.A. Carpenter and J. Reynolds). In H. Wechsler (Ed.), **Neural networks for perception, Volume 1**. New York: Academic Press, 1992, pp.248-264.
 198. The symmetric organization of parallel cortical systems for form and motion perception. In H. Wechsler (Ed.), **Neural networks for perception, Volume 1**. New York: Academic Press, 1992, pp.64-103.
 199. Neural FACADES: Visual representations of static and moving form-and-color-and-depth. In G.W. Humphreys (Ed.), **Understanding vision**. Oxford: Blackwell Press, pp.232-271.
 200. Adaptive resonance theory: Self-organizing neural network architectures for pattern recognition and hypothesis testing (with G.A. Carpenter). In **Encyclopedia of artificial intelligence, Second edition**. New York: Wiley and Sons, 1992, pp.13-21.

201. Emergence of tri-phasic muscle activation from the nonlinear interactions of central and spinal neural network circuits (with D. Bullock). **Technical Report CAS/CNS TR-91-004**, Boston University. *Human Movement Science*, 1992, **11**, 157-167.
202. Adaptive vector integration to endpoint: Self-organizing neural circuits for control of planned movement trajectories (with P. Gaudiano). *Human Movement Science*, 1992, **11**, 141-155.
203. Self-organizing cortical networks for distributed hypothesis testing and recognition learning (with G.A. Carpenter). In J.G. Taylor and C.L.T. Mannion (Eds.), **Theory and applications of neural networks**. London: Springer-Verlag, 1992, pp.3-27.
204. Cortical dynamics of visual motion perception: Short-range and long-range apparent motion (with M.E. Rudd). **Technical Report CAS/CNS 91-005**, Boston University. *Psychological Review*, 1992, **99**, 78-121.
205. Working memory networks for learning multiple groupings of temporal order with application to 3-D visual object recognition (with G. Bradski and G.A. Carpenter). **Technical Report CAS/CNS TR-91-014**, Boston University. *Neural Computation*, 1992, **4**, 270-286.
206. Fuzzy ARTMAP: A neural network architecture for incremental supervised learning of analog multidimensional maps (with G.A. Carpenter, N. Markuzon, and J.H. Reynolds). **Technical Report CAS/CNS TR-91-016**, Boston University. *IEEE Transactions on Neural Networks*, 1992, **3**(5), 698-713. Reprinted in T. Yamakawa (Ed.), **Fuzzy neural systems** (volume 12 of KOUZA-FUZZY), Japan Society for Fuzzy Theory and Systems, 1993.
207. A neural network model of adaptively timed reinforcement learning and hippocampal dynamics (with J.W.L. Merrill). **Technical Report CAS/CNS TR-91-020**, Boston University. *Cognitive Brain Research*, 1992, **1**, 3-38.
208. A self-organizing neural network for supervised learning, recognition, and prediction. *IEEE Communications Magazine*, 1992, **30**, 38-49.
209. Neural dynamics of visual motion perception: Local detection and global grouping (with E. Mingolla). In G.A. Carpenter and S. Grossberg (Eds.), **Neural networks for vision and image processing**. Cambridge, MA: MIT Press, 1992, pp.293-342.
210. Synchronized oscillations for binding spatially distributed feature codes into coherent spatial patterns (with D. Somers). In G.A. Carpenter and S. Grossberg (Eds.), **Neural networks for vision and image processing**. Cambridge, MA: MIT Press, 1992, pp.385-406.
211. Figure-ground separation of connected scenic figures: Boundaries, filling-in, and opponent processing (with L. Wyse). In G.A. Carpenter and S. Grossberg (Eds.), **Neural networks for vision and image processing**. Cambridge, MA: MIT Press, 1992, pp.161-194.

212. Attentive supervised learning and recognition by an adaptive resonance system (with G.A. Carpenter, N. Markuzon, J.H. Reynolds, and D.B. Rosen). In G.A. Carpenter and S. Grossberg (Eds.), **Neural networks for vision and image processing**. Cambridge, MA: MIT Press, 1992, pp.365-384.
213. Working memories for storage and recall of arbitrary temporal sequences (with G. Bradski and G.A. Carpenter). **Technical Report CAS/CNS TR-92-003**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **II**, 57-62. Piscataway, NJ: IEEE Service Center.
214. A neural network model for spino-muscular generation of launching and braking forces by opponent muscles (with D. Bullock and J.L. Contreras-Vidal). In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **III**, 450-455. Piscataway, NJ: IEEE Service Center.
215. A head-centered representation of 3-D target location derived from opponent eye position commands (with D. Bullock, D. Greve, and F.H. Guenther). In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **I**, 79-85. Piscataway, NJ: IEEE Service Center.
216. A self-organizing neural network model for redundant sensory-motor control, motor equivalence, and tool use (with D. Bullock and F.H. Guenther). **Technical Report CAS/CNS TR-92-004**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **IV**, 91-102. Piscataway, NJ: IEEE Service Center.
217. Comparative performance measures of Fuzzy ARTMAP, learned vector quantization, and back propagation for handwritten character recognition (with G.A. Carpenter and K. Iizuka). **Technical Report CAS/CNS TR-92-005**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **I**, 794-799. Piscataway, NJ: IEEE Service Center.
218. A what-and-where neural network for invariant image preprocessing (with G.A. Carpenter and G.W. Leshner). **Technical Report CAS/CNS TR-92-006**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **III**, 303-308. Piscataway, NJ: IEEE Service Center.
219. Fuzzy ARTMAP: An adaptive resonance architecture for incremental learning of analog maps (with G.A. Carpenter, N. Markuzon, J.H. Reynolds, and D.B. Rosen). In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **III**, 309-314. Piscataway, NJ: IEEE Service Center.
220. A neural pattern generator that exhibits frequency-dependent in-phase and anti-phase oscillations (with M.A. Cohen and C. Pribe). **Technical Report CAS/CNS TR-92-008**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **IV**, 146-151. Piscataway, NJ: IEEE Service Center.

221. A neural network for synthesizing the pitch of an acoustic source (with M.A. Cohen and L. Wyse). **Technical Report CAS/CNS TR-92-009**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **IV**, 649-654. Piscataway, NJ: IEEE Service Center.
222. Processing of synthetic aperture radar images by the Boundary Contour System and Feature Contour System (with D. Cruthirds, A. Gove, E. Mingolla, N. Nowak, and J. Williamson). **Technical Report CAS/CNS TR-92-010**, Boston University. In **Proceedings of the international joint conference on neural networks**, Baltimore, 1992, **IV**, 414-417. Piscataway, NJ: IEEE Service Center.
223. Equilibria and dynamics of a neural network model for opponent muscle control (with D. Bullock and J.L. Contreras-Vidal). **Technical Report CAS/CNS TR-92-017**, Boston University. In G. Bekey and K. Goldberg (Eds.), **Neural networks in robotics**. Boston: Kluwer Academic, 1992.
224. Fuzzy ARTMAP neural network compared to linear discriminant analysis prediction of the length of hospital stay in patients with pneumonia (with P.H. Goodman, V.G. Kaburlasos, D.D. Egbert, G.A. Carpenter, J.H. Reynolds, and D.B. Rosen). In **Proceedings of the IEEE international conference on systems, man, and cybernetics**, Chicago, **I**, 748-753. New York: IEEE Press, 1992.
225. Supervised learning by adaptive resonance neural networks (with G.A. Carpenter, N. Markuzon, J.H. Reynolds, and D.B. Rosen). In M. Marinaro and G. Scarpetta (Eds.), **Structure: From physics to general systems** (Festschrift volume in honor of the 70th birthday of Professor Eduardo R. Caianiello). Singapore: World Scientific Publishing Company, **2**, 36-63, 1992.
226. Synchronized oscillations for binding spatially distributed features into preattentive and attentive brain representations (with D. Somers). In M. Marinaro and G. Scarpetta (Eds.), **Structure: From physics to general systems** (Festschrift volume in honor of the 70th birthday of Professor Eduardo R. Caianiello). Singapore: World Scientific Publishing Company, **2**, 95-112, 1992.
227. Neural dynamics of motion perception: Direction fields, apertures, and resonant grouping (with E. Mingolla). **Technical Report CAS/CNS TR-92-031**, Boston University. *Perception and Psychophysics*, 1993, **53**, 243-278.
228. Neural representations for sensory-motor control, I: Head-centered 3-D target positions from opponent eye commands (with D. Bullock, D. Greve, and F. Guenther). **Technical Report CAS/CNS TR-92-018**, Boston University. *Acta Psychologica*, 1993, **82**, 115-138.
229. Neural representations for sensory-motor control, II: Learning a head-centered visuomotor representation of 3-D target position (with F. Guenther, D. Bullock, and D. Greve).

- Technical Report CAS/CNS TR-92-030**, Boston University. *Neural Networks*, 1993, **6**, 43-67.
230. A solution of the figure-ground problem for biological vision. **Technical Report CAS/CNS TR-92-020**, Boston University. *Neural Networks*, 1993, **6**, 463-483.
231. Normal and amnesic learning, recognition, and memory by a neural model of cortico-hippocampal interactions (with G.A. Carpenter). **Technical Report CAS/CNS TR-92-021**, Boston University. *Trends in Neurosciences*, 1993, **16**, 131-137.
232. A self-organizing neural model of motor equivalent reaching and tool use by a multijoint arm (with D. Bullock and F.H. Guenther). **Technical Report CAS/CNS TR-92-025**, Boston University. *Journal of Cognitive Neuroscience*, 1993, **5**, 408-435.
233. Self-organizing neural networks for stable control of autonomous behavior in a changing world. In J.G. Taylor (Ed.), **Mathematical approaches to neural networks**. Amsterdam: Elsevier Science Publishers, 1993, pp.139-197.
234. A neural network model for cursive script production (with D. Bullock and C. Mannes). **Technical Report CAS/CNS TR-92-029**, Boston University. *Biological Cybernetics*, 1993, **70**, 15-28.
235. Neural control of interlimb coordination and gait timing in bipeds and quadrupeds (with M.A. Cohen and C. Pribe). **Technical Report CAS/CNS TR-93-004**, Boston University. Submitted for publication, 1993.
236. Fusion ARTMAP: A neural network architecture for multi-channel data fusion and classification (with Y.R. Asfour, G.A. Carpenter, and G.W. Leshner). **Technical Report CAS/CNS TR-93-006**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **II**, 210-215. Hillsdale, NJ: Erlbaum Associates, 1993.
237. Variable rate working memories for phonetic categorization and invariant speech perception (with I. Boardman and M.A. Cohen). **Technical Report CAS/CNS TR-93-008**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **III**, 2-5. Hillsdale, NJ: Erlbaum Associates, 1993.
238. Cerebellar learning in an opponent motor controller for adaptive load compensation and synergy formation (with D. Bullock and J.L. Contreras-Vidal). **Technical Report CAS/CNS TR-93-009**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **IV**, 481-486. Hillsdale, NJ: Erlbaum Associates, 1993.
239. A self-organizing neural network for learning a body-centered invariant representation of 3-D target position (with D. Bullock, D. Greve, and F.H. Guenther). **Technical Report CAS/CNS TR-93-010**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **II**, 405-408. Hillsdale, NJ: Erlbaum Associates, 1993.

240. The VITEWRITE model of handwriting production (with D. Bullock and C. Mannes). **Technical Report CAS/CNS TR-93-011**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **I**, 507-511. Hillsdale, NJ: Erlbaum Associates, 1993.
241. Fuzzy ARTMAP, slow learning, and probability estimation (with G.A. Carpenter and J.H. Reynolds). **Technical Report CAS/CNS TR-93-014**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **II**, 26-30. Hillsdale, NJ: Erlbaum Associates, 1993.
242. A neural pattern generator that exhibits arousal-dependent human gait transitions (with M.A. Cohen and C.A. Pribe). **Technical Report CAS/CNS TR-93-017**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **IV**, 285-288. Hillsdale, NJ: Erlbaum Associates, 1993.
243. Frequency-dependent phase transitions in the coordination of human bimanual tasks (with M.A. Cohen and C.A. Pribe). **Technical Report CAS/CNS TR-93-018**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **IV**, 491-494. Hillsdale, NJ: Erlbaum Associates, 1993.
244. Quadruped gait transitions from a neural pattern generator with arousal modulated interactions (with M.A. Cohen and C.A. Pribe). **Technical Report CAS/CNS TR-93-019**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **II**, 610-613. Hillsdale, NJ: Erlbaum Associates, 1993.
245. Dynamic reset of persistent visual segmentations by neural networks (with G. Francis and E. Mingolla). In **Proceedings of the world congress on neural networks**, Portland, **II**, 108-111. Hillsdale, NJ: Erlbaum Associates, 1993.
246. Brightness perception, illusory contours, and corticogeniculate feedback (with A. Gove and E. Mingolla). **Technical Report CAS/CNS TR-93-021**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **I**, 25-28. Hillsdale, NJ: Erlbaum Associates, 1993.
247. Statistical properties of single and competing nonlinear fast-slow oscillators in noise (with A. Grunewald). **Technical Report CAS/CNS TR-93-022**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **IV**, 303-307. Hillsdale, NJ: Erlbaum Associates, 1993.
248. A neural theory of visual search: Resursive attention to segmentations and surfaces (with E. Mingolla and W.D. Ross). **Technical Report CAS/CNS TR-93-023**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **I**, 36-41. Hillsdale, NJ: Erlbaum Associates, 1993.

249. Processing of synthetic aperture radar images by a multiscale boundary contour system and feature contour system (with E. Mingolla and J. Williamson). **Technical Report CAS/CNS TR-93-024**, Boston University. In **Proceedings of the world congress on neural networks**, Portland, **III**, 785-788. Hillsdale, NJ: Erlbaum Associates, 1993.
250. Boundary, brightness, and depth interactions during preattentive representation and attentive recognition of figure and ground. **Technical Report CAS/CNS TR-93-003**, Boston University. *Italian Journal of Psychology*, 1993, **XX**, 771-804. Invited article in celebration of the 80th birthday of Professor Gaetano Kanizsa and the 20th anniversary of the Italian Journal of Psychology.
251. Fusion ARTMAP: An adaptive fuzzy network for multi-channel classification (with Y. Asfour, G.A. Carpenter, and G. Leshner). **Technical Report CAS/CNS TR-93-052**, Boston University. In **Proceedings of the third international conference on industrial fuzzy control and intelligent systems**. Piscataway, NJ: IEEE Press, 1993, 155-160.
252. Dynamic formation and reset of coherent visual segmentations by neural networks (with G. Francis and E. Mingolla). In R. Mammone (Ed.), **Artificial neural networks for speech and vision**. London: Chapman and Hall, 1994, pp.474-501.
253. Visual motion perception (with E. Mingolla). In V.S. Ramachandran (Ed.), **Encyclopedia of human behavior, Volume 4**. New York: Academic Press, 1994, pp.469-486.
254. Cortical dynamics of feature binding and reset: Control of visual persistence (with G. Francis and E. Mingolla). **Technical Report CAS/CNS TR-92-026**, Boston University. *Vision Research*, 1994, **34**, 1089-1104.
255. Integrating symbolic and neural processing in a self-organizing architecture for pattern recognition and prediction (with G.A. Carpenter). **Technical Report CAS/CNS TR-93-002**, Boston University. In V. Honavar and L. Uhr (Eds.), **Artificial intelligence and neural networks: Steps towards principled prediction**. San Diego: Academic Press, 1994, pp.387-421.
256. A neural theory of attentive visual search: Interactions of boundary, surface, spatial, and object representations (with E. Mingolla and W.D. Ross). **Technical Report CAS/CNS TR-93-038**, Boston University. *Psychological Review*, 1994, **101**, 470-489.
257. Cortical dynamics of 3-D vision and figure-ground pop-out. In R.M.J. Cotterill (Ed.), **Brain and mind**. Copenhagen: The Danish Royal Academy of Sciences and Letters, **43**, 1994, 47-91.
258. 3-D vision and figure-ground separation by visual cortex. **Technical Report CAS/CNS TR-92-019**, Boston University. *Perception and Psychophysics*, 1994, **55**, 48-120.

259. Hippocampal modulation of recognition, conditioning, timing, and space: Why so many functions? **Technical Report CAS/CNS TR-93-063**, Boston University. Invited commentary in *Behavioral and Brain Sciences*, 1994, **17**, 479-480.
260. Neural representations for sensory-motor control, III: Learning a body-centered representation of 3-D target position (with F.H. Guenther, D. Bullock, and D. Greve). **Technical Report CAS/CNS TR-93-045**, Boston University. *Journal of Cognitive Neuroscience*, 1994, **6**, 341-358.
261. Why bright Kanizsa squares look closer: Consistency of segmentations and surfaces in 3-D vision. In M. Marinaro and P.G. Morasso (Eds.), **Proceedings of the international conference on artificial neural networks (ICANN-94)**. New York: Springer-Verlag, 1994, pp.3-9.
262. Spatial pooling and perceptual framing by synchronizing cortical dynamics (with A. Grunewald). In M. Marinaro and P.G. Morasso (Eds.), **Proceedings of the international conference on artificial neural networks (ICANN-94)**. New York: Springer-Verlag, 1994, pp.10-15.
263. Binding of object representations by synchronous cortical dynamics explains temporal order and spatial pooling data (with A. Grunewald). **Technical Report CAS/CNS TR-94-015**, Boston University. In A. Ram and K. Eiselt (Eds.), **Proceedings of the sixteenth annual conference of the Cognitive Science Society**. Hillsdale, NJ: Erlbaum Associates, 1994, pp.387-391.
264. A neural model of timed response learning in the cerebellum (with D. Bullock and J.C. Fiala). **Technical Report CAS/CNS TR-94-007**, Boston University. *Neural Networks*, 1994, **7**, 1101-1114.
265. Rules for the cortical map of ocular dominance and orientation columns (with S.J. Olson). **Technical Report CAS/CNS TR-94-008**, Boston University. *Neural Networks*, 1994, **7**, 883-894.
266. STORE working memory networks for storage and recall of arbitrary temporal sequences (with G. Bradski and G.A. Carpenter). **Technical Report CAS/CNS TR-92-028**, Boston University. *Biological Cybernetics*, 1994, **71**, 469-480.
267. A neural architecture for 3-D object recognition from multiple 2-D views (with G. Bradski). In **Proceedings of the world congress on neural networks**, San Diego, **IV**, 211-219. Hillsdale, NJ: Erlbaum Associates, 1994.
268. Why bright Kanizsa squares look closer: Consistency of segmentations and surfaces in 3-D vision. In **Proceedings of the world congress on neural networks**, San Diego, **IV**, 277-283. Hillsdale, NJ: Erlbaum Associates, 1994.

269. Synchronized neural activities: A mechanism for perceptual framing (with A. Grunewald). **Technical Report CAS/CNS TR-94-014**, Boston University. In **Proceedings of the world congress on neural networks**, San Diego, **IV**, 655-660. Hillsdale, NJ: Erlbaum Associates, 1994.
270. Rules for the cortical map of ocular dominance and orientation columns (with S.J. Olson). In **Proceedings of the world congress on neural networks**, San Diego, **IV**, 284-289. Hillsdale, NJ: Erlbaum Associates, 1994.
271. Fuzzy ARTMAP: A synthesis of neural networks and fuzzy logic for supervised categorization and nonstationary prediction (with G.A. Carpenter). In R.R. Yager and L.A. Zadeh (Eds.), **Fuzzy sets, neural networks, and soft computing**. New York: Van Nostrand Reinhold, 1994, pp.126-165.
272. Self-organizing neural networks for supervised and unsupervised learning and prediction (with G.A. Carpenter). In V. Cherkassky, J.H. Friedman, and H. Wechsler (Eds.), **From statistics to neural networks: Theory and pattern recognition applications**. New York: Springer-Verlag, 1994, pp.319-348.
273. Recognition of 3-D objects from multiple 2-D views by a self-organizing neural architecture (with G. Bradski). **Technical Report CAS/CNS TR-94-004**, Boston University. In V. Cherkassky, J.H. Friedman, and H. Wechsler (Eds.), **From statistics to neural networks: Theory and pattern recognition applications**. New York: Springer-Verlag, 1994, pp.349-375.
274. Neural dynamics of phonetic trading relations for variable-rate CV syllables (with I. Boardman and M.A. Cohen). **Technical Report CAS/CNS TR-94-037**, Boston University. Submitted for publication.
275. A neural network model of auditory scene analysis and source segregation (with K.K. Govindarajan, L.L. Wyse, and M.A. Cohen). **Technical Report CAS/CNS TR-94-039**, Boston University. Submitted for publication.
276. A neural network architecture for autonomous learning, recognition, and prediction in a nonstationary world (with G.A. Carpenter). **Technical Report CAS/CNS TR-93-049**, Boston University. In S.F. Zornetzer, J.L. Davis, and C. Lau (Eds.), **An introduction to neural and electronic networks: Second edition**. New York: Academic Press, 1995, pp.465-482.
277. Book review of **The astonishing hypothesis: The scientific search for the soul** by Francis Crick. **Technical Report CAS/CNS TR-94-035**, Boston University. *American Scientist*, 1995, January-February, pp.79-80.
278. A fuzzy ARTMAP nonparametric probability estimator for nonstationary pattern recognition problems (with G.A. Carpenter and J.H. Reynolds). **Technical Report CAS/CNS TR-93-047**, Boston University. *IEEE Transactions on Neural Networks*, 1995, **6**, 1330-1336.

279. A spectral network model of pitch perception (with M.A. Cohen and L.L. Wyse). **Technical Report CAS/CNS TR-92-024**, Boston University. *Journal of the Acoustical Society of America*, 1995, **98**, 862-879.
280. Neural dynamics of motion perception, recognition learning, and attention. **Technical Report CAS/CNS TR-93-001**, Boston University. In R.F. Port and T. van Gelder (Eds.), **Mind as motion: Explorations in the dynamics of cognition**. Cambridge, MA: MIT Press, 1995, pp.449-489.
281. Neural models of temporally organized behaviors: Handwriting production and working memory. **Technical Report CAS/CNS TR-93-057**, Boston University. In E. Covey (Ed.), **Neural representation of temporal patterns**. New York: Plenum Press, 1995, pp.159-182.
282. VIEWNET: A neural architecture for learning to recognize 3-D objects from multiple 2-D views (with G. Bradski). In **Proceedings of the conference on intelligent robots and computer vision XIII: Algorithms and computer vision**. Bellingham, WA: SPIE, 1995.
283. Fast learning VIEWNET architectures for recognizing 3-D objects from multiple 2-D views (with G. Bradski). **Technical Report CAS/CNS TR-93-053**, Boston University. *Neural Networks* (Special Issue on Automatic Target Recognition), 1995, **8**, 1053-1080.
284. Synthetic aperture radar processing by a multiple scale neural system for boundary and surface representation (with E. Mingolla and J. Williamson). **Technical Report CAS/CNS TR-94-001**, Boston University. *Neural Networks* (Special Issue on Automatic Target Recognition), 1995, **8**, 1005-1028.
285. Brightness perception, illusory contours, and corticogeniculate feedback (with A. Gove and E. Mingolla). **Technical Report CAS/CNS TR-94-033**, Boston University. *Visual Neuroscience*, 1995, **12**, 1027-1052.
286. Are there universal principles of brain computation? In **Proceedings of the international workshop on artificial neural networks (IWANN'95)**, Malaga, Spain. New York: Springer-Verlag, 1995.
287. Are there universal principles of brain computation? Reflections on perception, learning, and consciousness. **Technical Report CAS/CNS TR-95-012**, Boston University.
288. The attentive brain. *American Scientist*, 1995, **83**, 438-449.
289. A multiple scale neural system for boundary and surface representation of SAR data (with E. Mingolla and J. Williamson). In **Proceedings of the IEEE workshop on neural networks for signal processing**. New York: IEEE Publishing Services, 1995.
290. Landsat satellite image segmentation using the fuzzy ARTMAP neural network (with G.A. Carpenter and Y.R. Asfour). **Technical Report CAS/CNS TR-95-004**, Boston University.

- In **Proceedings of the world congress on neural networks**, 1995, **I**, 150-156. Hillsdale, NJ: Erlbaum Associates.
291. A self-organizing heading and depth detection network (with S. Cameron and F.H. Guenther). In **Proceedings of the world congress on neural networks**, 1995, **I**, 3-7. Hillsdale, NJ: Erlbaum Associates.
 292. Neural dynamics of multi-source audition and variable-rate speech perception. In **Proceedings of the world congress on neural networks**, 1995, **II**, 905-906. Hillsdale, NJ: Erlbaum Associates.
 293. Visual illusions and brain resonance. In **Proceedings of the world congress on neural networks**, 1995, **II**, 948. Hillsdale, NJ: Erlbaum Associates.
 294. Self-organizing neural networks for multimodal control of saccadic eye movements. In **Proceedings of the world congress on neural networks**, 1995, **I**, 2. Hillsdale, NJ: Erlbaum Associates.
 295. Temporal dynamics of binocular disparity processing by corticogeniculate interactions (with A. Grunewald). **Technical Report CAS/CNS TR-95-021**, Boston University. Submitted for publication.
 296. Inertial load compensation by a model spinal circuit during single joint movement (with D. Bullock and J.L. Contreras-Vidal). **Technical Report CAS/CNS TR-95-007**, Boston University. Submitted for publication.
 297. VIEWNET architectures for invariant 3-D object learning and recognition from multiple 2-D views (with G. Bradski). In B. Bouchon-Meunier, R.R. Yager, and L.A. Zadeh (Eds.), **Fuzzy logic and soft computing**. Singapore: World Scientific, 1995, pp.465-497.
 298. A self-organizing heading and depth detection network (with S. Cameron and F.H. Guenther). In **Proceedings of the world congress on neural networks (WCNN'95)**. Hillsdale, NJ: Erlbaum Associates, 1995, **I**, 3-7.
 299. Figure-ground separation by visual cortex. **Technical Report CAS/CNS TR-93-062**, Boston University. In M.A. Arbib (Ed.), **Handbook of brain theory and neural networks**. Cambridge, MA: MIT Press, 1995, pp.395-399.
 300. Adaptive resonance theory (with G.A. Carpenter). **Technical Report CAS/CNS TR-94-034**, Boston University. In M.A. Arbib (Ed.), **Handbook of brain theory and neural networks**. Cambridge, MA: MIT Press, 1995, pp.79-82.
 301. Cortical dynamics of boundary segmentation and reset: Persistence, afterimages, and residual traces (with G. Francis). **Technical Report CAS/CNS TR-95-002**, Boston University. *Perception*, 1996, **35**, 543-567.

302. Are there universal principles of brain computation? In X.J.R. Avula and A. Nerode (Eds.), special issue of *Mathematical Modelling and Scientific Computing*, **6**, 1996.
303. Figure-ground separation by visual cortex. **Technical Report CAS/CNS TR-96-010**, Boston University. In G. Adelman and B.H. Smith (Eds.), **Encyclopedia of neuroscience**. Amsterdam: Elsevier, 1996.
304. The hippocampus and cerebellum in adaptively timed learning, recognition, and movement (with J.W.L. Merrill). **Technical Report CAS/CNS TR-93-065**, Boston University. *Journal of Cognitive Neuroscience*, 1996, **8**, 257-277.
305. Learning, categorization, rule formation, and prediction by fuzzy neural networks (with G.A. Carpenter). **Technical Report CAS/CNS TR-94-028**, Boston University. In C.H. Chen (Ed.), **Fuzzy logic and neural network handbook**. New York: McGraw-Hill, 1996, pp.1.3-1.45.
306. Adaptive resonance theory (with G.A. Carpenter). In J.D. Irwin (Ed.), **The industrial electronics handbook**. Boca Raton: CRC Press, 1996, pp.1286-1298.
307. Neural network modeling of sensory-motor control in animals (with D. Bullock and F.H. Guenther). In H. Zelaznik (Ed.), **Advances in motor learning and control**. Champaign, IL: Human Kinetics Press, 1996, pp.261-292.
308. Cortical dynamics of form and motion integration: Persistence, apparent motion, and illusory contours (with G. Francis). **Technical Report CAS/CNS TR-94-011**, Boston University. *Vision Research*, 1996, **36**, 149-173.
309. Metabotropic glutamate receptor activation in cerebellar Purkinje cells as substrate for adaptive timing of the classically conditioned eye blink response (with J.C. Fiala and D. Bullock). **Technical Report CAS/CNS TR-95-029**, Boston University. *Journal of Neuroscience*, 1996, **16**, 3760-3774.
310. Are there universal principles of brain computation? In **Proceedings of the international conference on neural networks (ICNN'96)**. Piscataway, NJ: IEEE Press, 1996.
311. Buffered reset leads to improved compression in fuzzy ARTMAP classification of radar range profiles (with M.A. Rubin and W.W. Streilein). **Technical Report CAS/CNS TR-96-014**, Boston University. In C.H. Dagli, M. Akay, C.L.P. Chen, B.R. Fernandez, and J. Ghosh (Eds.), **Intelligent engineering systems through artificial neural networks**, Volume 6. New York: AMSE International, 1996, pp.419-424.
312. Self-organizing neural networks for spatial planning and flexible arm movement control. **Technical Report CAS/CNS TR-96-024**, Boston University. In M. Mataric (Ed.), **Proceedings of the AAAI symposium on embodied cognition and action**, 1996.

313. Boundary contour system and feature contour system. **Technical Report CAS/CNS TR-95-015**, Boston University. In E. Fiesler and R. Beale (Eds.), **The handbook of neural computation**. New York: Oxford University Press, 1997, pp.C2.2: 19-30.
314. Adaptive resonance theory: Self-organizing networks for stable learning, recognition, and prediction (with G.A. Carpenter). **Technical Report CAS/CNS TR-95-017**, Boston University. In E. Fiesler and R. Beale (Eds.), **The handbook of neural computation**. New York: Oxford University Press, 1997, pp.C2.2: 1-15.
315. Perceptual grouping and attention during cortical form and motion processing. In W. Gerstner, A. Germond, M. Hasler, and J. D. Nicoud (Eds.), **Proceedings of the international conference on artificial neural networks (ICANN'97)**, Lecture Notes in Computer Science #1327. New York: Springer-Verlag, 1997, pp.885-894.
316. Motion capture implies motion extrapolation. **Technical Report CAS/CNS TR-97-005**, Boston University.
317. Cortical dynamics of three-dimensional figure-ground perception of two-dimensional figures. **Technical Report CAS/CNS TR-95-013**, Boston University. *Psychological Review*, 1997, **104**, 618-658.
318. A neural model of cerebellar learning for arm movement control: Cortico-spinal-cerebellar dynamics (with J.L. Contreras-Vidal and D. Bullock). **Technical Report CAS/CNS TR-97-003**, Boston University. *Learning and Memory*, 1997, **3**, 475-502.
319. Parallel auditory filtering by sustained and transient channels separates coarticulated vowels and consonants (with M.A. Cohen). **Technical Report CAS/CNS TR-93-051**, Boston University. *IEEE Transactions on Speech and Audio Processing*, 1997, **5**, 301-318.
320. Are there universal principles of brain computation? In S.W. Ellacott, J.C. Mason, and I.J. Anderson (Eds.), **Mathematics of neural networks: Models, algorithms, and applications**. Boston/London: Kluwer Academic Publishers, 1997, pp.34-40.
321. Neural dynamics of motion grouping: From aperture ambiguity to object speed and direction (with J. Chey and E. Mingolla). **Technical Report CAS/CNS TR-95-031**, Boston University. *Journal of the Optical Society of America*, 1997, **14**, 2570-2594.
322. Contour integration across polarities and spatial gaps: From local contrast filtering to global grouping (with B. Dresp). **Technical Report CAS/CNS TR-95-025**, Boston University. *Vision Research*, 1997, **37**, 913-924.
323. Visual brain and visual perception: How does the cortex do perceptual grouping? (with E. Mingolla and W.D. Ross). **Technical Report CAS/CNS TR-96-018**, Boston University. *Trends in Neurosciences*, 1997, **20**, 106-111.

324. A neural model of high-level motion processing: Line motion and formation dynamics (with A.A. Baloch). **Technical Report CAS/CNS TR-96-020**, Boston University. *Vision Research*, 1997, **37**, 3037-3059.
325. A neural model of multimodal adaptive saccadic eye movement control by superior colliculus (with K. Roberts, M. Aguilar, and D. Bullock). **Technical Report CAS/CNS TR-96-029**, Boston University. *Journal of Neuroscience*, 1997, **17**, 9706-9725.
326. Cortical circuits for control of voluntary arm movements (with P. Cisek and D. Bullock). In J. Bower (Ed.), **Computational neuroscience '96**. New York: Plenum Press, 1997, pp.287-292.
327. Cortical synchronization and perceptual framing (with A. Grunewald). **Technical Report CAS/CNS TR-94-025**, Boston University. *Journal of Cognitive Neuroscience*, 1997, **9**, 117-132.
328. Cortical dynamics of 3-D surface perception: Binocular and half-occluded scenic images (with N. McLoughlin). **Technical Report CAS/CNS TR-95-022**, Boston University. *Neural Networks*, 1997, **10**, 1583-1605.
329. Neural models of reaching. Commentary on Plamondon and Alimi, "Speed/accuracy trade-offs in target-directed movements". **Technical Report CAS/CNS TR-97-021**, Boston University. *Behavioral and Brain Sciences*, 1997, **20**, 310.
330. Neural models of development and learning. Commentary on S.R. Quartz and T.J. Sejnowski, "The neural basis of cognitive development: A constructivist manifesto". **Technical Report CAS/CNS TR-97-022**, Boston University. *Behavioral and Brain Sciences*, 1997, **20**, 566.
331. Principles of cortical synchronization. Commentary on W.A. Phillips and W. Singer, "In search of common foundations for cortical computation". **Technical Report CAS/CNS TR-97-024**, Boston University. *Behavioral and Brain Sciences*, 1997, **20**, 689-690.
332. Adaptive timing, attention, and movement control. Commentary on T.J. Shors and L.D. Matzel, "Long-term potentiation: What's learning got to do with it?". **Technical Report CAS/CNS TR-97-025**, Boston University. *Behavioral and Brain Sciences*, 1997, **20**, 619.
333. Fuzzy ART (with G.A. Carpenter). In B. Kosko (Ed.), **Fuzzy engineering**. Upper Saddle River, NJ: Prentice Hall, 1997, pp.467-497.
334. Neural control of interlimb oscillations, I: Human bimanual coordination (with C. Pribe and M.A. Cohen). **Technical Report CAS/CNS TR-94-021**, Boston University. *Biological Cybernetics*, 1997, **77**, 131-140.

335. Neural control of interlimb oscillations, II: Biped and quadruped gaits and bifurcations (with C. Pribe and M.A. Cohen). **Technical Report CAS/CNS TR-94-022**, Boston University. *Biological Cybernetics*, 1997, **77**, 141-152.
336. Neural dynamics of variable-rate speech categorization (with I. Boardman and M.A. Cohen). **Technical Report CAS/CNS TR-94-038**, Boston University. *Journal of Experimental Psychology: Human Perception and Performance*, 1997, **23**, 481-503.
337. Representations need self-organizing top-down expectations to fit a changing world. Commentary on “Representation is representation of similarities” by Shimon Edelman. **Technical Report CAS/CNS TR-97-019**, Boston University. *Behavioral and Brain Sciences*, 1998, **21**, 473-474.
338. The what-and-where filter: A spatial mapping neural network for object recognition and image understanding (with G.A. Carpenter and G.W. Leshner). **Technical Report CAS/CNS TR-93-043**, Boston University. *Computer Vision and Image Understanding*, 1998, **69**, 1-22.
339. Neural substrates of adaptively timed reinforcement, recognition, and motor learning. **Technical Report CAS/CNS TR-95-014**, Boston University. In C.D.L. Wynne and J.E.R. Staddon (Eds.), **Models of action: Mechanisms for adaptive behavior**. Hillsdale, NJ: Erlbaum Associates, 1998, pp.29-85.
340. Cortical computation of stereo disparity (with N.P. McLoughlin). **Technical Report CAS/CNS TR-96-022**, Boston University. *Vision Research*, 1998, **38**, 91-99.
341. Birth of a learning law. **Technical Report CAS/CNS TR-97-017**, Boston University. *Neural Networks Newsletter*, 1998, **21**, 1-4.
342. A self-organizing neural network architecture for navigation using optic flow (with S. Cameron and F.H. Guenther). **Technical Report CAS/CNS TR-95-032**, Boston University. *Neural Computation*, 1998, **10**, 313-352.
343. How is a moving target continuously tracked behind occluding cover? **Technical Report CAS/CNS TR-96-001**, Boston University. In T. Watanabe (Ed.), **High level motion processing: Computational, neurobiological, and psychophysical perspectives**. Cambridge, MA: MIT Press, 1998, pp.3-52.
344. Cortical networks for control of voluntary arm movements under variable force conditions (with D. Bullock and P. Cisek). **Technical Report CAS/CNS TR-95-019**, Boston University. *Cerebral Cortex*, 1998, **8**, 48-62.
345. A cortico-spinal model of reaching and proprioception under multiple task constraints (with P. Cisek and D. Bullock). **Technical Report CAS/CNS TR-96-035**, Boston University. *Journal of Cognitive Neuroscience*, 1998, **10**, 425-444.

346. A neural network model for the development of simple and complex cell receptive fields within cortical maps of orientation and ocular dominance (with S.J. Olson). **Technical Report CAS/CNS TR-96-021**, Boston University. *Neural Networks*, 1998, **11**, 189-208.
347. Self-organization of binocular disparity tuning by reciprocal corticogeniculate interactions (with A. Grunewald). **Technical Report CAS/CNS TR-96-027**, Boston University. *Journal of Cognitive Neuroscience*, 1998, **10**, 199-215.
348. Neural dynamics of motion processing and speed discrimination (with J. Chey and E. Mingolla). **Technical Report CAS/CNS TR-94-030**, Boston University. *Vision Research*, 1998, **38**, 2769-2786.
349. Texture segregation, surface representation, and figure-ground separation (with L. Pessoa). **Technical Report CAS/CNS TR-96-025**, Boston University. *Vision Research*, 1998, **38**, 2657-2684.
350. A neural model of the saccade generator in the reticular formation (with G. Gancarz). **Technical Report CAS/CNS TR-98-014**, Boston University. *Neural Networks*, 1998, **11**, 1159-1174.
351. Synaptic depression and cortical gain control. **Technical Report CAS/CNS TR-98-001**, Boston University.
352. Neural dynamics of binocular brightness perception (with F. Kelly). **Technical Report CAS/CNS TR-98-019**, Boston University. *Vision Research*, 1999, **39**, 3796-3816.
353. Neural dynamics of perceptual order and context effects for variable-rate speech syllables (with I. Boardman, C. Myers, and M.A. Cohen). **Technical Report CAS/CNS TR-98-004**, Boston University. *Perception and Psychophysics*, 1999, **61**, 1477-1500.
354. Pitch-based streaming in auditory perception. **Technical Report CAS/CNS TR-96-007**, Boston University. In N. Griffith and P. Todd (Eds.), **Musical networks: Parallel distributed perception and performance**. Cambridge, MA: MIT Press, 1999, pp.117-140.
355. A self-organizing architecture for invariant 3-D object learning and recognition from multiple 2-D views (with G. Bradski). In L.C. Jain and V.R. Vemuri (Eds.), **Industrial applications of neural networks**. Boca Raton: CRC Press, 1999, pp.113-157.
356. A self-organizing neural system for learning to recognize textured scenes (with J.R. Williamson). **Technical Report CAS/CNS TR-97-001**, Boston University. *Vision Research*, 1999, **39**, 1385-1406.
357. Figure-ground separation by visual cortex. **Technical Report CAS/CNS TR-96-010**, Boston University. In G. Adelman and B.H. Smith (Eds.), **Encyclopedia of neuroscience, 2nd edition**. Amsterdam: Elsevier, 1999, pp.716-721.

358. A neural model of saccadic eye movement control explains task-specific adaptation (with G. Gancarz). **Technical Report CAS/CNS TR-98-024**, Boston University. *Vision Research*, 1999, **39**, 3123-3143.
359. Neural models of normal and abnormal behavior: What do schizophrenia, Parkinsonism, attention deficit disorder, and depression have in common? **Technical Report CAS/CNS TR-98-030**, Boston University. In J. Reggia, E. Ruppin, and D.L. Glanzman (Eds.), **Disorders of brain, behavior, and cognition: The neurocomputational perspective**. Amsterdam: Elsevier, 1999, pp.375-406.
360. A neural network for enhancing boundaries and surfaces in synthetic aperture radar images (with E. Mingolla and W.D. Ross). **Technical Report CAS/CNS TR-98-032**, Boston University. *Neural Networks*, 1999, **12**, 499-511.
361. Spatial facilitation by color and luminance edges: Boundary, surface, and attentional factors (with B. Dresch). **Technical Report CAS/CNS TR-98-013**, Boston University. *Vision Research*, 1999, **39**, 3431-3443.
362. A neural model of first-order and second-order motion perception and magnocellular dynamics (with A.A. Baloch, E. Mingolla, and C.A.M. Nogueira). **Technical Report CAS/CNS TR-96-030**, Boston University. *Journal of the Optical Society of America*, 1999, **16**, 953-978.
363. The link between brain learning, attention, and consciousness. **Technical Report CAS/CNS TR-97-018**, Boston University. *Consciousness and Cognition*, 1999, **8**, 1-44.
364. How does the cerebral cortex work? Learning, attention, and grouping by the laminar circuits of visual cortex. **Technical Report CAS/CNS TR-97-023**, Boston University. *Spatial Vision*, 1999, **12**, 163-185.
365. Brain learning, attention, and consciousness. **Technical Report CAS/CNS TR-99-002**, Boston University. Submitted for publication.
366. A comment on “Assimilation of achromatic color cannot explain the brightness effect in the achromatic neon effect” by Marc K. Albert. **Technical Report CAS/CNS TR-99-003**, Boston University. *Perception*, 1999, **28**, 1291-1302.
367. Consciousness and complexity or consciousness and resonance? (with R.D.S. Raizada). **Technical Report CAS/CNS TR-99-004**, Boston University.
368. How the basal ganglia use parallel excitatory and inhibitory learning pathways to selectively respond to unexpected rewarding cues (with J. Brown and D. Bullock). **Technical Report CAS/CNS TR-99-011**, Boston University. *Journal of Neuroscience*, 1999, **19**, 10502-10511.

369. Self-organizing features and categories through attentive resonance. **Technical Report CAS/CNS TR-99-012**, Boston University. *Behavioral and Brain Sciences*, 1999, **21**, 27.
370. The laminar architecture of visual cortex and image processing technology. **Technical Report CAS/CNS TR-99-021**, Boston University. In V. Roberto (Ed.), **Proceedings of ICIAP'99**, Venice, 1999.
371. A neural model of motion processing and visual navigation by cortical area MST (with E. Mingolla and C. Pack). **Technical Report CAS/CNS TR-97-015**, Boston University. *Cerebral Cortex*, 1999, **9**, 878-895.
372. Perceptual framing and cortical synchronization (with A. Grunewald). In D.S. Levine, V.R. Brown, and V.T. Shirey (Eds.), **Oscillations in neural systems**. Mahwah, NJ: Erlbaum Associates, 1999, pp.217-237.
373. Familiarity discrimination of radar pulses (with E. Granger, M.A. Rubin, and W.W. Streilein). **Technical Report CAS/CNS TR-98-027**, Boston University. In M.S. Kearns *et al.* (Eds.), **Advances in neural information processing systems**. Cambridge, MA: MIT Press, 1999, **11**, pp.875-881.
374. A comparison of classifiers for radar emitter type identification (with E. Granger, P. Lavoie, and M.A. Rubin). **Technical Report CAS/CNS TR-99-014**, Boston University. In C.H. Dagli *et al.* (Eds.), **Intelligent engineering systems through artificial neural networks**. New York: ASME Press, 1999, **9**, pp.3-11.
375. Brain feedback and adaptive resonance in speech perception. **Technical Report CAS/CNS TR-99-022**, Boston University. *Behavioral and Brain Sciences*, 2000, **23**, pp. 332-333.
376. The complementary brain: Unifying brain dynamics and modularity. **Technical Report CAS/CNS TR-98-003**, Boston University. *Trends in Cognitive Sciences*, 2000, **4**, 233-246.
377. Contrast-sensitive perceptual grouping and object-based attention in the laminar circuits of primary visual cortex (with R.D.S. Raizada). **Technical Report CAS/CNS TR-99-008**, Boston University. *Vision Research*, 2000, **40**, 1413-1432.
378. How hallucinations may arise from brain mechanisms of learning, attention, and volition. **Technical Report CAS/CNS TR-99-020**, Boston University. *Journal of the International Neuropsychological Society*, 2000, **6**, 583-592.
379. Neural dynamics of 3-D surface perception: Figure-ground separation and lightness perception (with F. Kelly). **Technical Report CAS/CNS TR-98-026**, Boston University. *Perception and Psychophysics*, 2000, **62**, 1596-1618.
380. The imbalanced brain: From normal behavior to schizophrenia. **Technical Report CAS/CNS TR-99-018**, Boston University. *Biological Psychiatry*, 2000, **48**, 81-98.

381. The resonant dynamics of conscious speech: Interword integration and duration-dependent backward effects (with C.W. Myers). **Technical Report CAS/CNS TR-99-001**, Boston University. *Psychological Review*, 2000, **107**, 735-767.
382. Kinematic coordinates in which motor cortical cells encode movement direction (with R. Ajemian and D. Bullock). **Technical Report CAS/CNS TR-98-021**, Boston University. *Journal of Neurophysiology*, 2000, **84**, 2191-2203.
383. Frequency-dependent synaptic potentiation, depression, and spike timing induced by Hebbian pairing in cortical pyramidal neurons (with M. Okatan). **Technical Report CAS/CNS TR-2000-003**, Boston University. *Neural Networks*, 2000, **13**, 699-708.
384. Visual cortical mechanisms of perceptual grouping: Interacting layers, networks, columns, and maps (with W.D. Ross and E. Mingolla). **Technical Report CAS/CNS TR-98-023**, Boston University. *Neural Networks*, 2000, **13**, 571-588.
385. A neural model of corticocerebellar interactions during attentive imitation and predictive learning of sequential handwriting movements (with R. Paine). **Technical Report CAS/CNS TR-2000-009**, Boston University. *Neural Networks*, 2000, **13**, 999-1046.
386. Linking mind to brain: The mathematics of biological intelligence. **Technical Report CAS/CNS TR-2000-016**, Boston University. *Notices of the American Mathematical Society*, 2000, **47**, 1361-1372.
387. Classification of incomplete data using the fuzzy ARTMAP neural network (with E. Granger, M.A. Rubin, and P. Lavoie). **Technical Report CAS/CNS 2000-001**, Boston University. In **Proceedings of the international joint conference on neural networks (IJCNN)**, 2000, **4**, 35-40.
388. Localist but distributed representations. **Technical Report CAS/CNS TR-99-029**, Boston University. *Behavioral and Brain Sciences*, 2000, **23**, 478-479.
389. Biomimetic circuits for autonomously learning to selectively respond to unexpected reward-related events (with J. Brown and D. Bullock). In **Proceedings of the humanoid 2000 conference**, Cambridge.
390. A model of movement coordinates in the motor cortex: Posture-dependent changes in the gain and direction of single cell tuning curves (with R. Ajemian and D. Bullock). **Technical Report CAS/CNS TR 2000-017**, Boston University. *Cerebral Cortex*, 2001, **11**, 1124-1135.
391. Neural dynamics of motion integration and segmentation within and across apertures (with E. Mingolla and L. Viswanathan). **Technical Report CAS/CNS TR-2000-004**, Boston University. *Vision Research*, 2001, **41**, 2521-2553.

392. Attentive learning of sequential handwriting movements: A neural network model (with R.W. Paine). **Technical Report CAS/CNS TR-2000-012**, Boston University. In R. Sun and C.L. Giles (Eds.), **Sequence learning: Paradigms, algorithms, and applications**. New York: Springer-Verlag, 2001, pp.349-387.
393. A neural model of how horizontal and interlaminar connections of visual cortex develop into adult circuits that carry out perceptual grouping and learning (with J.R. Williamson). **Technical Report CAS/CNS TR-98-022**, Boston University. *Cerebral Cortex*, 2001, **11**, 37-58.
394. A neural model of smooth pursuit control and motion perception by cortical area MST (with C. Pack and E. Mingolla). **Technical Report CAS/CNS TR-99-023**, Boston University. *Journal of Cognitive Neuroscience*, 2001, **13**, 102-120.
395. A What-and-Where fusion neural network for recognition and tracking of multiple radar emitters (with E. Granger, M.A. Rubin, and P. Lavoie). **Technical Report CAS/CNS TR-2000-029**, Boston University. *Neural Networks*, 2001, **14**, 325-344.
396. Context-sensitive binding by the laminar circuits of V1 and V2: A unified model of perceptual grouping, attention, and orientation contrast (with R.D.S. Raizada). **Technical Report CAS/CNS TR-2000-008**, Boston University. *Visual Cognition* (Special Issue on Neural Binding of Space and Time), 2001, **8** (3/4/5), 431-466.
397. Linking the laminar circuits of visual cortex to visual perception: Development, grouping, and attention. **Technical Report CAS/CNS TR-2001-002**, Boston University. *Neuroscience and Biobehavioral Reviews*, 2001, **25**, 513-526.
398. Theory versus speculation in visual perception. *Perception*, 2001, **30**, 1505-1507.
399. Radar ESM with a what-and-where fusion neural network (with E. Granger, M.A. Rubin, and P. Lavoie). In **Proceedings of the IEEE workshop on neural networks for signal processing**, 2001.
400. Temporal dynamics of binocular disparity processing with corticogeniculate interactions (with A. Grunewald). **Technical Report CAS/CNS TR-99-017**, Boston University. *Neural Networks*, 2002, **15**, 181-200.
401. The laminar organization of visual cortex: A unified view of development, learning, attention, and grouping. **Technical Report CAS/CNS TR-2000-013**, Boston University. In G.K. Hung and K.J. Ciuffreda (Eds.), **Models of the visual system**. Boston: Kluwer Academic, 2002, pp.215-244.
402. Thalamocortical dynamics of the McCollough effect: Boundary-surface alignment through perceptual learning (with S. Hwang and E. Mingolla). **Technical Report CAS/CNS TR-2001-004**, Boston University. *Vision Research*, 2002, **42**, 1259-1286.

403. Depth perception from pairs of overlapping cues in pictorial displays (with B. Dresp and S. Durand). **Technical Report CAS/CNS TR-99-030**, Boston University. *Spatial Vision*, 2002, **15**, 255-276.
404. A self-organizing neural network for supervised learning, recognition, and prediction (with G.A. Carpenter). In Thad A. Polk and Colleen M. Seifert (Eds.), **Cognitive modeling**. Cambridge, MA: MIT Press, 2002, pp.288-314.
405. Neural substrates of visual percepts, imagery, and hallucinations. Commentary on “Mental imagery: In search of a theory” by Zenon Pylyshyn. **Technical Report CAS/CNS TR-2001-011**, Boston University. *Behavioral and Brain Sciences*, 2002, **25**, 194-195.
406. Resonant neural dynamics of speech perception. **Technical Report CAS/CNS TR-2002-008**, Boston University. *Journal of Phonetics*, 2003, **31**, 423-445.
407. Towards a theory of the laminar architecture of cerebral cortex: Computational clues from the visual system (with R.D.S. Raizada). **Technical Report CAS/CNS TR-2001-012**, Boston University. *Cerebral Cortex*, 2003, **13**, 100-113.
408. A laminar cortical model of stereopsis and three-dimensional surface perception (with P.D.L. Howe). **Technical Report CAS/CNS TR-2002-002**, Boston University. *Vision Research*, 2003, **43**, 801-829.
409. Laminar development of receptive fields, maps, and columns in visual cortex: The coordinating role of the subplate (with A. Seitz). **Technical Report CAS/CNS 2002-006**, Boston University. *Cerebral Cortex*, 2003, **13**, 852-863.
410. Laminar cortical architecture. **Technical Report CAS/CNS TR-2000-019**, Boston University. In M.A. Arbib (Ed.), **The handbook of brain theory and neural networks: Second edition**. Cambridge, MA: MIT Press, 2003, pp.594-600.
411. Adaptive resonance theory (with G.A. Carpenter). **Technical Report CAS/CNS TR-98-029**, Boston University. In M.A. Arbib (Ed.), **The handbook of brain theory and neural networks: Second edition**. Cambridge, MA: MIT Press, 2003, pp.87-90.
412. Filling-in the forms: Surface and boundary interactions in visual cortex. **Technical Report CAS/CNS TR-2000-018**, Boston University. In L. Pessoa and P. DeWeerd (Eds.), **Filling-in: From perceptual completion to skill learning**. New York: Oxford University Press, 2003, pp.13-37.
413. Linking visual cortical development to visual perception. **Technical Report CAS/CNS TR-2000-026**, Boston University. In B. Hopkins and S. Johnson (Eds.), **Neurobiology of infant vision**. Ablex Press, 2003, pp.211-271.
414. Adaptive resonance theory. **Technical Report CAS/CNS TR-2000-024**, Boston University. In **The encyclopedia of cognitive science**. London: Macmillan Reference Ltd., 2003.

415. From normal brain and behavior to schizophrenia. **Technical Report CAS/CNS TR-2003-001**, Boston University. *Psychopathology Research*, 2003, **13**, 5-10.
416. Laminar cortical dynamics of visual form perception. *Neural Networks*, 2003, **16(5/6)**, 925-931.
417. A neural model of how the brain represents and compares multi-digit numbers: Spatial and categorical processes (with D.V. Repin). **Technical Report CAS/CNS TR-2001-006**, Boston University. *Neural Networks*, 2003, **16**, 1107-1140.
418. Linking brain to mind in normal behavior and schizophrenia. Commentary on “Convergence of biological and psychological perspectives on cognitive coordination in schizophrenia” by W.A. Phillips and S.M. Silverstein. **Technical Report CAS/CNS TR-2003-013**, Boston University. *Behavioral and Brain Sciences*, 2003, **26**, 90.
419. Linking visual cortex to visual perception: An alternative to the Gestalt bubble. Commentary on “Gestalt isomorphism and the primacy of subjective conscious experience: A Gestalt bubble model” by Steven Lehar. **Technical Report CAS/CNS TR-2003-012**, Boston University. *Behavioral and Brain Sciences*, 2003, **26**, 412-413.
420. From working memory to long-term memory and back: Linked but distinct. Commentary on “Working memory retention systems: A state of activated long-term memory” by D.S. Ruchkin, J. Grafman, K. Cameron, and R.S. Berndt. **Technical Report CAS/CNS TR-2003-010**, Boston University. *Behavioral and Brain Sciences*, 2003, **26**, 737-738.
421. Bring ART into the ACT. Commentary on “The Newell test for a theory of cognition” by John R. Anderson and Christian Lebiere. **Technical Report CAS/CNS TR-2003-011**, Boston University. *Behavioral and Brain Sciences*, 2003, **26**, 610-611.
422. How does the cerebral cortex work? Development, learning, attention, and 3D vision by laminar circuits of visual cortex. **Technical Report CAS/CNS TR-2003-005**, Boston University. *Behavioral and Cognitive Neuroscience Reviews*, 2003, **2**, 47-76.
423. Brain learning, attention, and consciousness. In B.J. Baars, W.P. Banks, and J.B. Newman (Eds.), **Essential sources in the scientific study of consciousness**. Cambridge MA: MIT Press, pp.1007-1034.
424. A quantitative evaluation of the AVITWRITE model of handwriting learning (with R.W. Paine and A.W.A. van Gemmert). **Technical Report CAS/CNS TR-2003-020**, Boston University. *Human Movement Science*, 2004, **23**, 837-860.
425. Neural models of seeing and thinking. **Technical Report CAS/CNS TR-2002-005**, Boston University. In A. Carsetti (Ed.), **Seeing, thinking, and knowing**. Amsterdam: Kluwer Academic, 2004, pp.29-54.

426. ARTSTREAM: A neural network model of auditory scene analysis and source segregation (with K.K. Govindarajan, L.L. Wyse, and M.A. Cohen). **Technical Report CAS/CNS TR-2003-017**, Boston University. *Neural Networks*, 2004, **17**, 511-536.
427. How laminar frontal cortex and basal ganglia circuits interact to control planned and reactive saccades (with J.W. Brown and D. Bullock). **Technical Report CAS/CNS TR-2000-023**, Boston University. *Neural Networks*, 2004, **17**, 471-510.
428. The complementary brain: From brain dynamics to conscious experiences. **Technical Report CAS/CNS TR-2000-014**, Boston University. In C. Kaernbach, E. Schroger, and H. Muller (Eds.), **Psychophysics beyond sensation: Laws and invariants of human cognition**. Hillsdale, NJ: Erlbaum Associates, 2004, pp.417-449.
429. A laminar cortical model for 3D perception of slanted and curved surfaces and of 2D images: Development, attention, and bistability (with G. Swaminathan). **Technical Report CAS/CNS TR-2003-002**, Boston University. *Vision Research*, 2004, **44**, 1147-1187.
430. A neuromorphic model for achromatic and chromatic surface representation of natural images (with S. Hong). **Technical Report CAS/CNS TR-2004-003**, Boston University. *Neural Networks*, 2004, **17**, 787-808.
431. Fast synchronization of perceptual grouping in laminar visual cortical circuits (with A. Yazdanbakhsh). **Technical Report CAS/CNS TR-2004-005**, Boston University. *Neural Networks*, 2004, **17**, 707-718.
432. Laminar cortical dynamics of visual form and motion interactions during coherent object motion perception (with J. Berzhanskaya and E. Mingolla). **Technical Report CAS/CNS TR-2004-011**, Boston University. Submitted for publication.
433. Figure-ground separation by visual cortex. **Technical Report CAS/CNS TR-96-010**, Boston University. In G. Adelman and B.H. Smith (Eds.), **Encyclopedia of neuroscience, third edition**. Amsterdam: Elsevier, 2004.
434. START: A bridge between emotion theory and neurobiology through dynamic system modeling. Commentary on “Bridging emotion theory and neurobiology through dynamic system modeling” by Marc D. Lewis. **Technical Report CAS/CNS TR-2004-012**, Boston University. *Behavioral and Brain Sciences*, 2005, **28**, 207-208.
435. In appreciation of Jacob Beck. *Spatial Vision*, 2005, **18**, 133-141.
436. Linking attention to learning, expectation, competition, and consciousness. **Technical Report CAS/CNS TR-2003-007**, Boston University. In L. Itti, G. Rees, and J. Tsotsos (Eds.), **Neurobiology of attention**. San Diego: Elsevier, 2005, pp. 652-662.

437. Realistic constraints on brain color perception and category learning. Commentary on “Coordinating perceptually grounded categories through language” by Luc Steels and Tony Belpaeme. *Behavioral and Brain Sciences*, 2005, **28**, 495-496.
438. Laminar cortical dynamics of 3D surface perception: Stratification, transparency, and neon color spreading (with A. Yazdanbakhsh). **Technical Report CAS/CNS TR-2004-002**, Boston University. *Vision Research*, 2005, **45**, 1725-1743.
439. A laminar cortical model of stereopsis and 3D surface perception: Closure and da Vinci stereopsis (with Y. Cao). **Technical Report CAS/CNS TR-2004-007**, Boston University. *Spatial Vision*, 2005, **18**, 515-578.
440. SOVREIGN: A self-organizing vision, expectation, recognition, emotion, intelligent, goal-oriented navigation system (with W. Gnadt). **Technical Report CAS/CNS TR-2004-009**, Boston University. In Douglas Blank and Lisa Meeden (Eds.), **Developmental robotics: Papers from the 2005 AAI spring symposium**, 106-110. Menlo Park CA: American Association for Artificial Intelligence, 2005.
441. The watercolor illusion and neon color spreading: A unified analysis of new cases and neural mechanisms (with B. Pinna). *Journal of the Optical Society of America A*, 2005, **22**, 2207-2221.
442. Brain categorization: Learning, attention, and consciousness (with G.A. Carpenter and B. Ersoy). In **Proceedings of the international joint conference on neural networks (IJCNN)**, IEEE Press, 2005.
443. CELEST: The Center of Excellence for Learning in Education, Science, and Technology. Published in the inaugural issue of *Brains, Minds & Media*, an eJournal of new media in neural and cognitive science and education, <http://www.brains-minds-media.org/current/>, July 2005.
444. Linking visual development and learning to information processing: Preattentive and attentive brain dynamics. In P. DeWeerd, R. Pinaud, and L. Tremere (Eds.), **Plasticity in the visual system: From genes to circuits**. Springer/Kluwer Academic Press, 2005, pp.323-346.
445. A neural model of surface perception: Lightness, anchoring, and filling-in (with S. Hong). *Spatial Vision*, 2006, **19**, 263-321.
446. Neural dynamics of autistic behaviors: Cognitive, emotional, and timing substrates (with D. Seidman). *Psychological Review*, 2006, **113**, 483-525.
447. Space, time, and learning in the hippocampus: How fine spatial and temporal scales are expended into population codes for behavioral control (with Anatoli Gorchetchnikov). *Neural Networks*, 2007, **20**, 182-193.

448. A neural model of 3D shape-from-texture: Multiple-scale filtering, boundary grouping, and surface filling-in (with Levin Kuhlmann and Ennio Mingolla). *Vision Research*, 2007, **47**, 634-672.
449. Laminar cortical dynamics of visual form and motion interactions during coherent object motion perception (with J. Berzhanskaya and E. Mingolla). *Spatial Vision*, 2007, **20**, 337-395.
450. Towards a unified theory of neocortex: Laminar cortical circuits for vision and cognition. In P. Cisek, T. Drew, and J.F. Kalaska (Eds.), **Computational neuroscience: Theoretical insights into brain function**. Amsterdam: Elsevier, 2007, pp.79-104.
451. Intelligence through interaction: Towards a unified theory for learning (with A.-H. Tan and G. Carpenter). Submitted to the International Symposium on Neural Networks, Nanjing, China, 2007.
452. Logic and phenomenology of incompleteness in illusory figures: New cases and hypotheses (with B. Pinna). *Psychofenia: Ricerca ed Analisi Psicologica*, 2007, **IX**(15), 93-135.
453. Consciousness CLEARs the mind. *Neural Networks*, Special Issue on “Consciousness and Brain”, 2007, **20**, 1040-1053.
454. Texture segregation by visual cortex: Perceptual grouping, attention, and learning (with R. Bhatt and G. Carpenter). **Technical Report CAS/CNS TR-2006-007**, Boston University. *Vision Research*, 2007, **47**, 3173-3211.
455. The link between brain learning, attention, and consciousness. *La Nuova Critica*, 2007, **49-50**, 5-66.
456. Neural dynamics of saccadic and smooth pursuit eye movement coordination during visual tracking of unpredictably moving targets (with K. Srihasam and D. Bullock). *Neural Networks*, in press.
457. Neural models of motion integration, segmentation, and probabilistic decision-making. Technical Report CAS/CNS TR-2007-014, Boston University. In G. Masson and U. Ilg (Eds.), **Dynamics of visual motion processing: Behavioral and computational approaches**. Springer-Verlag, pp. 283-311, 2010.
458. SOVEREIGN: An autonomous neural system for goal-oriented perceptual and cognitive learning and navigation (with W. Gnatd). *Neural Networks*, 2008, **21**, 699-758.
459. Temporal dynamics of decision-making during motion perception in the visual cortex (with P. Pilly). *Vision Research*, 2008, **48**, 1345-1373.

460. Assessing the function of motor cortex: Single-neuron models of how neural response is modulated by limb biomechanics (with R. Ajemian, A. Green, D. Bullock, L. Sergio, and J. Kalaska). *Neuron*, 2008, **58**, 414-428.
461. The art of seeing and painting. *Spatial Vision*, Special Issue on “Neuroscience and Art”, 2008, **21**, 463-486.
462. Spikes, synchrony, and attentive learning by laminar thalamocortical circuits (with M. Versace). *Brain Research*, 2008, **1218**, 278-312.
463. SOVEREIGN: An autonomous neural system for incrementally learning to navigate towards a rewarded goal (with W. Gnadt). In X.-J. Jing (Ed.), **Mobile robots motion planning: New challenges**. Vienna, Austria: I-Tech Education and Publishing, 2008, pp.99-122.
464. Laminar cortical dynamics of cognitive and motor working memory, sequence learning, and performance: Toward a unified theory of how the cerebral cortex works (with L. Pearson). *Psychological Review*, 2008, **115**, 677-732.
465. How does binocular rivalry emerge from cortical mechanisms of 3D vision (with A. Yazdanbakhsh, Y. Cao, and G. Swaminathan). *Vision Research*, 2008, **48**, 2232-2250.
466. Neural dynamics underlying impaired autonomic and conditioned responses following amygdala and orbitofrontal lesions (with M. Dranias and D. Bullock). *Behavioral Neuroscience*, 2008, **122**(5), 1100-1125.
467. Dopaminergic and non-dopaminergic value systems in conditioning and outcome-specific revaluation (with M. Dranias and D. Bullock). *Brain Research*, 2008, **1238**, 239-287.
468. Speaker normalization using cortical strip maps: A neural model for steady state vowel categorization (with H. Ames). *Journal of the Acoustical Society of America*, 2008, **124**(6), 3918-3936.
469. A head-neck-eyes system that learns fault-tolerant saccades to 3-D targets using a self-organizing neural model (with N. Srinivasa). *Neural Networks*, 2008, **21**, 1380-1391.
470. Cortical and subcortical predictive dynamics and learning during perception, cognition, emotion, and action. *Philosophical Transactions of the Royal Society of London*, Special Issue on “Predictions in the brain: Using our past to generate a future”, 2009, **364**(1521), 1223-1234.
471. Target selection by frontal cortex during coordinated saccadic and smooth pursuit eye movements (with K. Srihasam and D. Bullock). *Journal of Cognitive Neuroscience*, 2009, **21**(8), 1611-27.

472. Cortical dynamics of attentive object recognition, scene understanding, and decision making. To appear in C. Chubb, B. Doshier, and Z.-L. Lu (Eds.), **Vision, attention, memory, and applications: A tribute to George Sperling**, 2008.
473. Form perception. **Technical Report CAS/CNS TR-2007-020**, Boston University. In U. Windhorst, M.D. Binder, and N. Hirokawa (Eds.), **Encyclopedia of neuroscience**. Heidelberg: Springer-Verlag, 2008.
474. Towards self-organizing autonomous brain-inspired cognitive architectures. In A.V. Samsonovich (Ed.), **Biologically inspired cognitive architectures: Papers from the AAI fall symposium**. AAI Technical Report FS-08-04, Menlo Park CA: AAI Press, 2008.
475. View-invariant object category learning, recognition, and search: How spatial and object attention are coordinated using surface-based attentional shrouds (with A. Fazl and E. Mingolla). **Technical Report CAS/CNS TR-2007-011**, Boston University. *Cognitive Psychology*, 2009, **58**, 1-48.
476. From stereogram to surface: How the brain sees the world in depth (with L. Fang). *Spatial Vision*, Special Issue on “Unresolved Questions in Stereopsis”, 2009, **22**(1), 45-82.
477. ARTSCENE: A neural system for natural scene classification (with T.-R. Huang). *Journal of Vision*, 2009, **9**(4), 1-19.
478. A neural model of visually guided steering, obstacle avoidance, and route selection (with D. Elder and E. Mingolla). *Journal of Experimental Psychology: Human Perception and Performance*, 2009, **35**, 1501-1531.
479. Beta oscillations and hippocampal place cell learning during exploration of novel environments. *Hippocampus*, 2009. **19**, 881-885.
480. A neural model of how the brain computes heading from optic flow in realistic scenes (with A. Browning and E. Mingolla). *Cognitive Psychology*, 2009, **59**, 320-356.
481. Visual motion perception. In V.S. Ramachandran (Ed.), **Encyclopedia of human behavior (second edition)**. Oxford: Elsevier, 2011, in press.
482. Cortical dynamics of navigation and steering in natural scenes: Motion-based object segmentation, heading and obstacle avoidance (with A. Browning and E. Mingolla). *Neural Networks*, 2009, **22**, 1383-1398.
483. Running as fast as it can: How spiking dynamics form object groupings in the laminar circuits of visual cortex. (with J. Leveille and M. Versace). *Journal of Computational Neuroscience*, 2010, **28**, 323-346.
484. The link between brain learning, attention, and consciousness. In A. Carsetti (Ed.), **Causality, meaningful complexity, and embodied cognition**. Springer, 2010.

485. On the road to invariant recognition: Explaining tradeoff and morph properties of cells in inferotemporal cortex using multiple-scale task-sensitive attentive learning (with J. Markowitz and Y. Cao). *Neural Networks*, **24**, 1036-1049, 2011.
486. Prototypical category learning in high-functioning autism (with T. Vladusich, F. Lafe, D.S. Kim, and H. Tager-Flusberg). *Autism Research*, 2010, **3**, 226-236.
487. Low-level sensory plasticity during task-irrelevant perceptual learning: Evidence from conventional and double training procedures (with P. Pilly and A. Seitz). *Vision Research*, 2010, **50**, 424-432.
488. How do object reference frames and motion vector decomposition emerge in laminar cortical circuits? (with J. Leveille and M. Versace). *Attention, Perception, & Psychophysics*, **73**, 1147-1170, 2011.
489. Grid cell hexagonal patterns formed by fast self-organized learning within entorhinal cortex. (with H. Mhatre and A. Gorchetchnikov), *Hippocampus*, **22**, 320-334.
490. Cortical dynamics of contextually-cued attentive visual learning and search: Spatial and object evidence accumulation (with T.-R. Huang). *Psychological Review*, 2010, **117**, 1080-1112.
491. Unattended exposure to components of speech sounds yields same benefits as explicit auditory training (with A. Seitz, A. Protopapas, Y. Tsushima, E. Vlahou, S. Gori, and T. Watanabe). *Cognition*, 2010, **115**, 435-443.
492. Probing perceptual antinomies with the watercolor illusion and explaining how the brain resolves them (with M. Tanca and B. Pinna). *Seeing and Perceiving*, 2010, **23**, 295-333.
493. How do children learn to follow gaze, share joint attention, imitate their teachers, and use tools during social interactions? (with T. Vladusich). *Neural Networks*, Special issue on "Social Cognition: From Babies to Robots", 2010, **23**, 940-965.
494. Cortical and subcortical predictive dynamics and learning during perception, cognition, emotion, and action. In M. Bar (Ed.), **Predictions in the Brain: Using our Past to Generate a Future**. New York: Oxford University Press.
495. Cortical learning of recognition categories: A resolution of the exemplar vs. prototype debate. (with G.P. Amis, G.A. Carpenter, and B. Ersoy). Submitted, 2009.
496. Stereopsis and 3D surface perception by spiking neurons in laminar cortical circuits: A Method for converting neural rate models into spiking models. (with Y. Cao). *Neural Networks*, 2012, 75-98.

497. Visual motion perception. In V.S. Ramachandran (Ed.), **Encyclopedia of human behavior (second edition)**, 2011. Oxford: Elsevier.
498. On the road to invariant recognition: Explaining tradeoff and morph properties of cells in inferotemporal cortex using multiple-scale task-sensitive attentive learning. (with J. Markowitz and Y. Cao), *Neural Networks*, 2011, **24**, 1036-1049.
499. How do object reference frames and motion vector decomposition emerge in laminar cortical circuits? (with J. Leveille and M. Versace). *Attention, Perception, & Psychophysics*, 2011, **73**, 1147-1170.
500. How does the brain rapidly learn and reorganize Invariant object representations in inferior temporal cortex? (with Y. Cao and J. Markowitz). *Neural Networks*, 2011, **24**, 1050-1061.
501. A neural model of normal and abnormal learning and memory: Adaptively timed conditioning, hippocampus, amnesia, neurotrophins, and consciousness. (with D. Franklin). Submitted, 2010.
502. Joining distributed pattern processing and homeostatic plasticity in recurrent on-center off-surround shunting networks: Noise, saturation, short-term memory, synaptic scaling, and BDNF. (with B. Chandler). *Neural Networks*, 2012, **25**, 21-29.
503. Laminar cortical dynamics of conscious speech perception: A neural model of phonemic restoration using subsequent context in noise. (with S. Kazerounian). *Journal of the Acoustical Society of America*, **130**, 440-460, 2011.
504. On the road to invariant object recognition: How cortical area V2 transforms absolute to relative disparity during 3D vision. (with K. Srinivasan and A. Yazdabakhsh). *Neural Networks*, **24**, 686-692, 2011.
505. A neuromorphic model of spatial lookahead planning. (with R. Ivey and D. Bullock). *Neural Networks*, **24**, 257-266, 2011.
506. Grid cell hexagonal patterns formed by fast self-organized learning within entorhinal cortex. (with H. Mhatre and A. Gorchetchnikov). *Hippocampus*, 2012, **22**, 320-334.
507. After-hyperpolarization currents and acetylcholine control sigmoid transfer functions in a spiking cortical model. (with J. Palma and M. Versace). *Journal of Computational Neuroscience*, 2012, **32**, 253-280.
508. A neural model of sequential movement planning and control of eye movements: Item-order-rank working memory and saccade selection by the supplementary eye fields. (with M.R. Silver, D. Bullock, M. Histed and E. Miller). *Neural Networks*, 2011, **26**, 29-58.
509. Adaptive resonance theory (with G.A. Carpenter). In C. Sammut and G. Webb (Eds.), **Encyclopedia of machine learning**. Springer, pp. 22-35, 2011.

510. Neural dynamics of object-based multifocal visual spatial attention and priming: Object cueing, useful-field-of-view, and crowding. (with N. Foley and E. Mingolla). *Cognitive Psychology*, 2012, **65**, 77-117.
511. How entorhinal grid cells may learn multiple spatial scales from a dorsoventral gradient of cell response rates in a self-organizing map. (with P. Pilly). *PLoS Computational Biology*, 2012, 8(10): 31002648. Doi:10.1371/journal.pcbi.1002648..
512. Gesture recognition system based on Adaptive Resonance Theory. (with P.K.J. Park, J.H. Lee, C.W. Shin, H.-S. Ryu, B.-C. Kang, and G.A. Carpenter). Submitted, 2011.
513. Learned integration of visual, vestibular, and motor cues in multiple brain regions computes head direction during visually-guided navigation. (with B. Fortenberry and A. Gorchetchnikov). *Hippocampus*, 2012, **22**, 2219-2237.
514. How do spatial learning and memory occur in the brain? Coordinated learning of entorhinal grid cells and hippocampal place cells. (with P. Pilly). *Journal of Cognitive Neuroscience*, **24**, 1031-1054..
515. From retinal waves to activity-dependent retinogeniculate map development. (with J. Markowitz and Y. Cao). *PLoS ONE*, 2012, <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0031553>..
516. Persistence and storage of activity patterns in spiking recurrent cortical networks: Modulation of sigmoid signals by after-hyperpolarization currents and acetylcholine. (with J. Palma and M. Versace). *Frontiers in Computational Neuroscience*, 2012 6:42. Doi: 10.3389/fncom.2012.00042.
517. A neural architecture for lookahead planning: Mentally simulating, segmenting, and storing the shortest path around obstacles to a goal. (with R. Ivey and D. Bullock). Submitted, 2011.
518. Real-time learning of predictive recognition categories that chunk sequences of items stored in working memory. (with S. Kazerounian). Submitted, 2012.
519. A bio-inspired kinematic controller for obstacle avoidance during reaching tasks with real robots. (with N. Srinivasa, R. Bhattacharyya, R. Sundareswara, and C. Lee). *Neural Networks*, 2012, **35**, 54-69.
520. Adaptive Resonance Theory: How a brain learns to consciously attend, learn, and recognize a changing world. *Neural Networks*, 2012, **37**, 1-47.
521. Neural Dynamics of Autistic Behaviors: Learning, Recognition, Attention, Emotion, Timing, and Social Cognition. In *The Comprehensive Guide to Autism*. V. B. Patel, V. R. Preedy, and C. R. Martin, Eds. London: Springer, 2012.

522. Neural dynamics of Gestalt principles of perceptual organization: From grouping to shape and meaning. (with B. Pinna). *Gestalt Theory*, 2012, **34**, 399-482.
523. Neural dynamics of saccadic and smooth pursuit eye movement coordination during visual tracking of unpredictably moving targets. (with K. Srihasam and D. Bullock). *Neural Networks*, 2012, **27**, 1-20.
524. Adaptive resonance theory. *Scholarpedia*, 2013, http://www.scholarpedia.org/article/Adaptive_resonance_theory
525. Recurrent neural networks, *Scholarpedia*, 2013, http://www.scholarpedia.org/article/Recurrent_neural_networks
526. Spiking neurons in a hierarchical self-organizing map model can learn to develop spatial and temporal properties of entorhinal grid cells and hippocampal place cells. (with P. Pilly) *PLOS ONE*, 2013, <http://dx.plos.org/10.1371/journal.pone.0060599>
527. How reduction of theta rhythm by medial septum inactivation may covary with disruption of entorhinal grid cell responses due to reduced cholinergic transmission. (with P. Pilly) *Frontiers in Neural Circuits*, 2013, doi: 10.3389/fncir.2013.00173
528. Coordinated learning of grid cell and place cell spatial and temporal properties: Multiple scales, attention, and oscillations. (with P. Pilly). *Philosophical Transactions of the Royal Society*, 2014, doi: 10.1098/rstb.2012.0524.
529. Where's Waldo? How perceptual, cognitive, and emotional brain processes cooperate during learning to categorize and find desired objects in a cluttered scene. (with H.-C. Chang and Y. Cao), *Frontiers in Integrative Neuroscience*, 2014, doi: 10.3389/fnint.2014.0043.
530. How the Venetian blind effect emerges from the laminar cortical dynamics of 3D vision. (with Y. Cao). *Frontiers in Psychology-Perception Science*, 2014, doi: 10.3389/fpsyg.2014.00694.
531. Binocular fusion and invariant category learning due to predictive remapping during scanning of a depthful scene with eye movements. (with K. Srinivasan and A. Yazdanbakhsh). *Frontiers in Psychology: Perceptual Science*, 2014, doi: 10.3389/fpsyg.2014.01457
532. How does the modular organization of entorhinal grid cells develop? (with P. K. Pilly), *Frontiers in Human Neuroscience*, 2014, doi:10.3389/fnhum.2014.0037.
533. How visual illusions illuminate complementary brain processes: Illusory depth from brightness and apparent motion of illusory contours, *Frontiers in Human Neuroscience*, 2014, doi: 10.3389/fnhum.2014.00854.

534. Real-time learning of predictive recognition categories that chunk sequences of items stored in working memory (with S. Kazerounian), *Frontiers in Psychology-Language Sciences*, 2014, doi: 10.3389/fpsyg.2014.01053.
535. From brain synapses to systems for learning and memory: Object recognition, spatial navigation, timed conditioning, and movement control. *Brain Research*, doi: 10.1016/j.brainres.2014.11.018.
536. Adaptive resonance theory (with G. A. Carpenter), *Encyclopedia of Machine Learning and Data Mining*. C. Sammut and G. Webb, Eds. Berlin: Springer-Verlag, in press.
537. Grossberg, S. (2016). Cortical dynamics of figure-ground separation in response to 2D pictures and 3D scenes: How V2 combines border ownership, stereoscopic cues, and Gestalt grouping rules. *Frontiers in Psychology: Perception Science*. 26 January 2016 <http://journal.frontiersin.org/article/10.3389/fpsyg.2015.02054/full>
538. Grossberg, S., Palma, J., and Versace, M. (2016). Resonant cholinergic dynamics in cognitive and motor decision-making: Attention, category learning, and choice in neocortex, superior colliculus, and optic tectum. *Frontiers in Neuroscience: Decision Neuroscience*, <http://journal.frontiersin.org/article/10.3389/fnins.2015.00501/full>
539. Grossberg, S. (2016). Neural dynamics of the basal ganglia during perceptual, cognitive, and motor learning and gating. In *The basal ganglia: Novel perspectives on motor and cognitive functions*. J.-J. Soghomonian (Ed.). Berlin: Springer, pp. 457-512.
540. Grossberg, S. (2016). Realizing the Now-or-Never Bottleneck and Chunk-and-Pass Processing with Item-Order-Rank working memories and masking field chunking networks. Commentary on *The Now-or-Never Bottleneck: A fundamental constraint on language* by H. Christiansen and N. Chater. *Behavioral and Brain Sciences*, in press.
541. Grossberg, S. (2015). Towards autonomous intelligence: From active 3D vision to invariant object and scene learning, recognition, and search. In *Advances in Cognitive Neurodynamics (V)*. R. Wang and X. Pan (Eds.), Berlin: Springer, pp. 17-25.
542. Grossberg, S., and Kazerounian, S. (2016). Phoneme restoration and empirical coverage of Interactive Activation and Adaptive Resonance models of human speech processing, *Journal of the Acoustical Society of America*, **140**, 1130-1153..
543. Grossberg, S. (2015). John Taylor. In *Oxford Dictionary of National Biography*. D. Cannadine (Ed.). Oxford, UK: Oxford University Press.
544. Dresch-Langley, B., and Grossberg, S. (2016). Neural computation of surface border ownership and relative surface depth from ambiguous contrast inputs. *Frontiers in Psychology*. 28 July 2016. <http://journal.frontiersin.org/article/10.3389/fpsyg.2016.01102/full>

545. Grossberg, S. (2016). Cortical dynamics of figure-ground separation in response to 2D pictures and 3D scenes: How V2 combines border ownership, stereoscopic cues, and gestalt grouping rules. *Frontiers in Psychology*, 26, January 2016. <http://journal.frontiersin.org/article/10.3389/fpsyg.2015.02054/full>
546. Grossberg, S. (2016). Coordinated learning of entorhinal grid cells and hippocampal place cells: Space, time, attention, and oscillations. In K. Al-Begain and A. Bargiela (Eds.). *Seminal contributions to modeling*, Berlin: Springer, doi: 10.1007/978-3-319-33786-9_3.
547. Grossberg, S. (2017). Towards solving the Hard Problem of Consciousness: The varieties of brain resonances and the conscious experiences that they support. *Neural Networks*, 87, 38-95. <http://www.sciencedirect.com/science/article/pii/S0893608016301800>
548. Grossberg, S. (2017). Grandmother cohorts: Multiple-scale brain compression dynamics during learning of object and sequence categories. In the special issue on "Cognitive and neurophysiological evidence for and against localist 'grandmother cell' representations", J. M. Bowers (Ed.). *Language, Cognition, and Neuroscience*, 32, 295-315.
549. Franklin, D. J., and Grossberg, S. (2017). A neural model of normal and abnormal learning and memory consolidation: Adaptively timed conditioning, hippocampus, amnesia, neurotrophins, and consciousness. *Cognitive, Affective, and Behavioral Neuroscience*, 17, 24-76. <http://link.springer.com/article/10.3758/s13415-016-0463-y>
550. Grossberg, S., and Zajak, L. (2017). How humans see paintings and paintings illuminate how humans see. *Art & Perception*, 5, 1-95.
551. Grossberg, S. (2017). The visual world as illusion: The ones we know and the ones we don't. In *Oxford Compendium of Visual Illusions*. A. Shapiro and D. Todorovic, Eds. Oxford, United Kingdom: Oxford University press, Chapter 7, pp. 90-118.
552. Grossberg, S. (2017). Acetylcholine neuromodulation in normal and abnormal learning and memory: Vigilance control in waking, sleep, autism, amnesia, and Alzheimer's disease. *Frontiers in Neural Circuits*, November 2, 2017, <https://doi.org/10.3389/fncir.2017.00082>
553. Grossberg, S. (2018). Desirability, availability, credit assignment, category learning, and attention in the amygdala and orbitofrontal, ventrolateral, and dorsolateral prefrontal cortices: Explaining prefrontal functions using cognitive-emotional and working memory dynamics. Special Collection on the Prefrontal Cortex. P. Rudebeck, C. Gillan, and E. Murray (Eds.), *Brain and Neuroscience Advances*, May 8, 2018. <http://journals.sagepub.com/doi/full/10.1177/2398212818772179>
554. Grossberg, S. (2018). A half century of progress towards a unified neural theory of mind and brain with applications to autonomous adaptive agents and mental disorders. In R. Kozma, C. Alippi, Y. Choe, and F. C. Morabito (Eds.). *Artificial Intelligence in the Age of Neural Networks and Brain Computing*. Cambridge, MA: Academic Press, in press.

555. Grossberg, S., and Kishnan, D. (2018). Neural dynamics of autistic behaviors and Fragile X syndrome: Basal ganglia movement gating and mGluR-modulated adaptively-timed learning. *Frontiers in Psychology, Psychopathology*.
<https://doi.org/10.3389/fpsyg.2018.00269>.
556. Cao, Y., and Grossberg, S. (2018). A laminar cortical model for 3D boundary and surface representations of complex natural scenes. In *From Parallel to Emergent Computing*. A. Adamatzky, S. Akl, and G. Sirakoulis (Eds.). Taylor & Francis/CRC.
557. Grossberg, S. (2019). The resonant brain: How attentive conscious seeing regulates action sequences that interact with attentive cognitive learning, recognition, and prediction. *Attention, Perception, & Psychophysics*, Published online: June 19, 2019.
<https://link.springer.com/article/10.3758/s13414-019-01789-2>
558. Grossberg, S. (2019). The embodied brain of SOVEREIGN2: From space-variant conscious percepts during visual search and navigation to learning invariant object categories and cognitive-emotional plans for acquiring valued goals. *Frontiers in Computational Neuroscience*. Published online: June 25, 2019.
<https://www.frontiersin.org/articles/10.3389/fncom.2019.00036/full>
559. Grossberg, S. (2019). How we see art and how artists make it. In the multimedia book *Mobile Brain-Body Imaging and the Neuroscience of Art, Innovation, and Creativity*. J. L. Contreras-Vidal, D. Robleto, J. G. Cruz-Garza, J. M. Azorin, and C. S. Nam (Eds.). Cham, Switzerland: Springer Nature Switzerland AG.
560. Grossberg, S. (2020). A path towards Explainable AI and autonomous adaptive intelligence: Deep Learning, Adaptive Resonance, and models of perception, emotion, and action. *Frontiers in Neurobotics*, June 25, 2020.
<https://www.frontiersin.org/articles/10.3389/fnbot.2020.00036/full>
561. Grossberg, S. (2020). Developmental designs and adult functions of cortical maps in multiple modalities: Perception, attention, navigation, numbers, streaming, speech, and cognition. *Frontiers in Neuroinformatics*, February 6, 2020.
<https://www.frontiersin.org/articles/10.3389/fninf.2020.00004/full>
562. Grossberg, S. (2020). A unified theory of conscious seeing, hearing, feeling, and knowing. *Cognitive Neuroscience*, DOI: 10.1080/17588928.2020.1839401
https://sites.bu.edu/steveg/files/2021/01/grossberg_in_press_cogn_neurosci-final-1-721.pdf
563. Grossberg, S. (2021). Attention: Multiple types, brain resonances, psychological functions, and conscious states. *Journal of Integrative Neuroscience*,
<https://jin.imrpress.com/article/2021/1757-448X/JIN2020406.shtml>

564. Grossberg, S. (2021). A canonical laminar neocortical circuit whose bottom-up, horizontal, and top-down pathways control attention, learning, and prediction. *Frontiers in Systems Neuroscience*. Published online: 23 April 2021.
<https://www.frontiersin.org/articles/10.3389/fnsys.2021.650263/full>
565. Grossberg, S. (2021). A neural model of intrinsic and extrinsic hippocampal theta rhythms: Anatomy, neurophysiology, and function. *Frontiers in Systems Neuroscience*. Published online: 28 April 2021.
<https://www.frontiersin.org/articles/10.3389/fnsys.2021.665052/full>
566. Grossberg, S. (2021). Toward autonomous adaptive intelligence: Building upon neural models of how brains make minds. Invited article in 50th Anniversary Special Issue of *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 51, 51-75.
https://sites.bu.edu/steveg/files/2021/01/tsmc-grossberg-3041476_4.pdf