

Riccardo Zecchina

List of Publications by Year in descending order

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130
papers

10,292
citations

50276

46
h-index

36028

97
g-index

134
all docs

134
docs citations

134
times ranked

6638
citing authors

#	ARTICLE	IF	CITATIONS
1	Direct-coupling analysis of residue coevolution captures native contacts across many protein families. Proceedings of the National Academy of Sciences of the United States of America, 2011, 108, E1293-301.	7.1	1,231
2	Protein 3D Structure Computed from Evolutionary Sequence Variation. PLoS ONE, 2011, 6, e28766.	2.5	975
3	Analytic and Algorithmic Solution of Random Satisfiability Problems. Science, 2002, 297, 812-815.	12.6	848
4	Determining computational complexity from characteristic "phase transitions". Nature, 1999, 400, 133-137.	27.8	617
5	RandomK-satisfiability problem: From an analytic solution to an efficient algorithm. Physical Review E, 2002, 66, 056126.	2.1	344
6	Integrated transcriptional and competitive endogenous RNA networks are cross-regulated in permissive molecular environments. Proceedings of the National Academy of Sciences of the United States of America, 2013, 110, 7154-7159.	7.1	303
7	Survey propagation: An algorithm for satisfiability. Random Structures and Algorithms, 2005, 27, 201-226.	1.1	294
8	Statistical Mechanics of Systems with Heterogeneous Agents: Minority Games. Physical Review Letters, 2000, 84, 1824-1827.	7.8	208
9	Statistical mechanics of the randomK-satisfiability model. Physical Review E, 1997, 56, 1357-1370.	2.1	197
10	Two Solutions to Diluted p-Spin Models and XORSAT Problems. Journal of Statistical Physics, 2003, 111, 505-533.	1.2	192
11	Ferromagnetic ordering in graphs with arbitrary degree distribution. European Physical Journal B, 2002, 28, 191-197.	1.5	189
12	Inverse statistical problems: from the inverse Ising problem to data science. Advances in Physics, 2017, 66, 197-261.	14.4	179
13	Coloring Random Graphs. Physical Review Letters, 2002, 89, 268701.	7.8	166
14	Threshold values of randomK-SAT from the cavity method. Random Structures and Algorithms, 2006, 28, 340-373.	1.1	165
15	Entropy of theK-Satisfiability Problem. Physical Review Letters, 1996, 76, 3881-3885.	7.8	159
16	Genome-wide analysis identifies a functional association of Tet1 and Polycomb repressive complex 2 in mouse embryonic stem cells. Genome Biology, 2013, 14, R91.	9.6	149
17	Bayesian Inference of Epidemics on Networks via Belief Propagation. Physical Review Letters, 2014, 112, 118701.	7.8	140
18	Clustering of Solutions in the Random Satisfiability Problem. Physical Review Letters, 2005, 94, 197205.	7.8	135

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19	Statistical mechanics methods and phase transitions in optimization problems. Theoretical Computer Science, 2001, 265, 3-67.	0.9	130
20	Perturbation Biology: Inferring Signaling Networks in Cellular Systems. PLoS Computational Biology, 2013, 9, e1003290.	3.2	128
21	Fast and Accurate Multivariate Gaussian Modeling of Protein Families: Predicting Residue Contacts and Protein-Interaction Partners. PLoS ONE, 2014, 9, e92721.	2.5	127
22	Optimizing Searches via Rare Events. Physical Review Letters, 2002, 88, 178701.	7.8	116
23	Simplest randomK-satisfiability problem. Physical Review E, 2001, 63, 026702.	2.1	114
24	Learning by Message Passing in Networks of Discrete Synapses. Physical Review Letters, 2006, 96, 030201.	7.8	114
25	Finding undetected protein associations in cell signaling by belief propagation. Proceedings of the National Academy of Sciences of the United States of America, 2011, 108, 882-887.	7.1	113
26	A ferromagnet with a glass transition. Europhysics Letters, 2001, 55, 465-471.	2.0	108
27	Simultaneous Reconstruction of Multiple Signaling Pathways via the Prize-Collecting Steiner Forest Problem. Journal of Computational Biology, 2013, 20, 124-136.	1.6	108
28	Modelling Competing Endogenous RNA Networks. PLoS ONE, 2013, 8, e66609.	2.5	108
29	Entropy-SGD: biasing gradient descent into wide valleys. Journal of Statistical Mechanics: Theory and Experiment, 2019, 2019, 124018.	2.3	100
30	Exact solution of a modified El Farol's bar problem: Efficiency and the role of market impact. Physica A: Statistical Mechanics and Its Applications, 2000, 280, 522-553.	2.6	97
31	Exact Solutions for Diluted Spin Glasses and Optimization Problems. Physical Review Letters, 2001, 87, 127209.	7.8	90
32	Efficient supervised learning in networks with binary synapses. Proceedings of the National Academy of Sciences of the United States of America, 2007, 104, 11079-11084.	7.1	90
33	Polynomial iterative algorithms for coloring and analyzing random graphs. Physical Review E, 2003, 68, 036702.	2.1	89
34	Unreasonable effectiveness of learning neural networks: From accessible states and robust ensembles to basic algorithmic schemes. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113, E7655-E7662.	7.1	84
35	Shape Similarity, Better than Semantic Membership, Accounts for the Structure of Visual Object Representations in a Population of Monkey Inferotemporal Neurons. PLoS Computational Biology, 2013, 9, e1003167.	3.2	80
36	Tricritical points in random combinatorics: the -SAT case. Journal of Physics A, 1998, 31, 9209-9217.	1.6	74

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37	Subdominant Dense Clusters Allow for Simple Learning and High Computational Performance in Neural Networks with Discrete Synapses. <i>Physical Review Letters</i> , 2015, 115, 128101.	7.8	68
38	Hiding Solutions in Random Satisfiability Problems: A Statistical Mechanics Approach. <i>Physical Review Letters</i> , 2002, 88, 188701.	7.8	65
39	Optimizing spread dynamics on graphs by message passing. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2013, 2013, P09011.	2.3	65
40	Weight Space Structure and Internal Representations: A Direct Approach to Learning and Generalization in Multilayer Neural Networks. <i>Physical Review Letters</i> , 1995, 75, 2432-2435.	7.8	62
41	2+p-SAT: Relation of typical-case complexity to the nature of the phase transition. <i>Random Structures and Algorithms</i> , 1999, 15, 414-435.	1.1	62
42	Entropy landscape and non-Gibbs solutions in constraint satisfaction problems. <i>Physical Review E</i> , 2008, 77, 031118.	2.1	62
43	Survey propagation as local equilibrium equations. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2004, 2004, P06007.	2.3	60
44	Are financial markets efficient? Phase transition in the aggregation of information. <i>Complexity</i> , 2002, 8, 20-23.	1.6	58
45	Combinatorial and topological approach to the 3D Ising model. <i>Journal of Physics A</i> , 2000, 33, 741-761.	1.6	51
46	Lossy Data Compression with Random Gates. <i>Physical Review Letters</i> , 2005, 95, 038701.	7.8	49
47	Pairs of SAT-assignments in random Boolean formulas. <i>Theoretical Computer Science</i> , 2008, 393, 260-279.	0.9	45
48	Phase coexistence and finite-size scaling in random combinatorial problems. <i>Journal of Physics A</i> , 2001, 34, 4615-4626.	1.6	42
49	Belief Propagation for Weighted b-Matchings on Arbitrary Graphs and its Relation to Linear Programs with Integer Solutions. <i>SIAM Journal on Discrete Mathematics</i> , 2011, 25, 989-1011.	0.8	40
50	RNAs competing for microRNAs mutually influence their fluctuations in a highly non-linear microRNA-dependent manner in single cells. <i>Genome Biology</i> , 2017, 18, 37.	8.8	40
51	Containing Epidemic Outbreaks by Message-Passing Techniques. <i>Physical Review X</i> , 2014, 4, .	8.9	39
52	Efficiency of quantum vs. classical annealing in nonconvex learning problems. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2018, 115, 1457-1462.	7.1	39
53	Statistical Mechanics of Steiner Trees. <i>Physical Review Letters</i> , 2008, 101, 037208.	7.8	38
54	Bridging the gaps in systems biology. <i>Molecular Genetics and Genomics</i> , 2014, 289, 727-734.	2.1	38

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55	Shaping the learning landscape in neural networks around wide flat minima. Proceedings of the National Academy of Sciences of the United States of America, 2020, 117, 161-170.	7.1	38
56	Survey-propagation decimation through distributed local computations. Journal of Statistical Mechanics: Theory and Experiment, 2005, 2005, P11016-P11016.	2.3	37
57	Large deviations of cascade processes on graphs. Physical Review E, 2013, 87, 062115.	2.1	37
58	Inference of sparse combinatorial-control networks from gene-expression data: a message passing approach. BMC Bioinformatics, 2010, 11, 355.	2.6	35
59	Local entropy as a measure for sampling solutions in constraint satisfaction problems. Journal of Statistical Mechanics: Theory and Experiment, 2016, 2016, 023301.	2.3	35
60	Properties of the Geometry of Solutions and Capacity of Multilayer Neural Networks with Rectified Linear Unit Activations. Physical Review Letters, 2019, 123, 170602.	7.8	31
61	Symmetry breaking in nonmonotonic neural networks. Journal of Physics A, 1993, 26, L507-L513.	1.6	30
62	Glassy dynamics near zero temperature. Physical Review E, 2000, 62, R7567-R7570.	2.1	29
63	The patient-zero problem with noisy observations. Journal of Statistical Mechanics: Theory and Experiment, 2014, 2014, P10016.	2.3	28
64	Aligning graphs and finding substructures by a cavity approach. Europhysics Letters, 2010, 89, 37009.	2.0	27
65	Time scale separation and heterogeneous off-equilibrium dynamics in spin models over random graphs. Physical Review E, 1999, 59, R1299-R1302.	2.1	25
66	Core Percolation and Onset of Complexity in Boolean Networks. Physical Review Letters, 2006, 96, 018101.	7.8	24
67	On the exactness of the cavity method for weighted b-matchings on arbitrary graphs and its relation to linear programs. Journal of Statistical Mechanics: Theory and Experiment, 2008, 2008, L06001.	2.3	24
68	Exact solution of the Ising model on group lattices of genus $g > 1$. Journal of Mathematical Physics, 1996, 37, 2796-2814.	1.1	23
69	Comment on "Thermal Model for Adaptive Competition in a Market". Physical Review Letters, 2000, 85, 5008-5008.	7.8	23
70	Stochastic Matching Problem. Physical Review Letters, 2011, 106, 190601.	7.8	23
71	Inference algorithms for gene networks: a statistical mechanics analysis. Journal of Statistical Mechanics: Theory and Experiment, 2008, 2008, P12001.	2.3	21
72	Title is missing!. International Journal of Modern Physics B, 2000, 14, 943.	2.0	21

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73	Minimizing energy below the glass thresholds. <i>Physical Review E</i> , 2004, 70, 036107.	2.1	19
74	Message-Passing Algorithms for Non-Linear Nodes and Data Compression. <i>Complexus</i> , 2006, 3, 58-65.	0.6	19
75	Learning to Coordinate in a Complex and Nonstationary World. <i>Physical Review Letters</i> , 2001, 87, 208701.	7.8	17
76	Inference and learning in sparse systems with multiple states. <i>Physical Review E</i> , 2011, 83, 056114.	2.1	17
77	A Three-Threshold Learning Rule Approaches the Maximal Capacity of Recurrent Neural Networks. <i>PLoS Computational Biology</i> , 2015, 11, e1004439.	3.2	16
78	Analytical and numerical study of internal representations in multilayer neural networks with binary weights. <i>Physical Review E</i> , 1996, 54, 717-736.	2.1	15
79	Statistical mechanics of asset markets with private information. <i>Quantitative Finance</i> , 2001, 1, 203-211.	1.7	15
80	Role of Synaptic Stochasticity in Training Low-Precision Neural Networks. <i>Physical Review Letters</i> , 2018, 120, 268103.	7.8	15
81	Encoding for the Blackwell Channel with Reinforced Belief Propagation. , 2007, , .		14
82	A rigorous analysis of the cavity equations for the minimum spanning tree. <i>Journal of Mathematical Physics</i> , 2008, 49, 125206.	1.1	14
83	Learning may need only a few bits of synaptic precision. <i>Physical Review E</i> , 2016, 93, 052313.	2.1	14
84	An externally modulated, noise-driven switch for the regulation of SPI1 in <i>Salmonella enterica</i> serovar Typhimurium. <i>Journal of Mathematical Biology</i> , 2011, 63, 637-662.	1.9	13
85	Unveiling the Structure of Wide Flat Minima in Neural Networks. <i>Physical Review Letters</i> , 2021, 127, 278301.	7.8	13
86	The computational core and fixed point organization in Boolean networks. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2006, 2006, P03002-P03002.	2.3	12
87	Performance of a cavity-method-based algorithm for the prize-collecting Steiner tree problem on graphs. <i>Physical Review E</i> , 2012, 86, 026706.	2.1	12
88	Complexity transitions in global algorithms for sparse linear systems over finite fields. <i>Journal of Physics A</i> , 2002, 35, 7559-7574.	1.6	11
89	Efficient LDPC codes over $GF(q)$ for lossy data compression. , 2009, , .		11
90	Stochastic optimization by message passing. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2011, 2011, P11009.	2.3	11

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91	Bicolouring random hypergraphs. <i>Journal of Physics A</i> , 2003, 36, 11037-11053.	1.6	10
92	Gene-network inference by message passing. <i>Journal of Physics: Conference Series</i> , 2008, 95, 012016.	0.4	10
93	Statistical physics approach to graphical games: local and global interactions. <i>European Physical Journal B</i> , 2011, 81, 327-339.	1.5	10
94	Response functions improving performance in analog attractor neural networks. <i>Physical Review E</i> , 1994, 49, R1823-R1826.	2.1	9
95	Sign problem in the Bethe approximation. <i>Physical Review B</i> , 2012, 86, .	3.2	9
96	Clustering of solutions in the symmetric binary perceptron. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2020, 2020, 073303.	2.3	9
97	ON THE GROUND STATE STRUCTURE OF P AND NP-COMPLETE RANDOM DECISION PROBLEMS. <i>Modern Physics Letters B</i> , 1999, 13, 1-12.	1.9	8
98	Clustering with shallow trees. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2009, 2009, P12010.	2.3	8
99	Survey and Belief Propagation on Random K-SAT. <i>Lecture Notes in Computer Science</i> , 2004, , 519-528.	1.3	8
100	Entropic gradient descent algorithms and wide flat minima*. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2021, 2021, 124015.	2.3	8
101	Learning through atypical phase transitions in overparameterized neural networks. <i>Physical Review E</i> , 2022, 106, .	2.1	8
102	Two-boson Hamiltonian for Shor's algorithm. <i>Physical Review A</i> , 1997, 55, 2594-2597.	2.5	7
103	Source coding by efficient selection of ground-state clusters. <i>Physical Review E</i> , 2005, 72, 015103.	2.1	7
104	Statistical mechanics of budget-constrained auctions. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2009, 2009, P07002.	2.3	7
105	Efficient data compression from statistical physics of codes over finite fields. <i>Physical Review E</i> , 2011, 84, 051111.	2.1	7
106	Simultaneous Reconstruction of Multiple Signaling Pathways via the Prize-Collecting Steiner Forest Problem. <i>Lecture Notes in Computer Science</i> , 2012, , 287-301.	1.3	7
107	Wide flat minima and optimal generalization in classifying high-dimensional Gaussian mixtures. <i>Journal of Statistical Mechanics: Theory and Experiment</i> , 2020, 2020, 124012.	2.3	7
108	Generalized fullerene-like lattices, and itinerant interacting electrons. <i>Physica A: Statistical Mechanics and Its Applications</i> , 1993, 199, 539-570.	2.6	6

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109	Statistical Mechanics of Combinatorial Auctions. Physical Review Letters, 2006, 97, 128701.	7.8	6
110	Geometry, topology, and physics of non-Abelian lattices. Rivista Del Nuovo Cimento, 1998, 21, 1-56.	5.7	5
111	A Prize-Collecting Steiner Tree Approach for Transduction Network Inference. Lecture Notes in Computer Science, 2009, , 83-95.	1.3	5
112	Theory and learning protocols for the material tempotron model. Journal of Statistical Mechanics: Theory and Experiment, 2013, 2013, P12013.	2.3	5
113	Superfluidity of the Bose-Hubbard model: su (1,1) linearization scheme. Physica A: Statistical Mechanics and Its Applications, 1996, 230, 300-312.	2.6	4
114	Counting over non-planar graphs. Physica A: Statistical Mechanics and Its Applications, 2001, 302, 100-109.	2.6	4
115	Sharing information to reconstruct patient-specific pathways in heterogeneous diseases. Pacific Symposium on Biocomputing Pacific Symposium on Biocomputing, 2014, , 39-50.	0.7	4
116	Weight Space Structure and Internal Representations: A Direct Approach to Learning and Generalization in Multilayer Neural Networks. Physical Review Letters, 1996, 76, 2205-2205.	7.8	3
117	Propagation of external regulation and asynchronous dynamics in random Boolean networks. Chaos, 2007, 17, 026109.	2.5	3
118	From inverse problems to learning: a Statistical Mechanics approach. Journal of Physics: Conference Series, 2018, 955, 012001.	0.4	3
119	Exact Probing of Glassy States by Survey Propagation. Progress of Theoretical Physics Supplement, 2005, 157, 330-337.	0.1	2
120	From statistical inference to a differential learning rule for stochastic neural networks. Interface Focus, 2018, 8, 20180033.	3.0	2
121	Native state of natural proteins optimizes local entropy. Physical Review E, 2021, 104, 064117.	2.1	2
122	Deep learning via message passing algorithms based on belief propagation. Machine Learning: Science and Technology, 2022, 3, 035005.	5.0	2
123	FROM STATISTICAL PHYSICS METHODS TO ALGORITHMS. International Journal of Modern Physics B, 2006, 20, 2814-2823.	2.0	1
124	Message passing for quantified Boolean formulas. Journal of Statistical Mechanics: Theory and Experiment, 2012, 2012, P05025.	2.3	1
125	Cavity approach to sphere packing in Hamming space. Physical Review E, 2012, 85, 021106.	2.1	1
126	Word Problem and Decimation Procedure in the Ising Model on Infinite Hyperbolic Group Lattices. International Journal of Modern Physics B, 1997, 11, 2803-2831.	2.0	0

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127	Ising Model over Cayley Lattices with Local 2D Geometry. Modern Physics Letters B, 1997, 11, 259-268.	1.9	0
128	Statistical physics, optimization and source coding. Pramana - Journal of Physics, 2005, 64, 1161-1173.	1.8	0
129	Stochastic optimization of service provision with selfish users. , 2013, , .		0
130	Statistical Mechanics and Combinatorial Problems. , 2006, , 50-55.		0