Karel Svoboda

List of Publications by Year
in descending order

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132 papers	50,214 citations	4658 85 h-index	14759 127 g-index
183 all docs	183 docs citations	183 times ranked	32442 citing authors

#	Article	IF	Citations
1	Ultrasensitive fluorescent proteins for imaging neuronal activity. Nature, 2013, 499, 295-300.	27.8	5,490
2	Imaging neural activity in worms, flies and mice with improved GCaMP calcium indicators. Nature Methods, 2009, 6, 875-881.	19.0	1,759
3	Long-term in vivo imaging of experience-dependent synaptic plasticity in adult cortex. Nature, 2002, 420, 788-794.	27.8	1,706
4	Experience-dependent structural synaptic plasticity in the mammalian brain. Nature Reviews Neuroscience, 2009, 10, 647-658.	10.2	1,569
5	Fully integrated silicon probes for high-density recording of neural activity. Nature, 2017, 551, 232-236.	27.8	1,531
6	Shared and distinct transcriptomic cell types across neocortical areas. Nature, 2018, 563, 72-78.	27.8	1,323
7	Rapid Spine Delivery and Redistribution of AMPA Receptors After Synaptic NMDA Receptor Activation. Science, 1999, 284, 1811-1816.	12.6	1,186
8	A toolbox of Cre-dependent optogenetic transgenic mice for light-induced activation and silencing. Nature Neuroscience, 2012, 15, 793-802.	14.8	1,153
9	ScanImage: Flexible software for operating laser scanning microscopes. BioMedical Engineering OnLine, 2003, 2, 13.	2.7	1,126
10	Optimization of a GCaMP Calcium Indicator for Neural Activity Imaging. Journal of Neuroscience, 2012, 32, 13819-13840.	3.6	1,099
11	Structure and Function of Dendritic Spines. Annual Review of Physiology, 2002, 64, 313-353.	13.1	1,050
12	Transient and Persistent Dendritic Spines in the Neocortex In Vivo. Neuron, 2005, 45, 279-291.	8.1	1,003
13	Principles of Two-Photon Excitation Microscopy and Its Applications to Neuroscience. Neuron, 2006, 50, 823-839.	8.1	923
14	The subcellular organization of neocortical excitatory connections. Nature, 2009, 457, 1142-1145.	27.8	903
15	Long-term, high-resolution imaging in the mouse neocortex through a chronic cranial window. Nature Protocols, 2009, 4, 1128-1144.	12.0	894
16	Channelrhodopsin-2â€“assisted circuit mapping of long-range callosal projections. Nature Neuroscience, 2007, 10, 663-668.	14.8	846
17	High-performance calcium sensors for imaging activity in neuronal populations and microcompartments. Nature Methods, 2019, 16, 649-657.	19.0	843
18	Sensitive red protein calcium indicators for imaging neural activity. ELife, 2016, 5, .	6.0	813

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19	In vivo dendritic calcium dynamics in neocortical pyramidal neurons. Nature, 1997, 385, 161-165.	27.8	795
20	Genetic Dissection of Neural Circuits. Neuron, 2008, 57, 634-660.	8.1	714
21	Experience-dependent plasticity of dendritic spines in the developing rat barrel cortex in vivo. Nature, 2000, 404, 876-881.	27.8	712
22	The Life Cycle of Ca2+ Ions in Dendritic Spines. Neuron, 2002, 33, 439-452.	8.1	652
23	Photon Upmanship: Why Multiphoton Imaging Is More than a Gimmick. Neuron, 1997, 18, 351-357.	8.1	646
24	Flow of Cortical Activity Underlying a Tactile Decision in Mice. Neuron, 2014, 81, 179-194.	8.1	622
25	Experience-dependent and cell-type-specific spine growth in the neocortex. Nature, 2006, 441, 979-983.	27.8	562
26	Locally dynamic synaptic learning rules in pyramidal neuron dendrites. Nature, 2007, 450, 1195-1200.	27.8	531
27	Spine growth precedes synapse formation in the adult neocortex in vivo. Nature Neuroscience, 2006, 9, 1117-1124.	14.8	506
28	Thy1-GCaMP6 Transgenic Mice for Neuronal Population Imaging In Vivo. PLoS ONE, 2014, 9, e108697.	2.5	506
29	A large field of view two-photon mesoscope with subcellular resolution for in vivo imaging. ELife, 2016, 5, .	6.0	495
30	Sparse optical microstimulation in barrel cortex drives learned behaviour in freely moving mice. Nature, 2008, 451, 61-64.	27.8	488
31	A motor cortex circuit for motor planning and movement. Nature, 2015, 519, 51-56.	27.8	474
32	Neuropixels 2.0: A miniaturized high-density probe for stable, long-term brain recordings. Science, 2021, 372, .	12.6	467
33	Nonlinear dendritic integration of sensory and motor input during an active sensing task. Nature, 2012, 492, 247-251.	27.8	464
34	Long-Range Neuronal Circuits Underlying the Interaction between Sensory and Motor Cortex. Neuron, 2011, 72, 111-123.	8.1	447
35	Neural Activity in Barrel Cortex Underlying Vibrissa-Based Object Localization in Mice. Neuron, 2010, 67, 1048-1061.	8.1	444
36	Maintenance of persistent activity in a frontal thalamocortical loop. Nature, 2017, 545, 181-186.	27.8	428

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37	Learning-related fine-scale specificity imaged in motor cortex circuits of behaving mice. Nature, 2010, 464, 1182-1186.	27.8	409
38	Robust neuronal dynamics in premotor cortex during motor planning. Nature, 2016, 532, 459-464.	27.8	380
39	The Spread of Ras Activity Triggered by Activation of a Single Dendritic Spine. Science, 2008, 321, 136-140.	12.6	377
40	Cell Type-Specific Structural Plasticity of Axonal Branches and Boutons in the Adult Neocortex. Neuron, 2006, 49, 861-875.	8.1	376
41	Genetic Dissection of Neural Circuits: A Decade of Progress. Neuron, 2018, 98, 256-281.	8.1	374
42	Procedures for Behavioral Experiments in Head-Fixed Mice. PLoS ONE, 2014, 9, e88678.	2.5	371
43	Bright and photostable chemigenetic indicators for extended in vivo voltage imaging. Science, 2019, 365, 699-704.	12.6	362
44	A platform for brain-wide imaging and reconstruction of individual neurons. ELife, 2016, 5, e10566.	6.0	355
45	In vivo dendritic calcium dynamics in deep-layer cortical pyramidal neurons. Nature Neuroscience, 1999, 2, 989-996.	14.8	352
46	Reconstruction of 1,000 Projection Neurons Reveals New Cell Types and Organization of Long-Range Connectivity in the Mouse Brain. Cell, 2019, 179, 268-281.e13.	28.9	352
47	A Cre-Dependent GCaMP3 Reporter Mouse for Neuronal ImagingIn Vivo. Journal of Neuroscience, 2012, 32, 3131-3141.	3.6	341
48	A cortico-cerebellar loop for motor planning. Nature, 2018, 563, 113-116.	27.8	321
49	Distinct descending motor cortex pathways and their roles in movement. Nature, 2018, 563, 79-84.	27.8	320
50	Activity in motorâ€“sensory projections reveals distributed coding in somatosensation. Nature, 2012, 489, 299-303.	27.8	314
51	Organization of Cortical and Thalamic Input to Pyramidal Neurons in Mouse Motor Cortex. Journal of Neuroscience, 2013, 33, 748-760.	3.6	313
52	Rapid Redistribution of Synaptic PSD-95 in the Neocortex In Vivo. PLoS Biology, 2006, 4, e370.	5.6	308
53	A Cellular Resolution Map of Barrel Cortex Activity during Tactile Behavior. Neuron, 2015, 86, 783-799.	8.1	304
54	Vibrissa-Based Object Localization in Head-Fixed Mice. Journal of Neuroscience, 2010, 30, 1947-1967.	3.6	297

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55	Circuit Analysis of Experience-Dependent Plasticity in the Developing Rat Barrel Cortex. Neuron, 2003, 38, 277-289.	8.1	296
56	Synaptic calcium transients in single spines indicate that NMDA receptors are not saturated. Nature, 1999, 399, 151-155.	27.8	293
57	Facilitation at single synapses probed with optical quantal analysis. Nature Neuroscience, 2002, 5, 657-664.	14.8	290
58	Neural mechanisms of movement planning: motor cortex and beyond. Current Opinion in Neurobiology, 2018, 49, 33-41.	4.2	259
59	Analysis of calcium channels in single spines using optical fluctuation analysis. Nature, 2000, 408, 589-593.	27.8	255
60	Ephus: multipurpose data acquisition software for neuroscience experiments. Frontiers in Neural Circuits, 2010, 4, 100.	2.8	247
61	Supersensitive Ras activation in dendrites and spines revealed by two-photon fluorescence lifetime imaging. Nature Neuroscience, 2006, 9, 283-291.	14.8	246
62	Spread of dendritic excitation in layer 2/3 pyramidal neurons in rat barrel cortex in vivo. Nature Neuroscience, 1999, 2, 65-73.	14.8	244
63	Rapid Development and Plasticity of Layer 2/3 Maps in Rat Barrel Cortex In Vivo. Neuron, 2001, 31, 305-315.	8.1	241
64	NMDA Receptor Subunit-Dependent [Ca2+] Signaling in Individual Hippocampal Dendritic Spines. Journal of Neuroscience, 2005, 25, 6037-6046.	3.6	239
65	Geometric and functional organization of cortical circuits. Nature Neuroscience, 2005, 8, 782-790.	14.8	236
66	Discrete attractor dynamics underlies persistent activity in the frontal cortex. Nature, 2019, 566, 212-217.	27.8	235
67	Neural coding during active somatosensation revealed using illusory touch. Nature Neuroscience, 2013, 16, 958-965.	14.8	228
68	Monitoring Neural Activity and [Ca2+] with Genetically Encoded Ca2+ Indicators. Journal of Neuroscience, 2004, 24, 9572-9579.	3.6	218
69	Diverse Modes of Axon Elaboration in the Developing Neocortex. PLoS Biology, 2005, 3, e272.	5.6	204
70	Laminar Analysis of Excitatory Local Circuits in Vibrissal Motor and Sensory Cortical Areas. PLoS Biology, 2011, 9, e1000572.	5.6	204
71	A Map of Anticipatory Activity in Mouse Motor Cortex. Neuron, 2017, 94, 866-879.e4.	8.1	204
72	The Functional Microarchitecture of the Mouse Barrel Cortex. PLoS Biology, 2007, 5, e189.	5.6	199

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73	Induction of Spine Growth and Synapse Formation by Regulation of the Spine Actin Cytoskeleton. Neuron, 2004, 44, 321-334.	8.1	178
74	Multiple new site-specific recombinases for use in manipulating animal genomes. Proceedings of the National Academy of Sciences of the United States of America, 2011, 108, 14198-14203.	7.1	154
75	Recruitment of GABAergic Interneurons in the Barrel Cortex during Active Tactile Behavior. Neuron, 2019, 104, 412-427.e4.	8.1	150
76	Spatiotemporal constraints on optogenetic inactivation in cortical circuits. ELife, 2019, 8, .	6.0	150
77	Automated Tracking of Whiskers in Videos of Head Fixed Rodents. PLoS Computational Biology, 2012, 8, e1002591.	3.2	149
78	Characterization and Subcellular Targeting of GCaMP-Type Genetically-Encoded Calcium Indicators. PLoS ONE, 2008, 3, e1796.	2.5	139
79	Precise Development of Functional and Anatomical Columns in the Neocortex. Neuron, 2004, 42, 789-801.	8.1	138
80	Natural Whisker-Guided Behavior by Head-Fixed Mice in Tactile Virtual Reality. Journal of Neuroscience, 2014, 34, 9537-9550.	3.6	129
81	Reverse engineering the mouse brain. Nature, 2009, 461, 923-929.	27.8	127
82	The Mind of a Mouse. Cell, 2020, 182, 1372-1376.	28.9	127
83	The Mechanical Variables Underlying Object Localization along the Axis of the Whisker. Journal of Neuroscience, 2013, 33, 6726-6741.	3.6	126
84	Kilohertz frame-rate two-photon tomography. Nature Methods, 2019, 16, 778-786.	19.0	122
85	Functional clustering of dendritic activity during decision-making. ELife, 2019, 8, .	6.0	115
86	Neural signatures of dynamic stimulus selection in Drosophila. Nature Neuroscience, 2017, 20, 1104-1113.	14.8	113
87	Comprehensive imaging of cortical networks. Current Opinion in Neurobiology, 2015, 32, 115-123.	4.2	109
88	Layer 4 fast-spiking interneurons filter thalamocortical signals during active somatosensation. Nature Neuroscience, 2016, 19, 1647-1657.	14.8	104
89	Subcellular Dynamics of Type II PKA in Neurons. Neuron, 2009, 62, 363-374.	8.1	103
90	A comparison of neuronal population dynamics measured with calcium imaging and electrophysiology. PLoS Computational Biology, 2020, 16, e1008198.	3.2	102

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91	Nonlinear [Ca2+] Signaling in Dendrites and Spines Caused by Activity-Dependent Depression of Ca2+ Extrusion. Journal of Neuroscience, 2006, 26, 8183-8194.	3.6	101
92	Rapid mesoscale volumetric imaging of neural activity with synaptic resolution. Nature Methods, 2020, 17, 291-294.	19.0	99
93	Recurrent interactions in local cortical circuits. Nature, 2020, 579, 256-259.	27.8	98
94	Neural coding in barrel cortex during whisker-guided locomotion. ELife, 2015, 4, .	6.0	93
95	The Functional Properties of Barrel Cortex Neurons Projecting to the Primary Motor Cortex. Journal of Neuroscience, 2010, 30, 4256-4260.	3.6	88
96	Dual-Channel Circuit Mapping Reveals Sensorimotor Convergence in the Primary Motor Cortex. Journal of Neuroscience, 2015, 35, 4418-4426.	3.6	87
97	Low-Dimensional and Monotonic Preparatory Activity in Mouse Anterior Lateral Motor Cortex. Journal of Neuroscience, 2018, 38, 4163-4185.	3.6	83
98	Attractor dynamics gate cortical information flow during decision-making. Nature Neuroscience, 2021, 24, 843-850.	14.8	83
99	A midbrain-thalamus-cortex circuit reorganizes cortical dynamics to initiate movement. Cell, 2022, 185, 1065-1081.e23.	28.9	83
100	Low-noise encoding of active touch by layer 4 in the somatosensory cortex. ELife, 2015, 4, .	6.0	74
101	Thy1 transgenic mice expressing the red fluorescent calcium indicator jRGECO1a for neuronal population imaging in vivo. PLoS ONE, 2018, 13, e0205444.	2.5	73
102	EASI-FISH for thick tissue defines lateral hypothalamus spatio-molecular organization. Cell, 2021, 184, 6361-6377.e24.	28.9	72
103	A Neuron-Based Screening Platform for Optimizing Genetically-Encoded Calcium Indicators. PLoS ONE, 2013, 8, e77728.	2.5	66
104	Tapered whiskers are required for active tactile sensation. ELife, 2013, 2, e01350.	6.0	64
105	Targeted photostimulation uncovers circuit motifs supporting short-term memory. Nature Neuroscience, 2021, 24, 259-265.	14.8	64
106	Whisking. Current Biology, 2015, 25, R137-R140.	3.9	60
107	An International Laboratory for Systems and Computational Neuroscience. Neuron, 2017, 96, 1213-1218.	8.1	60
108	Circuits in the Rodent Brainstem that Control Whisking in Concert with Other Orofacial Motor Actions. Neuroscience, 2018, 368, 152-170.	2.3	57

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109	Anterolateral Motor Cortex Connects with a Medial Subdivision of Ventromedial Thalamus through Cell Type-Specific Circuits, Forming an Excitatory Thalamo-Cortico-Thalamic Loop via Layer 1 Apical Tuft Dendrites of Layer 5B Pyramidal Tract Type Neurons. Journal of Neuroscience, 2018, 38, 8787-8797.	3.6	56
110	A hybrid open-top light-sheet microscope for versatile multi-scale imaging of cleared tissues. Nature Methods, 2022, 19, 613-619.	19.0	54
111	Structural Plasticity within the Barrel Cortex during Initial Phases of Whisker-Dependent Learning. Journal of Neuroscience, 2014, 34, 6078-6083.	3.6	51
112	The Past, Present, and Future of Single Neuron Reconstruction. Neuroinformatics, 2011, 9, 97-98.	2.8	49
113	Imaging Neocortical Neurons through a Chronic Cranial Window. Cold Spring Harbor Protocols, 2012, 2012, pdb.prot069617-pdb.prot069617.	0.3	44
114	Mechanisms underlying a thalamocortical transformation during active tactile sensation. PLoS Computational Biology, 2017, 13, e1005576.	3.2	41
115	DIADEMchallenge.Org: A Compendium of Resources Fostering the Continuous Development of Automated Neuronal Reconstruction. Neuroinformatics, 2011, 9, 303-304.	2.8	31
116	A general approach to engineer positive-going eFRET voltage indicators. Nature Communications, 2020, 11, 3444.	12.8	31
117	Prediction of Choice from Competing Mechanosensory and Choice-Memory Cues during Active Tactile Decision Making. Journal of Neuroscience, 2019, 39, 3921-3933.	3.6	28
118	Neural Algorithms and Circuits for Motor Planning. Annual Review of Neuroscience, 2022, 45, 249-271.	10.7	28
119	An orderly single-trial organization of population dynamics in premotor cortex predicts behavioral variability. Nature Communications, 2019, 10, 216.	12.8	26
120	High-fidelity estimates of spikes and subthreshold waveforms from 1-photon voltage imaging inÂvivo. Cell Reports, 2021, 35, 108954.	6.4	24
121	Accurate Localization of Linear Probe Electrode Arrays across Multiple Brains. ENeuro, 2021, 8, ENEURO.0241-21.2021.	1.9	16
122	Dynamic cues for whisker-based object localization: An analytical solution to vibration during active whisker touch. PLoS Computational Biology, 2018, 14, e1006032.	3.2	10
123	Response to â€œFallacies of Mice Experimentsâ€• Neuroinformatics, 2019, 17, 475-478.	2.8	5
124	High throughput instrument to screen fluorescent proteins under two-photon excitation. Biomedical Optics Express, 2020, 11, 7192.	2.9	4
125	Imaging the Neural Symphony. Cerebrum: the Dana Forum on Brain Science, 2016, 2016, .	0.1	2
126	Reconstruction of 1,000 Projection Neurons Reveals New Cell Types and Organization of Long-Range Connectivity in the Mouse Brain. SSRN Electronic Journal, 0, , .	0.4	1

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127	[PL06]: Illuminating cortical synapses and circuits. International Journal of Developmental Neuroscience, 2008, 26, 828-828.	1.6	0
128	Flow of Information Underlying a Tactile Decision in Mice. Research and Perspectives in Neurosciences, 2016, , 35-41.	0.4	0
129	A comparison of neuronal population dynamics measured with calcium imaging and electrophysiology. , 2020, 16, e1008198.		0
130	A comparison of neuronal population dynamics measured with calcium imaging and electrophysiology. , 2020, 16, e1008198.		0
131	A comparison of neuronal population dynamics measured with calcium imaging and electrophysiology. , 2020, 16, e1008198.		0
132	A comparison of neuronal population dynamics measured with calcium imaging and electrophysiology. , 2020, 16, e1008198.		0