Erkki J Somersalo

List of Publications by Year
in descending order

154 papers	5,943 citations	117625 34 h-index	76900 74 g-index
157 all docs	157 docs citations	157 times ranked	3339 citing authors

#	Article	IF	Citations
1	Existence and Uniqueness for Electrode Models for Electric Current Computed Tomography. SIAM Journal on Applied Mathematics, 1992, 52, 1023-1040.	1.8	740
2	Tikhonov regularization and prior information in electrical impedance tomography. IEEE Transactions on Medical Imaging, 1998, 17, 285-293.	8.9	476
3	Visualization of Magnetoencephalographic Data Using Minimum Current Estimates. NeuroImage, 1999, 10, 173-180.	4.2	448
4	Statistical inverse problems: Discretization, model reduction and inverse crimes. Journal of Computational and Applied Mathematics, 2007, 198, 493-504.	2.0	412
5	Statistical inversion and Monte Carlo sampling methods in electrical impedance tomography. Inverse Problems, 2000, 16, 1487-1522.	2.0	282
6	Inverse problems with structural prior information. Inverse Problems, 1999, 15, 713-729.	2.0	210
7	Approximation errors and model reduction with an application in optical diffusion tomography. Inverse Problems, 2006, 22, 175-195.	2.0	187
8	An inverse boundary value problem in electrodynamics. Duke Mathematical Journal, 1993, 70, 617.	1.5	140
9	Statistical inversion for medical x-ray tomography with few radiographs: I. General theory. Physics in Medicine and Biology, 2003, 48, 1437-1463.	3.0	123
10	On the existence and convergence of the solution of PML equations. Computing (Vienna/New York), 1998, 60, 229-241.	4.8	116
11	Layer stripping: a direct numerical method for impedance imaging. Inverse Problems, 1991, 7, 899-926.	2.0	112
12	Anisotropic effects in highly scattering media. Physical Review E, 2003, 68, 031908.	2.1	105
13	State estimation with fluid dynamical evolution models in process tomography - an application to impedance tomography. Inverse Problems, 2001, 17, 467-483.	2.0	94
14	Electrical impedance tomography with basis constraints. Inverse Problems, 1997, 13, 523-530.	2.0	92
15	Statistical inversion for medical x-ray tomography with few radiographs: II. Application to dental radiology. Physics in Medicine and Biology, 2003, 48, 1465-1490.	3.0	82
16	Linear inverse problems for generalised random variables. Inverse Problems, 1989, 5, 599-612.	2.0	80
17	Hypermodels in the Bayesian imaging framework. Inverse Problems, 2008, 24, 034013.	2.0	78
18	Conditionally Gaussian Hypermodels for Cerebral Source Localization. SIAM Journal on Imaging Sciences, 2009, 2, 879-909.	2.2	75

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19	A linearized inverse boundary value problem for Maxwell's equations. Journal of Computational and Applied Mathematics, 1992, 42, 123-136.	2.0	69
20	Inverse problems: From regularization to Bayesian inference. Wiley Interdisciplinary Reviews: Computational Statistics, 2018, 10, e1427.	3.9	68
21	Analysis of the PML equations in general convex geometry. Proceedings of the Royal Society of Edinburgh Section A: Mathematics, 2001, 131, 1183-1207.	1.2	62
22	Metapopulation Network Models for Understanding, Predicting, and Managing the Coronavirus Disease COVID-19. Frontiers in Physics, 2020, 8, .	2.1	62
23	Compensation for geometric mismodelling by anisotropies in optical tomography. Optics Express, 2005, 13, 296.	3.4	60
24	A Gaussian hypermodel to recover blocky objects. Inverse Problems, 2007, 23, 733-754.	2.0	51
25	Non-stationary magnetoencephalography by Bayesian filtering of dipole models. Inverse Problems, 2003, 19, 1047-1063.	2.0	47
26	Stochastic modelling of muscle recruitment during activity. Interface Focus, 2015, 5, 20140094.	3.0	47
27	Estimation of optical absorption in anisotropic background. Inverse Problems, 2002, 18, 559-573.	2.0	44
28	Astrocytes as the Glucose Shunt for Glutamatergic Neurons at High Activity: An In Silico Study. Journal of Neurophysiology, 2009, 101, 2528-2538.	1.8	44
29	Posterior covariance related optimal current patterns in electrical impedance tomography. Inverse Problems, 2004, 20, 919-936.	2.0	42
30	Nonstationary inverse problems and state estimation. Journal of Inverse and Ill-Posed Problems, 1999, 7, .	1.0	41
31	Priorconditioners for linear systems. Inverse Problems, 2005, 21, 1397-1418.	2.0	41
32	A Generalization of the CalderÃ³n-Vaillancourt Theorem toLp andhp. Mathematische Nachrichten, 1988, 138, 145-156.	0.8	40
33	State Estimation in Time-Varying Electrical Impedance Tomography. Annals of the New York Academy of Sciences, 1999, 873, 430-439.	3.8	40
34	Inversion of Discontinuities for the SchrÃ¶dinger Equation in Three Dimensions. SIAM Journal on Mathematical Analysis, 1991, 22, 480-499.	1.9	34
35	A reactionâ€“diffusion model of CO2 influx into an oocyte. Journal of Theoretical Biology, 2012, 309, 185-203.	1.7	33
36	A hierarchical Krylovâ€“Bayes iterative inverse solver for MEG with physiological preconditioning. Inverse Problems, 2015, 31, 125005.	2.0	32

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37	Iterative updating of model error for Bayesian inversion. Inverse Problems, 2018, 34, 025008.	2.0	31
38	Complex Riemannian metric and absorbing boundary conditions. Journal Des Mathematiques Pures Et Appliquees, 2001, 80, 739-768.	1.6	30
39	State space models in process tomography â€" approximation of state noise covariance. Inverse Problems in Science and Engineering, 2001, 9, 561-585.	0.5	28
40	Parameter estimation for stiff deterministic dynamical systems via ensemble Kalman filter. Inverse Problems, 2014, 30, 105008.	2.0	28
41	Statistical Analysis of Metabolic Pathways of Brain Metabolism at Steady State. Annals of Biomedical Engineering, 2007, 35, 886-902.	2.5	27
42	Hierachical Bayesian models and sparsity: â„“ ₂ -magic. Inverse Problems, 2019, 35, 035003.	2.0	27
43	Modeling anisotropic light propagation in a realistic model of the human head. Applied Optics, 2005, 44, 2049.	2.1	26
44	Using process tomography as a sensor for optimal control. Applied Numerical Mathematics, 2006, 56, 37-54.	2.1	26
45	Largeâ€Scale Statistical Parameter Estimation in Complex Systems with an Application to Metabolic Models. Multiscale Modeling and Simulation, 2006, 5, 1333-1366.	1.6	25
46	An experimental evaluation of state estimation with fluid dynamical models in process tomography. Chemical Engineering Journal, 2007, 127, 23-30.	12.7	25
47	Bayesian flux balance analysis applied to a skeletal muscle metabolic model. Journal of Theoretical Biology, 2007, 248, 91-110.	1.7	25
48	Maxwell's equations with a polarization independent wave velocity: Direct and inverse problems. Journal Des Mathematiques Pures Et Appliquees, 2006, 86, 237-270.	1.6	24
49	Metabolica: A statistical research tool for analyzing metabolic networks. Computer Methods and Programs in Biomedicine, 2010, 97, 151-167.	4.7	24
50	Energetics of Inhibition: Insights with a Computational Model of the Human GABAergic Neuronâ€"Astrocyte Cellular Complex. Journal of Cerebral Blood Flow and Metabolism, 2010, 30, 1834-1846.	4.3	24
51	Hierarchical regularization for edge-preserving reconstruction of PET images. Inverse Problems, 2010, 26, 035010.	2.0	24
52	Sparse reconstructions from few noisy data: analysis of hierarchical Bayesian models with generalized gamma hyperpriors. Inverse Problems, 2020, 36, 025010.	2.0	24
53	A modelling error approach for the estimation of optical absorption in the presence of anisotropies. Physics in Medicine and Biology, 2004, 49, 4785-4798.	3.0	23
54	Representation of bioelectric current sources using Whitney elements in the finite element method. Physics in Medicine and Biology, 2005, 50, 3023-3039.	3.0	23

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55	Helicopter-borne measurements of radar backscatter from forests. International Journal of Remote Sensing, 1990, 11, 1179-1191.	2.9	22
56	Reconstruction of Singularities of a Scattering Potential in Two Dimensions. Advances in Applied Mathematics, 1994, 15, 97-113.	0.7	22
57	Fluid dynamical models and state estimation in process tomography: Effect due to inaccuracies in flow fields. Journal of Electronic Imaging, 2001, 10, 630.	0.9	22
58	Dynamic activation model for a glutamatergic neurovascular unit. Journal of Theoretical Biology, 2011, 274, 12-29.	1.7	22
59	Quantitative in silico Analysis of Neurotransmitter Pathways Under Steady State Conditions. Frontiers in Endocrinology, 2013, 4, 137.	3.5	22
60	Linear multistep methods, particle filtering and sequential Monte Carlo. Inverse Problems, 2013, 29, 085007.	2.0	22
61	A spatially distributed computational model of brain cellular metabolism. Journal of Theoretical Biology, 2015, 376, 48-65.	1.7	22
62	Dynamical electric wire tomography: a time series approach. Inverse Problems, 1998, 14, 799-813.	2.0	21
63	Image inpainting with structural bootstrap priors. Image and Vision Computing, 2006, 24, 782-793.	4.5	21
64	Bayes Meets Krylov: Statistically Inspired Preconditioners for CGLS. SIAM Review, 2018, 60, 429-461.	9.5	21
65	MÃ©nage Ã Trois: The Role of Neurotransmitters in the Energy Metabolism of Astrocytes, Glutamatergic, and GABAergic Neurons. Journal of Cerebral Blood Flow and Metabolism, 2012, 32, 1472-1483.	4.3	20
66	Computational tools for calculating alternative muscle force patterns during motion: A comparison of possible solutions. Journal of Biomechanics, 2013, 46, 2097-2100.	2.1	20
67	Statistical elimination of boundary artefacts in image deblurring. Inverse Problems, 2005, 21, 1697-1714.	2.0	19
68	Brain Activity Mapping from MEG Data via a Hierarchical Bayesian Algorithm with Automatic Depth Weighting. Brain Topography, 2019, 32, 363-393.	1.8	19
69	Electromagnetic inverse problems with surface measurements at low frequencies. Inverse Problems, 1989, 5, 1107-1116.	2.0	18
70	Three-dimensional inverse scattering for the wave equation with variable speed: near-field formulae using point sources. Inverse Problems, 1989, 5, 1-6.	2.0	18
71	Left and right preconditioning for electrical impedance tomography with structural information. Inverse Problems, 2012, 28, 055015.	2.0	18
72	The Metabolism of Neurons and Astrocytes Through Mathematical Models. Annals of Biomedical Engineering, 2012, 40, 2328-2344.	2.5	16

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73	Inverse problems in the Bayesian framework. Inverse Problems, 2014, 30, 110301.	2.0	16
74	Dynamic updating of numerical model discrepancy using sequential sampling. Inverse Problems, 2014, 30, 114019.	2.0	16
75	A computational model integrating brain electrophysiology and metabolism highlights the key role of extracellular potassium and oxygen. Journal of Theoretical Biology, 2018, 446, 238-258.	1.7	16
76	Layer stripping for time-harmonic Maxwell's equations with high frequency. Inverse Problems, 1994, 10, 449-466.	2.0	14
77	Hierarchical beamformer and cross-talk reduction in electroneurography. Journal of Neural Engineering, 2011, 8, 056002.	3.5	14
78	Sparsity Promoting Hybrid Solvers for Hierarchical Bayesian Inverse Problems. SIAM Journal of Scientific Computing, 2020, 42, A3761-A3784.	2.8	14
79	Artificial boundary conditions and domain truncation in electrical impedance tomography. Part I: Theory and preliminary results. Inverse Problems and Imaging, 2015, 9, 749-766.	1.1	13
80	Artificial boundary conditions and domain truncation in electrical impedance tomography. Part II: Stochastic extension of the boundary map. Inverse Problems and Imaging, 2015, 9, 767-789.	1.1	13
81	Sampling-Based Analysis of a Spatially Distributed Model for Liver Metabolism at Steady State. Multiscale Modeling and Simulation, 2008, 7, 407-431.	1.6	12
82	<title>Impedance imaging and Markov chain Monte Carlo methods</title>. , 1997, 3171, 175.		11
83	Estimating Anomalies from Indirect Observations. Journal of Computational Physics, 2002, 181, 398-406.	3.8	11
84	An adaptive smoothness regularization algorithm for optical tomography. Optics Express, 2008, 16, 19957.	3.4	11
85	Bayesian stationary state flux balance analysis for a skeletal muscle metabolic model. Inverse Problems and Imaging, 2007, 1, 247-263.	1.1	11
86	The backus-gilbert method revisited: background, implementation and examples. Numerical Functional Analysis and Optimization, 1987, 9, 917-943.	1.4	10
87	One-Dimensional Electromagnetic Inverse Reflection Problem: Formulation as a Riemannâ€“Hilbert Problem and Imaging of Discontinuities. SIAM Journal on Applied Mathematics, 1989, 49, 944-951.	1.8	10
88	Large-scale Bayesian parameter estimation for a three-compartment cardiac metabolism model during ischemia. Inverse Problems, 2006, 22, 1797-1816.	2.0	10
89	A hybrid stochasticâ€“deterministic computational model accurately describes spatial dynamics and virus diffusion in HIV-1 growth competition assay. Journal of Theoretical Biology, 2012, 312, 120-132.	1.7	10
90	Microlocal sequential regularization in imaging. Inverse Problems and Imaging, 2007, 1, 1-11.	1.1	10

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91	A Bayesian approach and total variation priors in 3D electrical impedance tomography. , 0, , .		9
92	Bayesian particle filter algorithm for learning epidemic dynamics. Inverse Problems, 2021, 37, 115008.	2.0	9
93	Quantitative imaging with electrical impedance spectroscopy. Physics in Medicine and Biology, 2012, 57, 7289-7302.	3.0	8
94	Uncertainty quantification in flux balance analysis of spatially lumped and distributed models of neuronâ€“astrocyte metabolism. Journal of Mathematical Biology, 2016, 73, 1823-1849.	1.9	8
95	Local regularization method applied to estimating oxygen consumption during muscle activities. Inverse Problems, 2006, 22, 229-243.	2.0	7
96	A mathematical model of liver metabolism: from steady state to dynamic. Journal of Physics: Conference Series, 2008, 124, 012012.	0.4	7
97	Dynamic Bayesian sensitivity analysis of a myocardial metabolic model. Mathematical Biosciences, 2008, 212, 1-21.	1.9	6
98	The uniqueness of the one-dimensional electromagnetic inversion with bounded potentials. Journal of Mathematical Analysis and Applications, 1987, 127, 312-333.	1.0	5
99	Bayesian Preconditioned CGLS for Source Separation in MEG Time Series. SIAM Journal of Scientific Computing, 2013, 35, B778-B798.	2.8	5
100	Life sciences through mathematical models. Rendiconti Lincei, 2015, 26, 193-201.	2.2	5
101	Priorconditioned CGLS-Based Quasi-MAP Estimate, Statistical Stopping Rule, and Ranking of Priors. SIAM Journal of Scientific Computing, 2017, 39, S477-S500.	2.8	5
102	Brain energetics plays a key role in the coordination of electrophysiology, metabolism and hemodynamics: Evidence from an integrated computational model. Journal of Theoretical Biology, 2019, 478, 26-39.	1.7	5
103	A Bayesian filtering approach to layer stripping for electrical impedance tomography. Inverse Problems, 2020, 36, 055014.	2.0	5
104	Estimates for wave propagation in inhomogenous acoustic media. Journal of Mathematical Analysis and Applications, 1991, 162, 410-429.	1.0	4
105	Computation of Electromagnetic Fields in Axisymmetric Rf Structures With Boundary Integral Equations. Journal of Electromagnetic Waves and Applications, 1999, 13, 445-491.	1.6	4
106	Bayesian mixture models for source separation in MEG. Inverse Problems, 2011, 27, 115001.	2.0	4
107	Astrocytic tracer dynamics estimated from [1-11C]-acetate PET measurements. Mathematical Medicine and Biology, 2014, 32, dqu021.	1.2	4
108	Modeling HIV-1 Dynamics and Fitness in Cell Culture Across Scales. Bulletin of Mathematical Biology, 2014, 76, 486-514.	1.9	4

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109	Computational Model of Electrode-Induced Microenvironmental Effects on pH Measurements Near a Cell Membrane. Multiscale Modeling and Simulation, 2020, 18, 1053-1075.	1.6	4
110	Interpretation of NMR Spectroscopy Human Brain Data with a Multi-Compartment Computational Model of Cerebral Metabolism. Advances in Experimental Medicine and Biology, 2011, 701, 249-254.	1.6	4
111	Mining the Mind: Linear Discriminant Analysis of MEG Source Reconstruction Time Series Supports Dynamic Changes in Deep Brain Regions During Meditation Sessions. Brain Topography, 2021, 34, 840-862.	1.8	4
112	Regularization in Cardiac Source Imaging. Lecture Notes in Computer Science, 2003, , 101-110.	1.3	4
113	Gas temperature mapping using impedance tomography. Inverse Problems, 1997, 13, 1177-1189.	2.0	3
114	<title>Recursive estimation of fast-impedance changes in electrical impedance tomography and a related problem</title>. , 1997, 3171, 208.		3
115	Wind velocity observation with a CW Doppler radar. IEEE Transactions on Geoscience and Remote Sensing, 2002, 40, 2427-2437.	6.3	3
116	Bayesian image deblurring and boundary effects. , 2005, , .		3
117	An efficient deconvolution algorithm for estimating oxygen consumption during muscle activities. Computer Methods and Programs in Biomedicine, 2007, 85, 247-256.	4.7	3
118	Variable order smoothness priors for ill-posed inverse problems. Mathematics of Computation, 2014, 84, 1753-1773.	2.1	3
119	Approximation of continuous EIT data from electrode measurements with Bayesian methods. Inverse Problems, 2019, 35, 045012.	2.0	3
120	Estimating hemodynamic stimulus and blood vessel compliance from cerebral blood flow data. Journal of Theoretical Biology, 2019, 460, 243-261.	1.7	3
121	Overcomplete representation in a hierarchical Bayesian framework. Inverse Problems and Imaging, 2022, 16, 19.	1.1	3
122	Impedance Imaging and Electrode Models. , 1997, , 65-74.		3
123	Using tomographic measurements in process control. , 2004, , .		2
124	Computational issues in linear multistep method particle filtering. AIP Conference Proceedings, 2016, , .	0.4	2
125	Modeling Epidemic Spread among a Commuting Population Using Transport Schemes. Mathematics, 2021, 9, 1861.	2.2	2
126	Brain Energy Metabolism. , 2019, , 1-19.		2

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127	A Mathematical Model for Signal Analysis of FM Radar. Journal of Electromagnetic Waves and Applications, 1990, 4, 743-769.	1.6	1
128	Development Of Geophysical Algorithms For A Spaceborne Microwave Radiometer System. , 0, , .		1
129	Effects of inaccuracies in fluid dynamical models in state estimation of process tomography. , 2001, 4188, 69.		1
130	Local regularization and Bayesian hypermodels. , 2005, , .		1
131	Approximation Errors and Model Reduction in Optical Tomography. , 2006, 2006, 2659-62.		1
132	Inverse problems and computational cell metabolic models: a statistical approach. Journal of Physics: Conference Series, 2008, 124, 012003.	0.4	1
133	The inverse problem of brain energetics: ketone bodies as alternative substrates. Journal of Physics: Conference Series, 2008, 124, 012013.	0.4	1
134	Layer-stripping reconstruction algorithms in impedance imaging. , 1993, , 9-15.		1
135	Statistical Methods in Imaging. , 2011, , 913-957.		1
136	Statistical Methods in Imaging. , 2015, , 1343-1392.		1
137	Vectorized and parallel particle filter SMC parameter estimation for stiff ODEs. , 2015, , .		1
138	Bayesian Mesh Adaptation for Estimating Distributed Parameters. SIAM Journal of Scientific Computing, 2020, 42, A3878-A3906.	2.8	1
139	Modeling surface pH measurements of oocytes. Biomedical Physics and Engineering Express, 0, , .	1.2	1
140	Inverse scattering for standing wave solutions of the SchrÃ¶dinger equation. Journal of Mathematical Physics, 1987, 28, 2416-2419.	1.1	0
141	Determination of the Incident Field in EM Sounding by a Dispersion Relation. Journal of Electromagnetic Waves and Applications, 1989, 3, 199-208.	1.6	0
142	Construction of anatomy-based priors with anisotropic characteristics with application to electrical impedance tomography. , 0, , .		0
143	A unified Bayesian framework for algorithms to recover blocky signals. Proceedings of SPIE, 2007, , .	0.8	0
144	Bayesian flux balance analysis applied to a skeletal muscle metabolic model. Proceedings in Applied Mathematics and Mechanics, 2007, 7, 1120401-1120402.	0.2	0

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145	Perspectives in Numerical Analysis 2008. BIT Numerical Mathematics, 2008, 48, 163-165.	2.0	0
146	Computational modelling of cellular level metabolism. Journal of Physics: Conference Series, 2008, 124, 012011.	0.4	0
147	Recovery of shapes: hypermodels and Bayesian learning. Journal of Physics: Conference Series, 2008, 124, 012014.	0.4	0
148	Beyond the Model Limit: Parameter Inference Across Scales. SIAM-ASA Journal on Uncertainty Quantification, 2017, 5, 665-693.	2.0	0
149	Metabolism plays a central role in the cortical spreading depression: Evidence from a mathematical model. Journal of Theoretical Biology, 2020, 486, 110093.	1.7	0
150	First CalderÃ³n Prize. Journal of Physics: Conference Series, 2008, 124, 011002.	0.4	0
151	In silico study of lactate metabolism in brain during visual stimulation. FASEB Journal, 2009, 23, LB113.	0.5	0
152	Reconstruction of electromagnetic parameters from boundary measurements. , 1993, , 207-215.		0
153	Approximation Errors and Model Reduction in Optical Tomography. Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2006, , .	0.5	0
154	Brain Energy Metabolism. , 2022, , 540-558.		0