Wulfram Gerstner

List of Publications by Year
in descending order

129
papers

18,434
citations

26567
56
h-index

22102
113
g-index

150
all docs

150
docs citations

150
times ranked

9459
citing authors

#	Article	IF	Citations
1	Brain signals of a Surprise-Actor-Critic model: Evidence for multiple learning modules in human decision making. NeuroImage, 2022, 246, 118780.	2.1	4
2	Learning in Volatile Environments With the Bayes Factor Surprise. Neural Computation, 2021, 33, 269-340.	1.3	17
3	Novelty is not surprise: Human exploratory and adaptive behavior in sequential decision-making. PLoS Computational Biology, 2021, 17, e1009070.	1.5	18
4	A functional model of adult dentate gyrus neurogenesis. ELife, 2021, 10, .	2.8	6
5	Rapid suppression and sustained activation of distinct cortical regions for a delayed sensory-triggered motor response. Neuron, 2021, 109, 2183-2201.e9.	3.8	46
6	When shared concept cells support associations: Theory of overlapping memory engrams. PLoS Computational Biology, 2021, 17, e1009691.	1.5	16
7	On the choice of metric in gradient-based theories of brain function. PLoS Computational Biology, 2020, 16, e1007640.	1.5	7
8	Mesoscopic population equations for spiking neural networks with synaptic short-term plasticity. Journal of Mathematical Neuroscience, 2020, 10, 5.	2.4	21
9	Dendritic Voltage Recordings Explain Paradoxical Synaptic Plasticity: A Modeling Study. Frontiers in Synaptic Neuroscience, 2020, 12, 585539.	1.3	7
10	Biologically plausible deep learning â€" But how far can we go with shallow networks?. Neural Networks, 2019, 118, 90-101.	3.3	71
11	How single neuron properties shape chaotic dynamics and signal transmission in random neural networks. PLoS Computational Biology, 2019, 15, e1007122.	1.5	29
12	Stability of working memory in continuous attractor networks under the control of short-term plasticity. PLoS Computational Biology, 2019, 15, e1006928.	1.5	57
13	Optimal Stimulation Protocol in a Bistable Synaptic Consolidation Model. Frontiers in Computational Neuroscience, 2019, 13, 78.	1.2	5
14	One-shot learning and behavioral eligibility traces in sequential decision making. ELife, 2019, 8, .	2.8	16
15	Multicontact Co-operativity in Spike-Timingâ€"Dependent Structural Plasticity Stabilizes Networks. Cerebral Cortex, 2018, 28, 1396-1415.	1.6	21
16	Balancing New against Old Information: The Role of Puzzlement Surprise in Learning. Neural Computation, 2018, 30, 34-83.	1.3	56
17	Multi-Timescale Memory Dynamics Extend Task Repertoire in a Reinforcement Learning Network With Attention-Gated Memory. Frontiers in Computational Neuroscience, 2018, 12, 50.	1.2	3
18	Eligibility Traces and Plasticity on Behavioral Time Scales: Experimental Support of NeoHebbian Three-Factor Learning Rules. Frontiers in Neural Circuits, 2018, 12, 53.	1.4	174

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19	Excitable neuronal assemblies with adaptation as a building block of brain circuits for velocity-controlled signal propagation. PLoS Computational Biology, 2018, 14, e1006216.	1.5	12
20	Hebbian plasticity requires compensatory processes on multiple timescales. Philosophical Transactions of the Royal Society B: Biological Sciences, 2017, 372, 20160259.	1.8	151
21	The temporal paradox of Hebbian learning and homeostatic plasticity. Current Opinion in Neurobiology, 2017, 43, 166-176.	2.0	138
22	Exponentially Long Orbits in Hopfield Neural Networks. Neural Computation, 2017, 29, 458-484.	1.3	3
23	Cortical Dynamics in Presence of Assemblies of Densely Connected Weight-Hub Neurons. Frontiers in Computational Neuroscience, 2017, 11, 52.	1.2	22
24	Towards a theory of cortical columns: From spiking neurons to interacting neural populations of finite size. PLoS Computational Biology, 2017, 13, e1005507.	1.5	112
25	Predicting non-linear dynamics by stable local learning in a recurrent spiking neural network. ELife, 2017, 6, .	2.8	58
26	A Model of Synaptic Reconsolidation. Frontiers in Neuroscience, 2016, 10, 206.	1.4	9
27	Enhanced Sensitivity to Rapid Input Fluctuations by Nonlinear Threshold Dynamics in Neocortical Pyramidal Neurons. PLoS Computational Biology, 2016, 12, e1004761.	1.5	32
28	Does computational neuroscience need new synaptic learning paradigms?. Current Opinion in Behavioral Sciences, 2016, 11, 61-66.	2.0	28
29	Nonlinear Hebbian Learning as a Unifying Principle in Receptive Field Formation. PLoS Computational Biology, 2016, 12, e1005070.	1.5	46
30	Automated High-Throughput Characterization of Single Neurons by Means of Simplified Spiking Models. PLoS Computational Biology, 2015, 11, e1004275.	1.5	68
31	Synaptic Consolidation: From Synapses to Behavioral Modeling. Journal of Neuroscience, 2015, 35, 1319-1334.	1.7	42
32	Diverse synaptic plasticity mechanisms orchestrated to form and retrieve memories in spiking neural networks. Nature Communications, 2015, 6, 6922.	5.8	268
33	Neuromodulated Spike-Timing-Dependent Plasticity, and Theory of Three-Factor Learning Rules. Frontiers in Neural Circuits, 2015, 9, 85.	1.4	233
34	Stochastic variational learning in recurrent spiking networks. Frontiers in Computational Neuroscience, 2014, 8, 38.	1.2	56
35	Spike-timing prediction in cortical neurons with active dendrites. Frontiers in Computational Neuroscience, 2014, 8, 90.	1.2	30
36	Limits to high-speed simulations of spiking neural networks using general-purpose computers. Frontiers in Neuroinformatics, 2014, 8, 76.	1.3	55

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37	Fluctuations and information filtering in coupled populations of spiking neurons with adaptation. Physical Review E, 2014, 90, 062704.	0.8	32
38	Connection-type-specific biases make uniform random network models consistent with cortical recordings. Journal of Neurophysiology, 2014, 112, 1801-1814.	0.9	12
39	Optimal Control of Transient Dynamics in Balanced Networks Supports Generation of Complex Movements. Neuron, 2014, 82, 1394-1406.	3.8	259
40	Temporal whitening by power-law adaptation in neocortical neurons. Nature Neuroscience, 2013, 16, 942-948.	7.1	164
41	Synaptic Plasticity in Neural Networks Needs Homeostasis with a Fast Rate Detector. PLoS Computational Biology, 2013, 9, e1003330.	1.5	144
42	Reinforcement Learning Using a Continuous Time Actor-Critic Framework with Spiking Neurons. PLoS Computational Biology, 2013, 9, e1003024.	1.5	121
43	Inference of neuronal network spike dynamics and topology from calcium imaging data. Frontiers in Neural Circuits, 2013, 7, 201.	1.4	82
44	The Silent Period of Evidence Integration in Fast Decision Making. PLoS ONE, 2013, 8, e46525.	1.1	9
45	Reward-based learning under hardware constraintsâ€"using a RISC processor embedded in a neuromorphic substrate. Frontiers in Neuroscience, 2013, 7, 160.	1.4	27
46	Changing the responses of cortical neurons from sub- to suprathreshold using single spikes in vivo. ELife, 2013, 2, e00012.	2.8	26
47	Paradoxical Evidence Integration in Rapid Decision Processes. PLoS Computational Biology, 2012, 8, e1002382.	1.5	17
48	Coding and Decoding with Adapting Neurons: A Population Approach to the Peri-Stimulus Time Histogram. PLoS Computational Biology, 2012, 8, e1002711.	1.5	42
49	The Performance (and Limits) of Simple Neuron Models: Generalizations of the Leaky Integrate-and-Fire Model. , 2012, , 163-192.		7
50	Microcircuits of excitatory and inhibitory neurons in layer 2/3 of mouse barrel cortex. Journal of Neurophysiology, 2012, 107, 3116-3134.	0.9	207
51	Parameter extraction and classification of three cortical neuron types reveals two distinct adaptation mechanisms. Journal of Neurophysiology, 2012, 107, 1756-1775.	0.9	91
52	Theory and Simulation in Neuroscience. Science, 2012, 338, 60-65.	6.0	141
53	Perceptual learning, roving and the unsupervised bias. Vision Research, 2012, 61, 95-99.	0.7	28
54	Improved Similarity Measures for Small Sets of Spike Trains. Neural Computation, 2011, 23, 3016-3069.	1.3	37

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55	A history of spike-timing-dependent plasticity. Frontiers in Synaptic Neuroscience, 2011, 3, 4.	1.3	311
56	Extraction of Network Topology From Multi-Electrode Recordings: Is there a Small-World Effect?. Frontiers in Computational Neuroscience, 2011, 5, 4.	1.2	93
57	Synaptic tagging and capture: a bridge from molecular to behaviour. BMC Neuroscience, 2011, 12, .	0.8	0
58	Connectivity reflects coding: a model of voltage-based STDP with homeostasis. Nature Neuroscience, 2010, 13, 344-352.	7.1	517
59	STDP in Adaptive Neurons Gives Close-To-Optimal Information Transmission. Frontiers in Computational Neuroscience, 2010, 4, 143.	1.2	23
60	Voltage and spike timing interact in STDP - a unified model. Frontiers in Synaptic Neuroscience, 2010, 2, 25.	1.3	72
61	From Hebb Rules to Spike-Timing-Dependent Plasticity: A Personal Account. Frontiers in Synaptic Neuroscience, 2010, 2, 151.	1.3	7
62	Functional Requirements for Reward-Modulated Spike-Timing-Dependent Plasticity. Journal of Neuroscience, 2010, 30, 13326-13337.	1.7	121
63	Spike-Based Reinforcement Learning in Continuous State and Action Space: When Policy Gradient Methods Fail. PLoS Computational Biology, 2009, 5, e1000586.	1.5	82
64	How Good Are Neuron Models?. Science, 2009, 326, 379-380.	6.0	220
65	Stress, genotype and norepinephrine in the prediction of mouse behavior using reinforcement learning. Nature Neuroscience, 2009, 12, 1180-1186.	7.1	68
66	Is there a geometric module for spatial orientation? Insights from a rodent navigation model.. Psychological Review, 2009, 116, 540-566.	2.7	100
67	Phenomenological models of synaptic plasticity based on spike timing. Biological Cybernetics, 2008, 98, 459-478.	0.6	455
68	Extracting non-linear integrate-and-fire models from experimental data using dynamic Iâ€“V curves. Biological Cybernetics, 2008, 99, 361-370.	0.6	65
69	The quantitative single-neuron modeling competition. Biological Cybernetics, 2008, 99, 417-426.	0.6	103
70	Firing patterns in the adaptive exponential integrate-and-fire model. Biological Cybernetics, 2008, 99, 335-347.	0.6	250
71	Special issue on quantitative neuron modeling. Biological Cybernetics, 2008, 99, 237-239.	0.6	12
72	A benchmark test for a quantitative assessment of simple neuron models. Journal of Neuroscience Methods, 2008, 169, 417-424.	1.3	121

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73	Dynamic<i>I-V</i>Curves Are Reliable Predictors of Naturalistic Pyramidal-Neuron Voltage Traces. Journal of Neurophysiology, 2008, 99, 656-666.	0.9	183
74	Tag-Trigger-Consolidation: A Model of Early and Late Long-Term-Potentiation and Depression. PLoS Computational Biology, 2008, 4, e1000248.	1.5	110
75	Gamma Oscillations in a Nonlinear Regime: A Minimal Model Approach Using Heterogeneous Integrate-and-Fire Networks. Neural Computation, 2008, 20, 2973-3002.	1.3	25
76	Spike-triggered averages for passive and resonant neurons receiving filtered excitatory and inhibitory synaptic drive. Physical Review E, 2008, 78, 011914.	0.8	15
77	Modeling spatial and temporal aspects of visual backward masking.. Psychological Review, 2008, 115, 83-100.	2.7	38
78	Optimality Model of Unsupervised Spike-Timing-Dependent Plasticity: Synaptic Memory and Weight Distribution. Neural Computation, 2007, 19, 639-671.	1.3	41
79	Predicting neuronal activity with simple models of the threshold type: Adaptive Exponential Integrate-and-Fire model with two compartments. Neurocomputing, 2007, 70, 1668-1673.	3.5	53
80	Optimal Spike-Timing-Dependent Plasticity for Precise Action Potential Firing in Supervised Learning. Neural Computation, 2006, 18, 1318-1348.	1.3	208
81	Predicting spike timing of neocortical pyramidal neurons by simple threshold models. Journal of Computational Neuroscience, 2006, 21, 35-49.	0.6	246
82	Dependence of the spike-triggered average voltage on membrane response properties. Neurocomputing, 2006, 69, 1062-1065.	3.5	15
83	Adaptive sensory processing for efficient place coding. Neurocomputing, 2006, 69, 1211-1214.	3.5	0
84	From spiking neurons to rate models: A cascade model as an approximation to spiking neuron models with refractoriness. Physical Review E, 2006, 73, 051908.	0.8	21
85	Triplets of Spikes in a Model of Spike Timing-Dependent Plasticity. Journal of Neuroscience, 2006, 26, 9673-9682.	1.7	515
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87	Noise-enhanced computation in a model of a cortical column. NeuroReport, 2005, 16, 1237-1240.	0.6	4
88	Robust self-localisation and navigation based on hippocampal place cells. Neural Networks, 2005, 18, 1125-1140.	3.3	66
89	A Computational Model of Parallel Navigation Systems in Rodents. Neuroinformatics, 2005, 3, 223-242.	1.5	44
90	Short-Term Synaptic Plasticity Orchestrates the Response of Pyramidal Cells and Interneurons to Population Bursts. Journal of Computational Neuroscience, 2005, 18, 323-331.	0.6	25

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91	Generalized Bienenstock-Cooper-Munro rule for spiking neurons that maximizes information transmission. Proceedings of the National Academy of Sciences of the United States of America, 2005, 102, 5239-5244.	3.3	97
92	Competition between cue response and place response: a model of rat navigation behaviour. Connection Science, 2005, 17, 167-183.	1.8	5
93	Adaptive Exponential Integrate-and-Fire Model as an Effective Description of Neuronal Activity. Journal of Neurophysiology, 2005, 94, 3637-3642.	0.9	960
94	Synaptic Shot Noise and Conductance Fluctuations Affect the Membrane Voltage with Equal Significance. Neural Computation, 2005, 17, 923-947.	1.3	94
95	Generalized Integrate-and-Fire Models of Neuronal Activity Approximate Spike Trains of a Detailed Model to a High Degree of Accuracy. Journal of Neurophysiology, 2004, 92, 959-976.	0.9	233
96	Predicting spike times of a detailed conductance-based neuron model driven by stochastic spike arrival. Journal of Physiology (Paris), 2004, 98, 442-451.	2.1	13
97	Noninvasive Brain-Actuated Control of a Mobile Robot by Human EEG. IEEE Transactions on Biomedical Engineering, 2004, 51, 1026-1033.	2.5	562
98	Cognitive Navigation Based on Nonuniform Gabor Space Sampling, Unsupervised Growing Networks, and Reinforcement Learning. IEEE Transactions on Neural Networks, 2004, 15, 639-652.	4.8	78
99	Coding and learning of behavioral sequences. Trends in Neurosciences, 2004, 27, 11-14.	4.2	55
100	Optimal Hebbian Learning: A Probabilistic Point of View. Lecture Notes in Computer Science, 2003, , 92-98.	1.0	11
101	Stable Propagation of Activity Pulses in Populations of Spiking Neurons. Neural Computation, 2002, 14, 987-997.	1.3	56
102	Mathematical formulations of Hebbian learning. Biological Cybernetics, 2002, 87, 404-415.	0.6	289
103	Noise and the PSTH response to current transients: II. Integrate-and-fire model with slow recovery and application to motoneuron data. Journal of Computational Neuroscience, 2002, 12, 83-95.	0.6	16
104	Intrinsic Stabilization of Output Rates by Spike-Based Hebbian Learning. Neural Computation, 2001, 13, 2709-2741.	1.3	147
105	Coding properties of spiking neurons: reverse and cross-correlations. Neural Networks, 2001, 14, 599-610.	3.3	27
106	Noise and the PSTH response to current transients: I. General theory and application to the integrate-and-fire neuron. Journal of Computational Neuroscience, 2001, 11, 135-151.	0.6	35
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108	Spatial cognition and neuro-mimetic navigation: a model of hippocampal place cell activity. Biological Cybernetics, 2000, 83, 287-299.	0.6	240

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110	Population Dynamics of Spiking Neurons: Fast Transients, Asynchronous States, and Locking. Neural Computation, 2000, 12, 43-89.	1.3	372
111	Hebbian learning and spiking neurons. Physical Review E, 1999, 59, 4498-4514.	0.8	526
112	How the threshold of a neuron determines its capacity for coincidence detection. BioSystems, 1998, 48, 105-112.	0.9	29
113	Extracting Oscillations: Neuronal Coincidence Detection with Noisy Periodic Spike Input. Neural Computation, 1998, 10, 1987-2017.	1.3	92
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115	Learning navigational maps through potentiation and modulation of hippocampal place cells. , 1997, 4, 79-94.		100
116	What Matters in Neuronal Locking?. Neural Computation, 1996, 8, 1653-1676.	1.3	224
117	Vertical signal flow and oscillations in a three-layer model of the cortex. Journal of Computational Neuroscience, 1996, 3, 125-136.	0.6	4
118	A neuronal learning rule for sub-millisecond temporal coding. Nature, 1996, 383, 76-78.	13.7	1,038
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121	Time structure of the activity in neural network models. Physical Review E, 1995, 51, 738-758.	0.8	411
122	Emergence of spatiotemporal receptive fields and its application to motion detection. Biological Cybernetics, 1994, 72, 81-92.	0.6	12
123	A biologically motivated and analytically soluble model of collective oscillations in the cortex. Biological Cybernetics, 1994, 71, 349-358.	0.6	4
124	Why spikes? Hebbian learning and retrieval of time-resolved excitation patterns. Biological Cybernetics, 1993, 69, 503-515.	0.6	225
125	A biologically motivated and analytically soluble model of collective oscillations in the cortex. Biological Cybernetics, 1993, 68, 363-374.	0.6	116
126	Coherence and incoherence in a globally coupled ensemble of pulse-emitting units. Physical Review Letters, 1993, 71, 312-315.	2.9	107

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127	Associative memory in a network of â€˜spikingâ€™ neurons. Network: Computation in Neural Systems, 1992, 3, 139-164.	2.2	143
128	Universality in neural networks: the importance of the â€˜mean firing rateâ€™. Biological Cybernetics, 1992, 67, 195-205.	0.6	50
129	Associative memory in a network of â€˜spikingâ€™ neurons. , 0, .		102