Paul B Umbanhowar

List of Publications by Year
in descending order

84 papers	3,861 citations	159585 30 h-index	123424 61 g-index
84 all docs	84 docs citations	84 times ranked	1985 citing authors

#	Article	IF	Citations
1	Segregation forces in dense granular flows: closing the gap between single intruders and mixtures. Journal of Fluid Mechanics, 2022, 935, .	3.4	4
2	Potentialities and limitations of machine learning to solve cut-and-shuffle mixing problems: A case study. Chemical Engineering Science, 2022, 260, 117840.	3.8	0
3	Modeling granular segregation for overlapping species distributions. Chemical Engineering Science, 2021, 231, 116259.	3.8	9
4	Exploring shear-induced segregation in controlled-velocity granular flows. EPJ Web of Conferences, 2021, 249, 03012.	0.3	1
5	Visiflex: A Low-Cost Compliant Tactile Fingertip for Force, Torque, and Contact Sensing. IEEE Robotics and Automation Letters, 2021, 6, 3009-3016.	5.1	6
6	Predicting segregation of nonspherical particles. Physical Review Fluids, 2021, 6, .	2.5	6
7	Modelling segregation of bidisperse granular mixtures varying simultaneously in size and density for free surface flows. Journal of Fluid Mechanics, 2021, 918, .	3.4	14
8	A unified description of gravity- and kinematics-induced segregation forces in dense granular flows. Journal of Fluid Mechanics, 2021, 925, .	3.4	15
9	Particle capture in a model chaotic flow. Physical Review E, 2021, 104, 064203.	2.1	1
10	Granular flow in a wedgeâ€shaped heap: Velocity field, kinematic scalings, and segregation. AICHE Journal, 2020, 66, e16912.	3.6	9
11	Modeling segregation of polydisperse granular materials in hopper discharge. Powder Technology, 2020, 374, 389-398.	4.2	9
12	Identifying invariant ergodic subsets and barriers to mixing by cutting and shuffling: Study in a birotated hemisphere. Physical Review E, 2020, 101, 012204.	2.1	2
13	The Soft-Landing Problem: Minimizing Energy Loss by a Legged Robot Impacting Yielding Terrain. IEEE Robotics and Automation Letters, 2020, 5, 3658-3665.	5.1	10
14	Axisymmetric granular flow on a bounded conical heap: Kinematics and size segregation. Chemical Engineering Science, 2020, 217, 115505.	3.8	13
15	Measuring segregation characteristics of industrially relevant granular mixtures: Part I â€" A continuum model approach. Powder Technology, 2020, 368, 190-201.	4.2	3
16	Measuring segregation characteristics of industrially relevant granular mixtures: Part II â€" Experimental application and validation. Powder Technology, 2020, 368, 278-285.	4.2	4
17	Segregation models for density-bidisperse granular flows. Physical Review Fluids, 2020, 5, .	2.5	14
18	Rising and sinking intruders in dense granular flows. Physical Review Research, 2020, 2, .	3.6	29

#	Article	IF	Citations
19	Remarkable simplicity in the prediction of nonspherical particle segregation. Physical Review Research, 2020, 2, .	3.6	11
20	Cutting and shuffling a hemisphere: Nonorthogonal axes. Physical Review E, 2019, 99, 032204.	2.1	4
21	Pattern formation in a fully three-dimensional segregating granular flow. Physical Review E, 2019, 99, 062905.	2.1	4
22	Discrete element simulation of cylindrical particles using super-ellipsoids. Particuology, 2019, 46, 55-66.	3.6	49
23	Modeling Segregation in Granular Flows. Annual Review of Chemical and Biomolecular Engineering, 2019, 10, 129-153.	6.8	56
24	The geometry of cutting and shuffling: An outline of possibilities for piecewise isometries. Physics Reports, 2019, 802, 1-22.	25.6	4
25	Granular segregation induced by a moving subsurface blade. Physical Review E, 2019, 100, 052902.	2.1	1
26	Continuum modeling of granular segregation during hopper discharge. Chemical Engineering Science, 2019, 193, 188-204.	3.8	34
27	Modeling segregation of polydisperse granular materials in developing and transient freeâ€surface flows. AIChE Journal, 2019, 65, 882-893.	3.6	15
28	Diffusion, mixing, and segregation in confined granular flows. AIChE Journal, 2019, 65, 875-881.	3.6	36
29	Simulation and modeling of segregating rods in quasiâ€2D bounded heap flow. AIChE Journal, 2018, 64, 1550-1563.	3.6	32
30	Continuum modelling of segregating tridisperse granular chute flow. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2018, 474, 20170384.	2.1	15
31	Unsteady flows and inhomogeneous packing in damp granular heap flows. Physical Review E, 2018, 98, .	2.1	8
32	Optimized Mixing by Cutting-and-Shuffling. SIAM Journal on Applied Dynamical Systems, 2018, 17, 2544-2573.	1.6	3
33	Effect of pressure on segregation in granular shear flows. Physical Review E, 2018, 97, 062906.	2.1	31
34	Persistent structures in a three-dimensional dynamical system with flowing and non-flowing regions. Nature Communications, 2018, 9, 3122.	12.8	8
35	Asymmetric concentration dependence of segregation fluxes in granular flows. Physical Review Fluids, 2018, 3, .	2.5	35
36	Controlling granular segregation using modulated flow. Powder Technology, 2017, 312, 360-368.	4.2	16

#	Article	IF	Citations
37	Dynamic In-Hand Sliding Manipulation. IEEE Transactions on Robotics, 2017, 33, 778-795.	10.3	76
38	Transient response in granular quasi-two-dimensional bounded heap flow. Physical Review E, 2017, 96, 040902.	2.1	5
39	Mixing and transport from combined stretching-and-folding and cutting-and-shuffling. Physical Review E, 2017, 96, 042213.	2.1	9
40	Mixing and the fractal geometry of piecewise isometries. Physical Review E, 2017, 95, 042208.	2.1	9
41	Predicting mixing via resonances: Application to spherical piecewise isometries. Physical Review E, 2017, 95, 062210.	2.1	10
42	Modeling Segregation in Modulated Granular Flow. EPJ Web of Conferences, 2017, 140, 03018.	0.3	5
43	A continuum approach for predicting segregation in flowing polydisperse granularÂmaterials. Journal of Fluid Mechanics, 2016, 797, 95-109.	3.4	45
44	Cutting and Shuffling of a Line Segment: Effect of Variation in Cut Location. International Journal of Bifurcation and Chaos in Applied Sciences and Engineering, 2016, 26, 1630038.	1.7	10
45	A review on locomotion robophysics: the study of movement at the intersection of robotics, soft matter and dynamical systems. Reports on Progress in Physics, 2016, 79, 110001.	20.1	197
46	Modelling density segregation in flowing bidisperse granular materials. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2016, 472, 20150856.	2.1	49
47	Mixing with piecewise isometries on a hemispherical shell. Chaos, 2016, 26, 073115.	2.5	16
48	Shear-Rate-Independent Diffusion in Granular Flows. Physical Review Letters, 2015, 115, 088001.	7.8	45
49	On Mixing and Segregation: From Fluids and Maps to Granular Solids and Advectionâ€"Diffusion Systems. Industrial & Engineering Chemistry Research, 2015, 54, 10465-10471.	3.7	9
50	Modeling segregation of bidisperse granular materials using physical control parameters in the quasiâ€2D bounded heap. AIChE Journal, 2015, 61, 1524-1534.	3.6	56
51	Granular segregation in circular tumblers: theoretical model and scaling laws. Journal of Fluid Mechanics, 2015, 765, 632-652.	3.4	68
52	Force and flow at the onset of drag in plowed granular media. Physical Review E, 2014, 89, 042202.	2.1	34
53	Competitive autocatalytic reactions in chaotic flows with diffusion: Prediction using finite-time Lyapunov exponents. Chaos, 2014, 24, 013109.	2.5	8
54	Modelling size segregation of granular materials: the roles of segregation, advection and diffusion. Journal of Fluid Mechanics, 2014, 741, 252-279.	3.4	111

#	Article	IF	Citations
55	Modeling, design, and control of 6-DoF flexure-based parallel mechanisms for vibratory manipulation. Mechanism and Machine Theory, 2013, 64, 111-130.	4.5	16
56	Modeling granular materials: A test bed for framing and analysis. AIChE Journal, 2013, 59, 3237-3246.	3.6	4
57	Kinematics of monodisperse and bidisperse granular flows in quasi-two-dimensional bounded heaps. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2013, 469, 20130235.	2.1	45
58	A mapping method for distributive mixing with diffusion: Interplay between chaos and diffusion in time-periodic sine flow. Physics of Fluids, 2013, 25, .	4.0	20
59	Slow axial drift in three-dimensional granular tumbler flow. Physical Review E, 2013, 88, 012208.	2.1	17
60	Effects of worker size on the dynamics of fire ant tunnel construction. Journal of the Royal Society Interface, 2012, 9, 3312-3322.	3.4	26
61	Sliding manipulation of rigid bodies on a controlled 6-DoF plate. International Journal of Robotics Research, 2012, 31, 819-838.	8.5	33
62	The effect of anisotropic friction on vibratory velocity fields. , 2012, , .		18
63	Stratification, segregation, and mixing of granular materials in quasi-two-dimensional bounded heaps. Physical Review E, 2012, 86, 051305.	2.1	57
64	Granular lift forces predict vertical motion of a sand-swimming robot. , 2011, , .		21
65	Mechanical models of sandfish locomotion reveal principles of high performance subsurface sand-swimming. Journal of the Royal Society Interface, 2011, 8, 1332-1345.	3.4	149
66	Undulatory swimming in sand: experimental and simulation studies of a robotic sandfish. International Journal of Robotics Research, 2011, 30, 793-805.	8.5	72
67	Force and Flow Transition in Plowed Granular Media. Physical Review Letters, 2010, 105, 128301.	7.8	103
68	Toward the set of frictional velocity fields generable by 6-degree-of-freedom oscillatory motion of a rigid plate. , 2010, , .		12
69	Granular impact and the critical packing state. Physical Review E, 2010, 82, 010301.	2.1	108
70	Sensitive dependence of the motion of a legged robot on granular media. Proceedings of the National Academy of Sciences of the United States of America, 2009, 106, 3029-3034.	7.1	164
71	Friction-Induced Velocity Fields for Point Parts Sliding on a Rigid Oscillated Plate. International Journal of Robotics Research, 2009, 28, 1020-1039.	8.5	61
72	Friction-Induced Lines of Attraction and Repulsion for Parts Sliding on an Oscillated Plate. IEEE Transactions on Automation Science and Engineering, 2009, 6, 685-699.	5.2	24

#	Article	IF	Citations
73	Optimal Vibratory Stick-Slip Transport. IEEE Transactions on Automation Science and Engineering, 2008, 5, 537-544.	5.2	25
74	Vibration-Induced Frictional Force Fields on a Rigid Plate. Proceedings - IEEE International Conference on Robotics and Automation, 2007, , .	0.0	20
75	Low density fragile states in cohesive powders. American Journal of Physics, 2006, 74, 720-721.	0.7	7
76	Creeping motion in granular flow. Physical Review E, 2005, 71, 031304.	2.1	30
77	Shaken sand â€" a granular fluid?. Nature, 2003, 424, 886-887.	27.8	4
78	Wavelength scaling and square/stripe and grain mobility transitions in vertically oscillated granular layers. Physica A: Statistical Mechanics and Its Applications, 2000, 288, 344-362.	2.6	40
79	Periodic, aperiodic, and transient patterns in vibrated granular layers. Physica A: Statistical Mechanics and Its Applications, 1998, 249, 1-9.	2.6	61
80	Comment on â€œSpontaneous Wave Pattern Formation in Vibrated Granular Materialsâ€. Physical Review Letters, 1997, 79, 4713-4713.	7.8	19
81	Patterns in the sand. Nature, 1997, 389, 541-542.	27.8	14
82	Localized excitations in a vertically vibrated granular layer. Nature, 1996, 382, 793-796.	27.8	717
83	Hexagons, Kinks, and Disorder in Oscillated Granular Layers. Physical Review Letters, 1995, 75, 3838-3841.	7.8	386
84	Transition to parametric wave patterns in a vertically oscillated granular layer. Physical Review Letters, 1994, 72, 172-175.	7.8	315