Edward S Boyden

List of Publications by Year
in descending order

149 papers	27,283 citations	17776 65 h-index	10679 143 g-index
188 all docs	188 docs citations	188 times ranked	29411 citing authors

#	Article	IF	Citations
1	Autism genes converge on asynchronous development of shared neuron classes. Nature, 2022, 602, 268-273.	13.7	180
2	ExCel: Super-Resolution Imaging of C. elegans with Expansion Microscopy. Methods in Molecular Biology, 2022, 2468, 141-203.	0.4	2
3	Abstract PD6-03: Spatio-molecular dissection of the breast cancer metastatic microenvironment. Cancer Research, 2022, 82, PD6-03-PD6-03.	0.4	0
4	Rapid directed molecular evolution of fluorescent proteins in mammalian cells. Protein Science, 2022, 31, 728-751.	3.1	11
5	Tuning the Sensitivity of Genetically Encoded Fluorescent Potassium Indicators through Structure-Guided and Genome Mining Strategies. ACS Sensors, 2022, 7, 1336-1346.	4.0	17
6	Neuronal activity drives pathway-specific depolarization of peripheral astrocyte processes. Nature Neuroscience, 2022, 25, 607-616.	7.1	30
7	RNA timestamps identify the age of single molecules in RNA sequencing. Nature Biotechnology, 2021, 39, 320-325.	9.4	35
8	Expansion sequencing: Spatially precise in situ transcriptomics in intact biological systems. Science, 2021, 371, .	6.0	197
9	Restoration of breathing after opioid overdose and spinal cord injury using temporal interference stimulation. Communications Biology, 2021, 4, 107.	2.0	21
10	In situ genome sequencing resolves DNA sequence and structure in intact biological samples. Science, 2021, 371, .	6.0	141
11	A highly homogeneous polymer composed of tetrahedron-like monomers for high-isotropy expansion microscopy. Nature Nanotechnology, 2021, 16, 698-707.	15.6	43
12	Barcoded oligonucleotides ligated on RNA amplified for multiplexed and parallel <i>in situ</i> analyses. Nucleic Acids Research, 2021, 49, e58-e58.	6.5	39
13	Tetra-gel enables superior accuracy in combined super-resolution imaging and expansion microscopy. Scientific Reports, 2021, 11, 16944.	1.6	16
14	Implosion Fabrication as a Platform for Three-Dimensional Nanophotonics. , 2021, , .		0
15	Large-scale voltage imaging in behaving mice using targeted illumination. IScience, 2021, 24, 103263.	1.9	21
16	Inhibition of LRRK2 kinase activity promotes anterograde axonal transport and presynaptic targeting of Î±-synuclein. Acta Neuropathologica Communications, 2021, 9, 180.	2.4	16
17	Integrated Neurophotonics: Toward Dense Volumetric Interrogation of Brain Circuit Activityâ€”at Depth and in Real Time. Neuron, 2020, 108, 66-92.	3.8	40
18	Spatial Multiplexing of Fluorescent Reporters for Imaging Signaling Network Dynamics. Cell, 2020, 183, 1682-1698.e24.	13.5	38

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19	Light microscopy based approach for mapping connectivity with molecular specificity. Nature Communications, 2020, 11, 4632.	5.8	32
20	Expansion Microscopy for Beginners: Visualizing Microtubules in Expanded Cultured HeLa Cells. Current Protocols in Neuroscience, 2020, 92, e96.	2.6	18
21	Nanoscale imaging of clinical specimens using conventional and rapid-expansion pathology. Nature Protocols, 2020, 15, 1649-1672.	5.5	28
22	Novel Genetically Encoded Bright Positive Calcium Indicator NCaMP7 Based on the mNeonGreen Fluorescent Protein. International Journal of Molecular Sciences, 2020, 21, 1644.	1.8	33
23	Precision Calcium Imaging of Dense Neural Populations via a Cell-Body-Targeted Calcium Indicator. Neuron, 2020, 107, 470-486.e11.	3.8	87
24	All-Optical Electrophysiology Reveals the Role of Lateral Inhibition in Sensory Processing in Cortical Layer 1. Cell, 2020, 180, 521-535.e18.	13.5	124
25	Sparse decomposition light-field microscopy for high speed imaging of neuronal activity. Optica, 2020, 7, 1457.	4.8	43
26	Improved genetically encoded near-infrared fluorescent calcium ion indicators for in vivo imaging. PLoS Biology, 2020, 18, e3000965.	2.6	62
27	Expansion microscopy of C. elegans. ELife, 2020, 9, .	2.8	59
28	Expansion microscopy: enabling single cell analysis in intact biological systems. FEBS Journal, 2019, 286, 1482-1494.	2.2	31
29	Immuno-SABER enables highly multiplexed and amplified protein imaging in tissues. Nature Biotechnology, 2019, 37, 1080-1090.	9.4	301
30	Silencing cortical activity during sound-localization training impairs auditory perceptual learning. Nature Communications, 2019, 10, 3075.	5.8	26
31	Advances in the automation of whole-cell patch clamp technology. Journal of Neuroscience Methods, 2019, 326, 108357.	1.3	45
32	Multiplexed and high-throughput neuronal fluorescence imaging with diffusible probes. Nature Communications, 2019, 10, 4377.	5.8	63
33	Physical magnification of objects. Materials Horizons, 2019, 6, 11-13.	6.4	0
34	A genetically encoded near-infrared fluorescent calcium ion indicator. Nature Methods, 2019, 16, 171-174.	9.0	154
35	A theoretical analysis of single molecule protein sequencing via weak binding spectra. PLoS ONE, 2019, 14, e0212868.	1.1	15
36	Architecting Discovery: A Model for How Engineers Can Help Invent Tools for Neuroscience. Neuron, 2019, 102, 523-525.	3.8	0

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37	Gamma Entrainment Binds Higher-Order Brain Regions and Offers Neuroprotection. Neuron, 2019, 102, 929-943.e8.	3.8	252
38	Multi-sensory Gamma Stimulation Ameliorates Alzheimerâ€™s-Associated Pathology and Improves Cognition. Cell, 2019, 177, 256-271.e22.	13.5	423
39	Autonomous patch-clamp robot for functional characterization of neurons in vivo: development and application to mouse visual cortex. Journal of Neurophysiology, 2019, 121, 2341-2357.	0.9	26
40	PatcherBot: a single-cell electrophysiology robot for adherent cells and brain slices. Journal of Neural Engineering, 2019, 16, 046003.	1.8	32
41	Optogenetics: Tools for Controlling Brain Cells with Light. Molecular Frontiers Journal, 2019, 03, 129-137.	0.9	0
42	Population imaging of neural activity in awake behaving mice. Nature, 2019, 574, 413-417.	13.7	190
43	Imaging cellular ultrastructures using expansion microscopy (U-ExM). Nature Methods, 2019, 16, 71-74.	9.0	335
44	Expansion microscopy: principles and uses in biological research. Nature Methods, 2019, 16, 33-41.	9.0	330
45	Cortical column and whole-brain imaging with molecular contrast and nanoscale resolution. Science, 2019, 363, .	6.0	277
46	Multidimensional screening yields channelrhodopsin variants having improved photocurrent and order-of-magnitude reductions in calcium and proton currents. Journal of Biological Chemistry, 2019, 294, 3806-3821.	1.6	25
47	Investigating the feasibility of channelrhodopsin variants for nanoscale optogenetics. Neurophotonics, 2019, 6, 1.	1.7	15
48	A robotic multidimensional directed evolution approach applied to fluorescent voltage reporters. Nature Chemical Biology, 2018, 14, 352-360.	3.9	264
49	Evidence for Long-Timescale Patterns of Synaptic Inputs in CA1 of Awake Behaving Mice. Journal of Neuroscience, 2018, 38, 1821-1834.	1.7	6
50	Expansion microscopy: development and neuroscience applications. Current Opinion in Neurobiology, 2018, 50, 56-63.	2.0	43
51	Glyoxal as an alternative fixative to formaldehyde in immunostaining and superâ€resolution microscopy. EMBO Journal, 2018, 37, 139-159.	3.5	206
52	3D nanofabrication by volumetric deposition and controlled shrinkage of patterned scaffolds. Science, 2018, 362, 1281-1285.	6.0	116
53	Translating Temporal Interference Brain Stimulation to Treat Neurological and Psychiatric Conditions. JAMA Neurology, 2018, 75, 1307.	4.5	29
54	New observations in neuroscience using superresolution microscopy. Journal of Neuroscience, 2018, 38, 9459-9467.	1.7	50

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55	Scalable, Modular Three-Dimensional Silicon Microelectrode Assembly via Electroless Plating. Micromachines, 2018, 9, 436.	1.4	4
56	Light sheet theta microscopy for rapid high-resolution imaging of large biological samples. BMC Biology, 2018, 16, 57.	1.7	86
57	Automated in vivo patch-clamp evaluation of extracellular multielectrode array spike recording capability. Journal of Neurophysiology, 2018, 120, 2182-2200.	0.9	19
58	Expansion Microscopy: Protocols for Imaging Proteins and RNA in Cells and Tissues. Current Protocols in Cell Biology, 2018, 80, e56.	2.3	136
59	Multi-neuron intracellular recording in vivo via interacting autopatching robots. ELife, 2018, 7, .	2.8	40
60	A Suite of Transgenic Driver and Reporter Mouse Lines with Enhanced Brain-Cell-Type Targeting and Functionality. Cell, 2018, 174, 465-480.e22.	13.5	571
61	Influenza virus exploits tunneling nanotubes for cell-to-cell spread. Scientific Reports, 2017, 7, 40360.	1.6	110
62	Iterative expansion microscopy. Nature Methods, 2017, 14, 593-599.	9.0	279
63	Wide-field three-photon excitation in biological samples. Light: Science and Applications, 2017, 6, e16255-e16255.	7.7	67
64	Cell diversity and network dynamics in photosensitive human brain organoids. Nature, 2017, 545, 48-53.	13.7	933
65	Emerging Trends in Micro- and Nanoscale Technologies in Medicine: From Basic Discoveries to Translation. ACS Nano, 2017, 11, 5195-5214.	7.3	104
66	Noninvasive Deep Brain Stimulation via Temporally Interfering Electric Fields. Cell, 2017, 169, 1029-1041.e16.	13.5	536
67	Expansion mini-microscopy: An enabling alternative in point-of-care diagnostics. Current Opinion in Biomedical Engineering, 2017, 1, 45-53.	1.8	11
68	Sonofragmentation of Ultrathin 1D Nanomaterials. Particle and Particle Systems Characterization, 2017, 34, 1600339.	1.2	4
69	Submillisecond Optogenetic Control of Neuronal Firing with Two-Photon Holographic Photoactivation of Chronos. Journal of Neuroscience, 2017, 37, 10679-10689.	1.7	100
70	Large Volume, Behaviorally-relevant Illumination for Optogenetics in Non-human Primates. Journal of Visualized Experiments, 2017, , .	0.2	2
71	Near-Infrared Fluorescent Proteins Engineered from Bacterial Phytochromes in Neuroimaging. Biophysical Journal, 2017, 113, 2299-2309.	0.2	42
72	Closed-Loop Real-Time Imaging Enables Fully Automated Cell-Targeted Patch-Clamp Neural Recording InÂVivo. Neuron, 2017, 95, 1037-1047.e11.	3.8	45

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73	Rapid Sequential in Situ Multiplexing with DNA Exchange Imaging in Neuronal Cells and Tissues. Nano Letters, 2017, 17, 6131-6139.	4.5	116
74	Nanoscale imaging of clinical specimens using pathology-optimized expansion microscopy. Nature Biotechnology, 2017, 35, 757-764.	9.4	182
75	Expansion microscopy of zebrafish for neuroscience and developmental biology studies. Proceedings of the National Academy of Sciences of the United States of America, 2017, 114, E10799-E10808.	3.3	73
76	Temporally precise single-cell-resolution optogenetics. Nature Neuroscience, 2017, 20, 1796-1806.	7.1	227
77	Q&A: Expansion microscopy. BMC Biology, 2017, 15, 50.	1.7	49
78	Feasibility of 3D Reconstruction of Neural Morphology Using Expansion Microscopy and Barcode-Guided Agglomeration. Frontiers in Computational Neuroscience, 2017, 11, 97.	1.2	16
79	Mesoscale-duration activated states gate spiking in response to fast rises in membrane voltage in the awake brain. Journal of Neurophysiology, 2017, 118, 1270-1291.	0.9	6
80	Protein-retention expansion microscopy of cells and tissues labeled using standard fluorescent proteins and antibodies. Nature Biotechnology, 2016, 34, 987-992.	9.4	510
81	Nanoscale imaging of RNA with expansion microscopy. Nature Methods, 2016, 13, 679-684.	9.0	314
82	Functional and topological diversity of LOV domain photoreceptors. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113, E1442-51.	3.3	125
83	Transient optogenetic inactivation of the medial entorhinal cortex biases the active population of hippocampal neurons. Hippocampus, 2016, 26, 246-260.	0.9	45
84	Multiplexed neural recording along a single optical fiber via optical reflectometry. Journal of Biomedical Optics, 2016, 21, 057003.	1.4	3
85	Assembly and operation of the autopatcher for automated intracellular neural recording in vivo. Nature Protocols, 2016, 11, 634-654.	5.5	53
86	Modulation of nitrogen vacancy charge state and fluorescence in nanodiamonds using electrochemical potential. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113, 3938-3943.	3.3	77
87	Programmable RNA-binding protein composed of repeats of a single modular unit. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113, E2579-88.	3.3	56
88	Striosomeâ€“dendron bouquets highlight a unique striatonigral circuit targeting dopamine-containing neurons. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113, 11318-11323.	3.3	112
89	Hybrid Microscopy: Enabling Inexpensive High-Performance Imaging through Combined Physical and Optical Magnifications. Scientific Reports, 2016, 6, 22691.	1.6	44
90	Integration of autopatching with automated pipette and cell detection in vitro. Journal of Neurophysiology, 2016, 116, 1564-1578.	0.9	39

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91	Heterogeneous neural amplifier integration for scalable extracellular microelectrodes. , 2016, 2016, 2789-2793.		6
92	Close-Packed Silicon Microelectrodes for Scalable Spatially Oversampled Neural Recording. IEEE Transactions on Biomedical Engineering, 2016, 63, 120-130.	2.5	168
93	Stress Enables Reinforcement-Elicited Serotonergic Consolidation of Fear Memory. Biological Psychiatry, 2016, 79, 814-822.	0.7	50
94	Abstract 4229: Physical expansion of tissue microarrays for high-resolution imaging of normal and cancer samples with conventional microscopy. , 2016, , .		6
95	A direct-to-drive neural data acquisition system. Frontiers in Neural Circuits, 2015, 9, 46.	1.4	16
96	Optogenetic stimulation of the cochlear nucleus using channelrhodopsin-2 evokes activity in the central auditory pathways. Brain Research, 2015, 1599, 44-56.	1.1	23
97	Superior temporal resolution of Chronos versus channelrhodopsin-2 in an optogenetic model of the auditory brainstem implant. Hearing Research, 2015, 322, 235-241.	0.9	53
98	Expansion microscopy. Science, 2015, 347, 543-548.	6.0	1,131
99	Hearing the light: neural and perceptual encoding of optogenetic stimulation in the central auditory pathway. Scientific Reports, 2015, 5, 10319.	1.6	42
100	Closed-loop, ultraprecise, automated craniotomies. Journal of Neurophysiology, 2015, 113, 3943-3953.	0.9	31
101	Optogenetic and pharmacological suppression of spatial clusters of face neurons reveal their causal role in face gender discrimination. Proceedings of the National Academy of Sciences of the United States of America, 2015, 112, 6730-6735.	3.3	143
102	Principles of designing interpretable optogenetic behavior experiments. Learning and Memory, 2015, 22, 232-238.	0.5	110
103	Optogenetics and the future of neuroscience. Nature Neuroscience, 2015, 18, 1200-1201.	7.1	140
104	Processes for design, construction and utilisation of arrays of lightâ€emitting diodes and lightâ€emitting diodeâ€coupled optical fibres for multiâ€site brain light delivery. Journal of Engineering, 2015, 2015, 177-184.	0.6	11
105	Microchip amplifier for in vitro, in vivo, and automated whole cell patch-clamp recording. Journal of Neurophysiology, 2015, 113, 1275-1282.	0.9	16
106	Inhibiting the Activity of CA1 Hippocampal Neurons Prevents the Recall of Contextual Fear Memory in Inducible ArchT Transgenic Mice. PLoS ONE, 2015, 10, e0130163.	1.1	11
107	A fully genetically encoded protein architecture for optical control of peptide ligand concentration. Nature Communications, 2014, 5, 3019.	5.8	55
108	Independent optical excitation of distinct neural populations. Nature Methods, 2014, 11, 338-346.	9.0	1,879

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109	Simultaneous whole-animal 3D imaging of neuronal activity using light-field microscopy. Nature Methods, 2014, 11, 727-730.	9.0	672
110	Designing Tools for Assumption-Proof Brain Mapping. Neuron, 2014, 83, 1239-1241.	3.8	5
111	Optogenetic astrocyte activation modulates response selectivity of visual cortex neurons in vivo. Nature Communications, 2014, 5, 3262.	5.8	195
112	Noninvasive optical inhibition with a red-shifted microbial rhodopsin. Nature Neuroscience, 2014, 17, 1123-1129.	7.1	480
113	All-optical electrophysiology in mammalian neurons using engineered microbial rhodopsins. Nature Methods, 2014, 11, 825-833.	9.0	666
114	Spatial information in large-scale neural recordings. Frontiers in Computational Neuroscience, 2014, 8, 172.	1.2	7
115	Optogenetics and Translational Medicine. Science Translational Medicine, 2013, 5, 177ps5.	5.8	99
116	Nanotools for Neuroscience and Brain Activity Mapping. ACS Nano, 2013, 7, 1850-1866.	7.3	323
117	<i>In vivo</i> robotics: the automation of neuroscience and other intactâ€system biological fields. Annals of the New York Academy of Sciences, 2013, 1305, 63-71.	1.8	8
118	Optogenetics: Molecular and Optical Tools for Controlling Life with Light. , 2013, , .		0
119	Physical principles for scalable neural recording. Frontiers in Computational Neuroscience, 2013, 7, 137.	1.2	215
120	Three-dimensional multiwaveguide probe array for light delivery to distributed brain circuits. Optics Letters, 2012, 37, 4841.	1.7	171
121	Automated whole-cell patch-clamp electrophysiology of neurons in vivo. Nature Methods, 2012, 9, 585-587.	9.0	214
122	Genetically encoded molecular tools for light-driven silencing of targeted neurons. Progress in Brain Research, 2012, 196, 49-61.	0.9	43
123	A toolbox of Cre-dependent optogenetic transgenic mice for light-induced activation and silencing. Nature Neuroscience, 2012, 15, 793-802.	7.1	1,153
124	Optogenetics and thermogenetics: technologies for controlling the activity of targeted cells within intact neural circuits. Current Opinion in Neurobiology, 2012, 22, 61-71.	2.0	168
125	Optogenetic Mimicry of the Transient Activation of Dopamine Neurons by Natural Reward Is Sufficient for Operant Reinforcement. PLoS ONE, 2012, 7, e33612.	1.1	118
126	Measuring Cation Dependent DNA Polymerase Fidelity Landscapes by Deep Sequencing. PLoS ONE, 2012, 7, e43876.	1.1	54

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127	A gene-fusion strategy for stoichiometric and co-localized expression of light-gated membrane proteins. Nature Methods, 2011, 8, 1083-1088.	9.0	79
128	Towards optogenetic sensory replacement. , 2011, 2011, 3139-41.		6
129	Optogenetic tools for analyzing the neural circuits of behavior. Trends in Cognitive Sciences, 2011, 15, 592-600.	4.0	246
130	A history of optogenetics: the development of tools for controlling brain circuits with light. F1000 Biology Reports, 2011, 3, 11.	4.0	169
131	A High-Light Sensitivity Optical Neural Silencer: Development and Application to Optogenetic Control of Non-Human Primate Cortex. Frontiers in Systems Neuroscience, 2011, 5, 18.	1.2	421
132	A wirelessly powered and controlled device for optical neural control of freely-behaving animals. Journal of Neural Engineering, 2011, 8, 046021.	1.8	222
133	Synthetic Physiology. Methods in Enzymology, 2011, 497, 425-443.	0.4	10
134	Virally delivered Channelrhodopsin-2 Safely and Effectively Restores Visual Function in Multiple Mouse Models of Blindness. Molecular Therapy, 2011, 19, 1220-1229.	3.7	261
135	Acute Optogenetic Silencing of Orexin/Hypocretin Neurons Induces Slow-Wave Sleep in Mice. Journal of Neuroscience, 2011, 31, 10529-10539.	1.7	235
136	Light-Activated Ion Pumps and Channels for Temporally Precise Optical Control of Activity in Genetically Targeted Neurons. Neuromethods, 2011, , 99-132.	0.2	1
137	Optogenetics: using light to control the brain. Cerebrum: the Dana Forum on Brain Science, 2011, 2011, 16.	0.1	5
138	Scalable Fluidic Injector Arrays for Viral Targeting of Intact 3-D Brain Circuits. Journal of Visualized Experiments, 2010, , .	0.2	8
139	High-performance genetically targetable optical neural silencing by light-driven proton pumps. Nature, 2010, 463, 98-102.	13.7	1,075
140	Toward the Second Generation of Optogenetic Tools. Journal of Neuroscience, 2010, 30, 14998-15004.	1.7	95
141	Multiwaveguide implantable probe for light delivery to sets of distributed brain targets. Optics Letters, 2010, 35, 4133.	1.7	160
142	Informational Lesions: Optical Perturbation of Spike Timing and Neural Synchrony Via Microbial Opsin Gene Fusions. Frontiers in Molecular Neuroscience, 2009, 2, 12.	1.4	28
143	Millisecond-Timescale Optical Control of Neural Dynamics in the Nonhuman Primate Brain. Neuron, 2009, 62, 191-198.	3.8	460
144	Prosthetic systems for therapeutic optical activation and silencing of genetically targeted neurons. Proceedings of SPIE, 2008, 6854, 68540H.	0.8	57

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145	Multiple-Color Optical Activation, Silencing, and Desynchronization of Neural Activity, with Single-Spike Temporal Resolution. PLoS ONE, 2007, 2, e299.	1.1	547
146	Selective Engagement of Plasticity Mechanisms for Motor Memory Storage. Neuron, 2006, 51, 823-834.	3.8	130
147	Millisecond-timescale, genetically targeted optical control of neural activity. Nature Neuroscience, 2005, 8, 1263-1268.	7.1	4,110
148	CEREBELLUM-DEPENDENT LEARNING: The Role of Multiple Plasticity Mechanisms. Annual Review of Neuroscience, 2004, 27, 581-609.	5.0	392
149	Active Reversal of Motor Memories Reveals Rules Governing Memory Encoding. Neuron, 2003, 39, 1031-1042.	3.8	112