Michael J Shelley

List of Publications by Year
in descending order

159 papers	11,790 citations	26630 56 h-index	29157 104 g-index
169 all docs	169 docs citations	169 times ranked	7109 citing authors

#	Article	IF	Citations
1	Fast liquid-crystal elastomer swims into the dark. Nature Materials, 2004, 3, 307-310.	27.5	894
2	Flexible filaments in a flowing soap film as a model for one-dimensional flags in a two-dimensional wind. Nature, 2000, 408, 835-839.	27.8	604
3	Removing the stiffness from interfacial flows with surface tension. Journal of Computational Physics, 1994, 114, 312-338.	3.8	448
4	Instabilities and Pattern Formation in Active Particle Suspensions: Kinetic Theory and Continuum Simulations. Physical Review Letters, 2008, 100, 178103.	7.8	366
5	Flapping and Bending Bodies Interacting with Fluid Flows. Annual Review of Fluid Mechanics, 2011, 43, 449-465.	25.0	321
6	Simulating the dynamics and interactions of flexible fibers in Stokes flows. Journal of Computational Physics, 2004, 196, 8-40.	3.8	314
7	The mechanics of slithering locomotion. Proceedings of the National Academy of Sciences of the United States of America, 2009, 106, 10081-10085.	7.1	302
8	Orientational Order and Instabilities in Suspensions of Self-Locomoting Rods. Physical Review Letters, 2007, 99, 058102.	7.8	277
9	Instabilities, pattern formation, and mixing in active suspensions. Physics of Fluids, 2008, 20, .	4.0	270
10	A neuronal network model of macaque primary visual cortex (V1): Orientation selectivity and dynamics in the input layer 4Calpha. Proceedings of the National Academy of Sciences of the United States of America, 2000, 97, 8087-8092.	7.1	228
11	Drag reduction through self-similar bending of a flexible body. Nature, 2002, 420, 479-481.	27.8	225
12	Viscoelastic Fluid Response Can Increase the Speed and Efficiency of a Free Swimmer. Physical Review Letters, 2010, 104, 038101.	7.8	222
13	Flapping States of a Flag in an Inviscid Fluid: Bistability and the Transition to Chaos. Physical Review Letters, 2008, 100, 074301.	7.8	213
14	Active suspensions and their nonlinear models. Comptes Rendus Physique, 2013, 14, 497-517.	0.9	206
15	Hydrodynamic capture of microswimmers into sphere-bound orbits. Soft Matter, 2014, 10, 1784.	2.7	198
16	Heavy Flags Undergo Spontaneous Oscillations in Flowing Water. Physical Review Letters, 2005, 94, 094302.	7.8	182
17	Boundary Integral Methods for Multicomponent Fluids and Multiphase Materials. Journal of Computational Physics, 2001, 169, 302-362.	3.8	175
18	The odd free surface flows of a colloidal chiral fluid. Nature Physics, 2019, 15, 1188-1194.	16.7	174

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19	Droplet breakup in a model of the Hele-Shaw cell. Physical Review E, 1993, 47, 4169-4181.	2.1	148
20	Coherent locomotion as an attracting state for a free flapping body. Proceedings of the National Academy of Sciences of the United States of America, 2005, 102, 11163-11166.	7.1	143
21	Emergence of coherent structures and large-scale flows in motile suspensions. Journal of the Royal Society Interface, 2012, 9, 571-585.	3.4	138
22	Non-Newtonian Hele-Shaw Flow and the Saffman-Taylor Instability. Physical Review Letters, 1998, 80, 1433-1436.	7.8	134
23	Dynamics of Flexible Fibers in Viscous Flows and Fluids. Annual Review of Fluid Mechanics, 2019, 51, 539-572.	25.0	130
24	An egalitarian network model for the emergence of simple and complex cells in visual cortex. Proceedings of the National Academy of Sciences of the United States of America, 2004, 101, 366-371.	7.1	129
25	A study of singularity formation in vortex-sheet motion by a spectrally accurate vortex method. Journal of Fluid Mechanics, 1992, 244, 493.	3.4	128
26	Multiscale Polar Theory of Microtubule and Motor-Protein Assemblies. Physical Review Letters, 2015, 114, 048101.	7.8	119
27	Active contraction of microtubule networks. ELife, 2015, 4, .	6.0	112
28	An effective kinetic representation of fluctuation-driven neuronal networks with application to simple and complex cells in visual cortex. Proceedings of the National Academy of Sciences of the United States of America, 2004, 101, 7757-7762.	7.1	111
29	Hele - Shaw flow and pattern formation in a time-dependent gap. Nonlinearity, 1997, 10, 1471-1495.	1.4	109
30	Instability of Elastic Filaments in Shear Flow Yields First-Normal-Stress Differences. Physical Review Letters, 2001, 87, 198301.	7.8	107
31	Surprising behaviors in flapping locomotion with passive pitching. Physics of Fluids, 2010, 22, .	4.0	105
32	How Simple Cells Are Made in a Nonlinear Network Model of the Visual Cortex. Journal of Neuroscience, 2001, 21, 5203-5211.	3.6	101
33	C. elegans chromosomes connect to centrosomes by anchoring into the spindle network. Nature Communications, 2017, 8, 15288.	12.8	101
34	How flexibility induces streamlining in a two-dimensional flow. Physics of Fluids, 2004, 16, 1694-1713.	4.0	100
35	Stability of active suspensions. Physical Review E, 2010, 81, 046311.	2.1	95
36	Hydrodynamic schooling of flapping swimmers. Nature Communications, 2015, 6, 8514.	12.8	95

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37	Topology transitions and singularities in viscous flows. Physical Review Letters, 1993, 70, 3043-3046.	7.8	93
38	Mexican hats and pinwheels in visual cortex. Proceedings of the National Academy of Sciences of the United States of America, 2003, 100, 2848-2853.	7.1	92
39	Stretch-Coil Transition and Transport of Fibers in Cellular Flows. Physical Review Letters, 2007, 99, 058303.	7.8	90
40	Models of non-Newtonian Hele-Shaw flow. Physical Review E, 1996, 54, R4536-R4539.	2.1	86
41	Self-focussed optical structures in a nematic liquid crystal. Physica D: Nonlinear Phenomena, 1996, 97, 471-497.	2.8	86
42	Optimization of Chiral Structures for Microscale Propulsion. Nano Letters, 2013, 13, 531-537.	9.1	86
43	Efficient and accurate time-stepping schemes for integrate-and-fire neuronal networks. Journal of Computational Neuroscience, 2001, 11, 111-119.	1.0	84
44	Dispersion of Self-Propelled Rods Undergoing Fluctuation-Driven Flips. Physical Review Letters, 2013, 110, 038301.	7.8	83
45	Extensile motor activity drives coherent motions in a model of interphase chromatin. Proceedings of the National Academy of Sciences of the United States of America, 2018, 115, 11442-11447.	7.1	83
46	Dynamical aspects of vortex reconnection of perturbed anti-parallel vortex tubes. Journal of Fluid Mechanics, 1993, 246, 613-652.	3.4	82
47	The Dynamics of Microtubule/Motor-Protein Assemblies in Biology and Physics. Annual Review of Fluid Mechanics, 2016, 48, 487-506.	25.0	79
48	Pattern formation in non-Newtonian Heleâ€“Shaw flow. Physics of Fluids, 2001, 13, 1191-1212.	4.0	77
49	Instabilities and nonlinear dynamics of concentrated active suspensions. Physics of Fluids, 2013, 25, .	4.0	77
50	States of high conductance in a large-scale model of the visual cortex. Journal of Computational Neuroscience, 2002, 13, 93-109.	1.0	75
51	Emergence of singular structures in Oldroyd-B fluids. Physics of Fluids, 2007, 19, .	4.0	72
52	LFP spectral peaks in V1 cortex: network resonance and cortico-cortical feedback. Journal of Computational Neuroscience, 2010, 29, 495-507.	1.0	69
53	Dynamic self-assembly of microscale rotors and swimmers. Soft Matter, 2016, 12, 4584-4589.	2.7	69
54	Falling cards. Journal of Fluid Mechanics, 2005, 540, 393.	3.4	67

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55	A fast platform for simulating semi-flexible fiber suspensions applied to cell mechanics. Journal of Computational Physics, 2017, 329, 173-209.	3.8	65
56	The Stokesian hydrodynamics of flexing, stretching filaments. Physica D: Nonlinear Phenomena, 2000, 146, 221-245.	2.8	63
57	Experiments and theory of undulatory locomotion in a simple structured medium. Journal of the Royal Society Interface, 2012, 9, 1809-1823.	3.4	62
58	Dynamic Patterns and Self-Knotting of a Driven Hanging Chain. Physical Review Letters, 2001, 87, 114301.	7.8	57
59	A model of cytoplasmically driven microtubule-based motion in the single-celled <i>Caenorhabditis elegans</i> embryo. Proceedings of the National Academy of Sciences of the United States of America, 2011, 108, 10508-10513.	7.1	57
60	Liquid crystal droplet production in a microfluidic device. Liquid Crystals, 2007, 34, 861-870.	2.2	56
61	Searching for Autocoherence in the Cortical Network with a Time-Frequency Analysis of the Local Field Potential. Journal of Neuroscience, 2010, 30, 4033-4047.	3.6	54
62	Transition to Mixing and Oscillations in a Stokesian Viscoelastic Flow. Physical Review Letters, 2009, 103, 094501.	7.8	51
63	Analytical structure, dynamics, and coarse graining of a kinetic model of an active fluid. Physical Review Fluids, 2017, 2, .	2.5	50
64	Peristaltic pumping and irreversibility of a Stokesian viscoelastic fluid. Physics of Fluids, 2008, 20, .	4.0	49
65	Cytoplasmic flows as signatures for the mechanics of mitotic positioning. Molecular Biology of the Cell, 2017, 28, 3261-3270.	2.1	49
66	A paraxial model for optical self-focussing in a nematic liquid crystal. Physica D: Nonlinear Phenomena, 1995, 88, 55-81.	2.8	48
67	Filamentation and Undulation of Self-Focused Laser Beams in Liquid Crystals. Europhysics Letters, 1993, 23, 239-244.	2.0	47
68	Collective chemotactic dynamics in the presence of self-generated fluid flows. Physical Review E, 2012, 86, 040902.	2.1	47
69	Guiding microscale swimmers using teardrop-shaped posts. Soft Matter, 2017, 13, 4681-4688.	2.7	47
70	Instabilities and singularities in Heleâ€“Shaw flow. Physics of Fluids, 1998, 10, 2701-2723.	4.0	46
71	Collective Surfing of Chemically Active Particles. Physical Review Letters, 2014, 112, 128304.	7.8	46
72	A numerical study of the effect of surface tension and noise on an expanding Heleâ€“Shaw bubble. Physics of Fluids A, Fluid Dynamics, 1993, 5, 2131-2146.	1.6	44

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73	Transport and buckling dynamics of an elastic fibre in a viscous cellular flow. Journal of Fluid Mechanics, 2015, 769, 387-402.	3.4	44
74	Sculpting of an erodible body by flowing water. Proceedings of the National Academy of Sciences of the United States of America, 2012, 109, 19606-19609.	7.1	43
75	Shape optimization of peristaltic pumping. Journal of Computational Physics, 2010, 229, 1260-1291.	3.8	42
76	Rotational dynamics of a superhelix towed in a Stokes fluid. Physics of Fluids, 2007, 19, 103105.	4.0	41
77	Applying a second-kind boundary integral equation for surface tractions in Stokes flow. Journal of Computational Physics, 2011, 230, 2141-2159.	3.8	41
78	Modeling and simulation of liquid-crystal elastomers. Physical Review E, 2011, 83, 051703.	2.1	41
79	Theory of Active Suspensions. Biological and Medical Physics Series, 2015, , 319-355.	0.4	41
80	Bistability in the synchronization of actuatedÂmicrofilaments. Journal of Fluid Mechanics, 2018, 836, 304-323.	3.4	39
81	Focused Force Transmission through an Aqueous Suspension of Granules. Physical Review Letters, 2010, 105, 188301.	7.8	38
82	Relating Rheotaxis and Hydrodynamic Actuation using Asymmetric Gold-Platinum Phoretic Rods. Physical Review Letters, 2019, 123, 178004.	7.8	38
83	Boundary integral techniques for multi-connected domains. Journal of Computational Physics, 1986, 64, 112-132.	3.8	37
84	Computational modeling of orientation tuning dynamics in monkey primary visual cortex. Journal of Computational Neuroscience, 2000, 8, 143-159.	1.0	37
85	Self-straining of actively crosslinked microtubule networks. Nature Physics, 2019, 15, 1295-1300.	16.7	37
86	A moving overset grid method for interface dynamics applied to non-Newtonian Heleâ€"Shaw flow. Journal of Computational Physics, 2004, 195, 117-142.	3.8	36
87	Shape-changing bodies in fluid: Hovering, ratcheting, and bursting. Physics of Fluids, 2009, 21, .	4.0	36
88	Orientation selectivity in visual cortex by fluctuation-controlled criticality. Proceedings of the National Academy of Sciences of the United States of America, 2006, 103, 12911-12916.	7.1	35
89	Motile dislocations knead odd crystals into whorls. Nature Physics, 2022, 18, 212-218.	16.7	35
90	Coarse-grained reduction and analysis of a network model of cortical response: I. Drifting grating stimuli. Journal of Computational Neuroscience, 2002, 12, 97-122.	1.0	34

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91	Self-similar evolution of a body eroding in a fluid flow. Physics of Fluids, 2013, 25, .	4.0	34
92	Forces positioning the mitotic spindle: Theories, and now experiments. BioEssays, 2017, 39, 1600212.	2.5	34
93	Multiscale modeling and simulation of microtubuleâ€"motor-protein assemblies. Physical Review E, 2015, 92, 062709.	2.1	33
94	Modeling simple locomotors in Stokes flow. Journal of Computational Physics, 2010, 229, 958-977.	3.8	32
95	Rotating Membrane Inclusions Crystallize Through Hydrodynamic and Steric Interactions. Physical Review Letters, 2019, 123, 148101.	7.8	32
96	Mooreâ€™s law and the Saffmanâ€"Taylor instability. Journal of Computational Physics, 2006, 212, 1-5.	3.8	30
97	The collapse of an axi-symmetric, swirling vortex sheet. Nonlinearity, 1993, 6, 843-867.	1.4	29
98	Attracting Manifold for a Viscous Topology Transition. Physical Review Letters, 1995, 75, 3665-3668.	7.8	29
99	A multiscale biophysical model gives quantized metachronal waves in a lattice of beating cilia. Proceedings of the National Academy of Sciences of the United States of America, 2022, 119, .	7.1	27
100	A Stokesian viscoelastic flow: Transition to oscillations and mixing. Physica D: Nonlinear Phenomena, 2011, 240, 1602-1614.	2.8	26
101	Stoichiometric interactions explain spindle dynamics and scaling across 100 million years of nematode evolution. ELife, 2020, 9, .	6.0	26
102	Large-scale modeling of the primary visual cortex: influence of cortical architecture upon neuronal response. Journal of Physiology (Paris), 2003, 97, 237-252.	2.1	24
103	Swirling Instability of the Microtubule Cytoskeleton. Physical Review Letters, 2021, 126, 028103.	7.8	24
104	Dynamics of a Deformable Body in a Fast Flowing Soap Film. Physical Review Letters, 2006, 97, 134502.	7.8	23
105	A neuronal network model of primary visual cortex explains spatial frequency selectivity. Journal of Computational Neuroscience, 2009, 26, 271-287.	1.0	23
106	A scalable computational platform for particulate Stokes suspensions. Journal of Computational Physics, 2020, 416, 109524.	3.8	23
107	Dynamics of complex biofluids. , 2011, , 65-94.		23
108	A computational model of the flight dynamics and aerodynamics of a jellyfish-like flyingÂmachine. Journal of Fluid Mechanics, 2017, 819, 621-655.	3.4	22

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109	Correlation between spatial frequency and orientation selectivity in V1 cortex: Implications of a network model. Vision Research, 2010, 50, 2261-2273.	1.4	20
110	On the rotation of porous ellipsoids in simple shear flows. Journal of Fluid Mechanics, 2013, 733, .	3.4	20
111	Measuring and modeling polymer concentration profiles near spindle boundaries argues that spindle microtubules regulate their own nucleation. New Journal of Physics, 2018, 20, 055012.	2.9	20
112	The stormy fluid dynamics of the living cell. Physics Today, 2019, 72, 32-38.	0.3	20
113	Nonlinear concentration patterns and bands in autochemotactic suspensions. Physical Review E, 2018, 98, .	2.1	18
114	Lattices of Hydrodynamically Interacting Flapping Swimmers. Physical Review X, 2019, 9, .	8.9	17
115	Ultra-sharp pinnacles sculpted by natural convective dissolution. Proceedings of the National Academy of Sciences of the United States of America, 2020, 117, 23339-23344.	7.1	16
116	Tissue fluidity mediated by adherens junction dynamics promotes planar cell polarity-driven ommatidial rotation. Nature Communications, 2021, 12, 6974.	12.8	16
117	Active matter invasion of a viscous fluid: Unstable sheets and a no-flow theorem. Physical Review Letters, 2019, 122, 098002.	7.8	15
118	From cytoskeletal assemblies to living materials. Current Opinion in Cell Biology, 2019, 56, 109-114.	5.4	15
119	Connecting macroscopic dynamics with microscopic properties in active microtubule network contraction. New Journal of Physics, 2017, 19, 125011.	2.9	14
120	Computing collision stress in assemblies of active spherocylinders: Applications of a fast and generic geometric method. Journal of Chemical Physics, 2019, 150, 064109.	3.0	14
121	A design framework for actively crosslinked filament networks. New Journal of Physics, 2021, 23, 013012.	2.9	14
122	Elastic Fibers in Flows. RSC Soft Matter, 2015, , 168-192.	0.4	14
123	Coarse graining the dynamics of immersed and driven fiber assemblies. Physical Review Fluids, 2019, 4, .	2.5	14
124	Hyperuniformity and phase enrichment in vortex and rotor assemblies. Nature Communications, 2022, 13, 804.	12.8	14
125	A weak-coupling expansion for viscoelastic fluids applied to dynamic settling of a body. Journal of Non-Newtonian Fluid Mechanics, 2012, 183-184, 25-36.	2.4	13
126	Flexibly imposing periodicity in kernel independent FMM: A multipole-to-local operator approach. Journal of Computational Physics, 2018, 355, 214-232.	3.8	13

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127	Universal image systems for non-periodic and periodic Stokes flows above a no-slip wall. Journal of Computational Physics, 2018, 375, 263-270.	3.8	13
128	The many behaviors of deformable active droplets. Mathematical Biosciences and Engineering, 2021, 18, 2849-2881.	1.9	13
129	A stable and accurate scheme for solving the Stefan problem coupled with natural convection using the Immersed Boundary Smooth Extension method. Journal of Computational Physics, 2021, 432, 110162.	3.8	13
130	Slithering Locomotion. The IMA Volumes in Mathematics and Its Applications, 2012, , 117-135.	0.5	13
131	Hydrodynamic mobility of chiral colloidal aggregates. Physical Review E, 2009, 79, 051405.	2.1	12
132	Metallic microswimmers driven up the wall by gravity. Soft Matter, 2021, 17, 6597-6602.	2.7	12
133	Domain of convergence of perturbative solutions for Hele-Shaw flow near interface collapse. Physics of Fluids, 1999, 11, 2809-2811.	4.0	10
134	Directed Migration of Microscale Swimmers by an Array of Shaped Obstacles: Modeling and Shape Optimization. SIAM Journal on Applied Mathematics, 2018, 78, 2370-2392.	1.8	9
135	Toward the cellular-scale simulation of motor-driven cytoskeletal assemblies. ELife, 0, 11, .	6.0	9
136	Light interacting with liquid crystals. Physica D: Nonlinear Phenomena, 1993, 68, 116-126.	2.8	8
137	Current approaches for the analysis of spindle organization. Current Opinion in Structural Biology, 2019, 58, 269-277.	5.7	8
138	Retinal and cortical nonlinearities combine to produce masking in V1 responses to plaids. Journal of Computational Neuroscience, 2008, 25, 390-400.	1.0	7
139	Activity-induced instability of phonons in 1D microfluidic crystals. Soft Matter, 2018, 14, 945-950.	2.7	7
140	A fast Chebyshev method for the Bingham closure with application to active nematic suspensions. Journal of Computational Physics, 2022, 457, 110937.	3.8	6
141	Oscillations of a layer of viscoelastic fluid under steady forcing. Journal of Non-Newtonian Fluid Mechanics, 2012, 175-176, 38-43.	2.4	5
142	Equilibrium Shapes and Their Stability for Liquid Films in Fast Flows. Physical Review Letters, 2018, 121, 094501.	7.8	5
143	Comparison of explicit and mean-field models of cytoskeletal filaments with crosslinking motors. European Physical Journal E, 2021, 44, 45.	1.6	5
144	Weakly nonlinear analysis of pattern formation in active suspensions. Journal of Fluid Mechanics, 2022, 942, .	3.4	5

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145	Thermodynamically consistent coarse-graining of polar active fluids. Physical Review Fluids, 2022, 7, .	2.5	5
146	Fluidâ€Structure Interactions: Research in the Courant Institute's Applied Mathematics Laboratory. Communications on Pure and Applied Mathematics, 2012, 65, 1697-1721.	3.1	3
147	On a roll. Nature, 2013, 503, 43-44.	27.8	3
148	Enhanced clamshell swimming with asymmetric beating at low Reynolds number. Soft Matter, 2022, 18, 3605-3612.	2.7	3
149	Surface waves on a semitoroidal water ring. Physics of Fluids, 2007, 19, 058105.	4.0	2
150	Droplet breakup in a stagnation-point flow. Journal of Fluid Mechanics, 2020, 901, .	3.4	2
151	LÃ©vy Walks and Path Chaos in the Dispersal of Elongated Structures Moving across Cellular Vortical Flows. Physical Review Letters, 2021, 127, 074503.	7.8	2
152	How Cross-Link Numbers Shape the Large-Scale Physics of Cytoskeletal Materials. Annual Review of Condensed Matter Physics, 2022, 13, 365-384.	14.5	2
153	Theoretical analysis of reverse-time correlation for idealized orientation tuning dynamics. Journal of Computational Neuroscience, 2008, 25, 401-438.	1.0	1
154	A Compact Eulerian Representation of Axisymmetric Inviscid Vortex Sheet Dynamics. Communications on Pure and Applied Mathematics, 2020, 73, 239-256.	3.1	1
155	Course 5 Some useful numerical techniques for simulating integrate-and-fire networks. Les Houches Summer School Proceedings, 2005, 80, 179-196.	0.2	0
156	Computing Microstructural Dynamics for Complex Fluids. , 2005, , 1371-1388.		0
157	Spirals, Jets, and Pinches. , 1999, , 119-128.		0
158	Computing Microstructural Dynamics for Complex Fluids. , 2005, , 1371-1388.		0
159	Active Condensation of Filaments Under Spatial Confinement. Frontiers in Physics, 0, 10, .	2.1	0