Lexing Ying

List of Publications by Year
in descending order

117 papers	6,409 citations	101543 36 h-index	66911 78 g-index
117 all docs	117 docs citations	117 times ranked	4001 citing authors

#	Article	IF	Citations
1	Fast Discrete Curvelet Transforms. Multiscale Modeling and Simulation, 2006, 5, 861-899.	1.6	2,092
2	A kernel-independent adaptive fast multipole algorithm in two and three dimensions. Journal of Computational Physics, 2004, 196, 591-626.	3.8	366
3	Seismic wave extrapolation using lowrank symbol approximation. Geophysical Prospecting, 2013, 61, 526-536.	1.9	223
4	Wave atoms and sparsity of oscillatory patterns. Applied and Computational Harmonic Analysis, 2007, 23, 368-387.	2.2	221
5	SelInv---An Algorithm for Selected Inversion of a Sparse Symmetric Matrix. ACM Transactions on Mathematical Software, 2011, 37, 1-19.	2.9	167
6	Sweeping Preconditioner for the Helmholtz Equation: Moving Perfectly Matched Layers. Multiscale Modeling and Simulation, 2011, 9, 686-710.	1.6	163
7	Adaptive local basis set for Kohn–Sham density functional theory in a discontinuous Galerkin framework I: Total energy calculation. Journal of Computational Physics, 2012, 231, 2140-2154.	3.8	162
8	A high-order 3D boundary integral equation solver for elliptic PDEs in smooth domains. Journal of Computational Physics, 2006, 219, 247-275.	3.8	123
9	Sweeping preconditioner for the Helmholtz equation: Hierarchical matrix representation. Communications on Pure and Applied Mathematics, 2011, 64, 697-735.	3.1	123
10	Solving parametric PDE problems with artificial neural networks. European Journal of Applied Mathematics, 2021, 32, 421-435.	2.9	109
11	Lowrank finite-differences and lowrank Fourier finite-differences for seismic wave extrapolation in the acoustic approximation. Geophysical Journal International, 2013, 193, 960-969.	2.4	103
12	A Fast Butterfly Algorithm for the Computation of Fourier Integral Operators. Multiscale Modeling and Simulation, 2009, 7, 1727-1750.	1.6	101
13	Fast Directional Multilevel Algorithms for Oscillatory Kernels. SIAM Journal of Scientific Computing, 2007, 29, 1710-1737.	2.8	97
14	Hierarchical Interpolative Factorization for Elliptic Operators: Differential Equations. Communications on Pure and Applied Mathematics, 2016, 69, 1415-1451.	3.1	93
15	A fast direct solver for elliptic problems on general meshes in 2D. Journal of Computational Physics, 2012, 231, 1314-1338.	3.8	87
16	Solving for high-dimensional committor functions using artificial neural networks. Research in Mathematical Sciences, 2019, 6, 1.	1.0	76
17	Fast construction of hierarchical matrix representation from matrix–vector multiplication. Journal of Computational Physics, 2011, 230, 4071-4087.	3.8	72
18	Compressed Representation of Kohn–Sham Orbitals via Selected Columns of the Density Matrix. Journal of Chemical Theory and Computation, 2015, 11, 1463-1469.	5.3	72

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19	A fast directional algorithm for high frequency acoustic scattering in two dimensions. Communications in Mathematical Sciences, 2009, 7, 327-345.	1.0	72
20	Fast Computation of Fourier Integral Operators. SIAM Journal of Scientific Computing, 2007, 29, 2464-2493.	2.8	68
21	Compression of the electron repulsion integral tensor in tensor hypercontraction format with cubic scaling cost. Journal of Computational Physics, 2015, 302, 329-335.	3.8	68
22	Low-rank one-step wave extrapolation for reverse time migration. Geophysics, 2016, 81, S39-S54.	2.6	67
23	Solving electrical impedance tomography with deep learning. Journal of Computational Physics, 2020, 404, 109119.	3.8	63
24	Fast algorithm for extracting the diagonal of the inverse matrix with application to the electronic structure analysis of metallic systems. Communications in Mathematical Sciences, 2009, 7, 755-777.	1.0	59
25	A fast solver for the Stokes equations with distributed forces in complex geometries. Journal of Computational Physics, 2004, 193, 317-348.	3.8	58
26	SwitchNet: A Neural Network Model for Forward and Inverse Scattering Problems. SIAM Journal of Scientific Computing, 2019, 41, A3182-A3201.	2.8	58
27	A Parallel Sweeping Preconditioner for Heterogeneous 3D Helmholtz Equations. SIAM Journal of Scientific Computing, 2013, 35, C194-C212.	2.8	57
28	Fast Gaussian wavepacket transforms and Gaussian beams for the Schrödinger equation. Journal of Computational Physics, 2010, 229, 7848-7873.	3.8	55
29	Synchrosqueezed Curvelet Transform for Two-Dimensional Mode Decomposition. SIAM Journal on Mathematical Analysis, 2014, 46, 2052-2083.	1.9	48
30	Pole-Based approximation of the Fermi-Dirac function. Chinese Annals of Mathematics Series B, 2009, 30, 729-742.	0.4	46
31	Fast Multiscale Gaussian Wavepacket Transforms and Multiscale Gaussian Beams for the Wave Equation. Multiscale Modeling and Simulation, 2010, 8, 1803-1837.	1.6	43
32	A Butterfly Algorithm for Synthetic Aperture Radar Imaging. SIAM Journal on Imaging Sciences, 2012, 5, 203-243.	2.2	42
33	Hierarchical Interpolative Factorization for Elliptic Operators: Integral Equations. Communications on Pure and Applied Mathematics, 2016, 69, 1314-1353.	3.1	41
34	Butterfly Factorization. Multiscale Modeling and Simulation, 2015, 13, 714-732.	1.6	40
35	A kernel independent fast multipole algorithm for radial basis functions. Journal of Computational Physics, 2006, 213, 451-457.	3.8	38
36	Sparse Fourier Transform via Butterfly Algorithm. SIAM Journal of Scientific Computing, 2009, 31, 1678-1694.	2.8	36

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37	Quantitative Canvas Weave Analysis Using 2-D Synchrosqueezed Transforms: Application of time-frequency analysis to art investigation. IEEE Signal Processing Magazine, 2015, 32, 55-63.	5.6	36
38	SCDM-k: Localized orbitals for solids via selected columns of the density matrix. Journal of Computational Physics, 2017, 334, 1-15.	3.8	36
39	A Fast Parallel Algorithm for Selected Inversion of Structured Sparse Matrices with Application to 2D Electronic Structure Calculations. SIAM Journal of Scientific Computing, 2011, 33, 1329-1351.	2.8	35
40	The phase flow method. Journal of Computational Physics, 2006, 220, 184-215.	3.8	34
41	Fast geodesics computation with the phase flow method. Journal of Computational Physics, 2006, 220, 6-18.	3.8	32
42	A fast butterfly algorithm for generalized Radon transforms. Geophysics, 2013, 78, U41-U51.	2.6	32
43	A sweeping preconditioner for time-harmonic Maxwell's equations with finite elements. Journal of Computational Physics, 2012, 231, 3770-3783.	3.8	31
44	A Recursive Skeletonization Factorization Based on Strong Admissibility. Multiscale Modeling and Simulation, 2017, 15, 768-796.	1.6	31
45	Wave atoms and time upscaling of wave equations. Numerische Mathematik, 2009, 113, 1-71.	1.9	29
46	BCR-Net: A neural network based on the nonstandard wavelet form. Journal of Computational Physics, 2019, 384, 1-15.	3.8	28
47	Synchrosqueezed Wave Packet Transform for 2D Mode Decomposition. SIAM Journal on Imaging Sciences, 2013, 6, 1979-2009.	2.2	25
48	A Simple Solver for the Fractional Laplacian in Multiple Dimensions. SIAM Journal of Scientific Computing, 2020, 42, A878-A900.	2.8	25
49	Crystal Image Analysis Using 2D Synchrosqueezed Transforms. Multiscale Modeling and Simulation, 2015, 13, 1542-1572.	1.6	24
50	Fast Spatial Gaussian Process Maximum Likelihood Estimation via Skeletonization Factorizations. Multiscale Modeling and Simulation, 2017, 15, 1584-1611.	1.6	24
51	A Multiscale Neural Network Based on Hierarchical Matrices. Multiscale Modeling and Simulation, 2019, 17, 1189-1213.	1.6	24
52	Numerical methods for Kohn–Sham density functional theory. Acta Numerica, 2019, 28, 405-539.	10.7	23
53	Adaptively Compressed Polarizability Operator for Accelerating Large Scale *Ab Initio* Phonon Calculations. Multiscale Modeling and Simulation, 2017, 15, 29-55.	1.6	22
54	A fast spectral algorithm for the quantum Boltzmann collision operator. Communications in Mathematical Sciences, 2012, 10, 989-999.	1.0	21

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55	Discrete Symbol Calculus. SIAM Review, 2011, 53, 71-104.	9.5	20
56	A Parallel Butterfly Algorithm. SIAM Journal of Scientific Computing, 2014, 36, C49-C65.	2.8	19
57	A multiscale neural network based on hierarchical nested bases. Research in Mathematical Sciences, 2019, 6, 1.	1.0	19
58	Meta-learning pseudo-differential operators with deep neural networks. Journal of Computational Physics, 2020, 408, 109309.	3.8	19
59	A fast nested dissection solver for Cartesian 3D elliptic problems using hierarchical matrices. Journal of Computational Physics, 2014, 258, 227-245.	3.8	17
60	Fast algorithms for integral formulations of steady-state radiative transfer equation. Journal of Computational Physics, 2019, 380, 191-211.	3.8	17
61	Simple, direct and efficient multi-way spectral clustering. Information and Inference, 2019, 8, 181-203.	1.6	17
62	Sparsifying Preconditioner for the Lippmann--Schwinger Equation. Multiscale Modeling and Simulation, 2015, 13, 644-660.	1.6	16
63	Fast directional algorithms for the Helmholtz kernel. Journal of Computational and Applied Mathematics, 2010, 234, 1851-1859.	2.0	15
64	Recursive Sweeping Preconditioner for the Three-Dimensional Helmholtz Equation. SIAM Journal of Scientific Computing, 2016, 38, A814-A832.	2.8	15
65	An Efficient Dynamical Low-Rank Algorithm for the Boltzmann-BGK Equation Close to the Compressible Viscous Flow Regime. SIAM Journal of Scientific Computing, 2021, 43, B1057-B1080.	2.8	15
66	Scattering in Flatland: Efficient Representations viaÂWave Atoms. Foundations of Computational Mathematics, 2010, 10, 569-613.	2.5	13
67	A sweeping preconditioner for Yeeâ€™s finite difference approximation of time-harmonic Maxwellâ€™s equations. Frontiers of Mathematics in China, 2012, 7, 347-363.	0.7	13
68	Fast algorithm for periodic density fitting for Bloch waves. Annals of Mathematical Sciences and Applications, 2016, 1, 321-339.	0.4	13
69	Fast wave computation via Fourier integral operators. Mathematics of Computation, 2012, 81, 1455-1486.	2.1	12
70	An Entropic Fourier Method for the Boltzmann Equation. SIAM Journal of Scientific Computing, 2018, 40, A2858-A2882.	2.8	12
71	Additive Sweeping Preconditioner for the Helmholtz Equation. Multiscale Modeling and Simulation, 2016, 14, 799-822.	1.6	11
72	A Technique for Updating Hierarchical Skeletonization-Based Factorizations of Integral Operators. Multiscale Modeling and Simulation, 2016, 14, 42-64.	1.6	11

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73	Algorithmic shape modeling with subdivision surfaces. Computers and Graphics, 2002, 26, 865-875.	2.5	10
74	Second kind integral equations for the first kind Dirichlet problem of the biharmonic equation in three dimensions. Journal of Computational Physics, 2011, 230, 7488-7501.	3.8	9
75	Optimized local basis set for Kohnâ€"Sham density functional theory. Journal of Computational Physics, 2012, 231, 4515-4529.	3.8	9
76	A Parallel Directional Fast Multipole Method. SIAM Journal of Scientific Computing, 2014, 36, C335-C352.	2.8	9
77	Distributed-memory hierarchical interpolative factorization. Research in Mathematical Sciences, 2017, 4, 1.	1.0	9
78	Computing Localized Representations of the Kohn--Sham Subspace Via Randomization and Refinement. SIAM Journal of Scientific Computing, 2017, 39, B1178-B1198.	2.8	9
79	Convex Relaxation Approaches for Strictly Correlated Density Functional Theory. SIAM Journal of Scientific Computing, 2019, 41, B773-B795.	2.8	9
80	Fast Computation of Partial Fourier Transforms. Multiscale Modeling and Simulation, 2009, 8, 110-124.	1.6	8
81	A fast directional algorithm for high-frequency electromagnetic scattering. Journal of Computational Physics, 2011, 230, 5471-5487.	3.8	8
82	A pedestrian introduction to fast multipole methods. Science China Mathematics, 2012, 55, 1043-1051.	1.7	8
83	A Multiscale Butterfly Algorithm for Multidimensional Fourier Integral Operators. Multiscale Modeling and Simulation, 2015, 13, 614-631.	1.6	8
84	Multidimensional butterfly factorization. Applied and Computational Harmonic Analysis, 2018, 44, 737-758.	2.2	8
85	Recursively preconditioned hierarchical interpolative factorization for elliptic partial differential equations. Communications in Mathematical Sciences, 2020, 18, 91-108.	1.0	8
86	A Convergent Multiscale Gaussian-Beam Parametrix for the Wave Equation. Communications in Partial Differential Equations, 2013, 38, 92-134.	2.2	7
87	Tensor Network Skeletonization. Multiscale Modeling and Simulation, 2017, 15, 1423-1447.	1.6	7
88	Analytical Low-Rank Compression via Proxy Point Selection. SIAM Journal on Matrix Analysis and Applications, 2020, 41, 1059-1085.	1.4	7
89	Efficient Construction of Tensor Ring Representations from Sampling. Multiscale Modeling and Simulation, 2021, 19, 1261-1284.	1.6	7
90	A fast algorithm for 3D azimuthally anisotropic velocity scan. Geophysical Prospecting, 2015, 63, 368-377.	1.9	6

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91	Hessian transport gradient flows. Research in Mathematical Sciences, 2019, 6, 1.	1.0	6
92	Element orbitals for Kohn-Sham density functional theory. Physical Review B, 2012, 85, .	3.2	5
93	A fast algorithm for multilinear operators. Applied and Computational Harmonic Analysis, 2012, 33, 148-158.	2.2	5
94	Sparsify and Sweep: An Efficient Preconditioner for the Lippmann--Schwinger Equation. SIAM Journal of Scientific Computing, 2018, 40, B379-B404.	2.8	5
95	Semidefinite Relaxation of Multimarginal Optimal Transport for Strictly Correlated Electrons in Second Quantization. SIAM Journal of Scientific Computing, 2020, 42, B1462-B1489.	2.8	5
96	Fast Directional Computation of High Frequency Boundary Integrals via Local FFTs. Multiscale Modeling and Simulation, 2015, 13, 423-439.	1.6	4
97	Sparsifying Preconditioner for Pseudospectral Approximations of Indefinite Systems on Periodic Structures. Multiscale Modeling and Simulation, 2015, 13, 459-471.	1.6	4
98	Sparsifying preconditioner for the time-harmonic Maxwell's equations. Journal of Computational Physics, 2019, 376, 913-923.	3.8	4
99	Stochastic modified equations for the asynchronous stochastic gradient descent. Information and Inference, 2020, 9, 851-873.	1.6	4
100	Mirror Descent Algorithms for Minimizing Interacting Free Energy. Journal of Scientific Computing, 2020, 84, 1.	2.3	4
101	A simple multiscale method for mean field games. Journal of Computational Physics, 2021, 439, 110385.	3.8	4
102	Directional Preconditioner for 2D High Frequency Obstacle Scattering. Multiscale Modeling and Simulation, 2015, 13, 829-846.	1.6	3
103	Multilevel Fine-Tuning: Closing Generalization Gaps in Approximation of Solution Maps under a Limited Budget for Training Data. Multiscale Modeling and Simulation, 2021, 19, 344-373.	1.6	3
104	A semigroup method for high dimensional elliptic PDEs and eigenvalue problems based on neural networks. Journal of Computational Physics, 2022, 453, 110939.	3.8	3
105	Pole Expansion for Solving a Type of Parametrized Linear Systems in Electronic Structure Calculations. SIAM Journal of Scientific Computing, 2014, 36, A2929-A2951.	2.8	2
106	Sparsifying preconditioner for soliton calculations. Journal of Computational Physics, 2016, 315, 458-466.	3.8	2
107	Hierarchical Interpolative Factorization Preconditioner for Parabolic Equations. Journal of Scientific Computing, 2020, 85, 1.	2.3	2
108	Natural Gradient for Combined Loss Using Wavelets. Journal of Scientific Computing, 2021, 86, 1.	2.3	1

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109	Localized sparsifying preconditioner for periodic indefinite systems. Communications in Mathematical Sciences, 2017, 15, 1155-1169.	1.0	1
110	A note on optimization formulations of Markov decision processes. Communications in Mathematical Sciences, 2022, 20, 727-745.	1.0	1
111	A sharp convergence rate for a model equation of the asynchronous stochastic gradient descent. Communications in Mathematical Sciences, 2021, 19, 851-863.	1.0	0
112	A Heuristic Independent Particle Approximation to Determinantal Point Processes. Journal of Scientific Computing, 2021, 87, 1.	2.3	0
113	Approximate inversion of discrete Fourier integral operators. Journal of Computational Physics, 2021, 446, 110654.	3.8	0
114	Hierarchical low-rank structure of parameterized distributions. Communications in Mathematical Sciences, 2021, 19, 865-874.	1.0	0
115	On the gradient flow structure of the isotropic Landau equation. Communications in Mathematical Sciences, 2021, 19, 2319-2333.	1.0	0
116	A fast algorithm for reiterated homogenization. Communications in Mathematical Sciences, 2013, 11, 635-649.	1.0	0
117	On Lyapunov functions and particle methods for regularized minimax problems. Research in Mathematical Sciences, 2022, 9, 1.	1.0	0