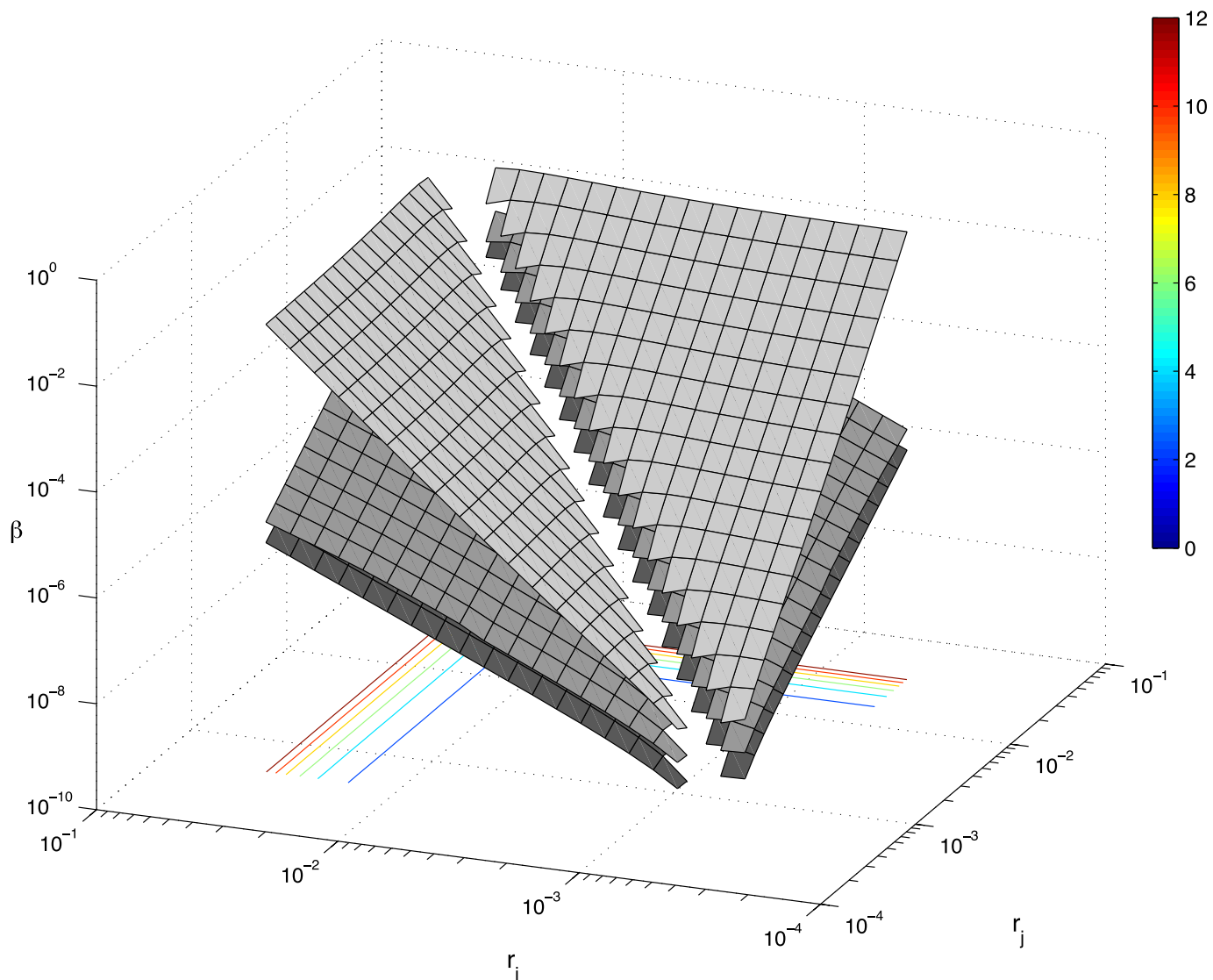


# Supporting Information

Humphries 10.1073/pnas.0809063106



**Fig. S1.** Three-dimensional surface plots of coagulation kernels ( $\beta_{ij}$ ) for differential sedimentation of two spheres of radius  $r_i$  and  $r_j$ . Light gray, rectilinear kernel; gray, intermediate  $Re$  kernel; dark gray, curvilinear kernel. Breaks occur where identically sized spheres do not coagulate. Coloured contour map and color bar show  $Re$  values for spheres with excess density of 0.064. Note the logged axes.

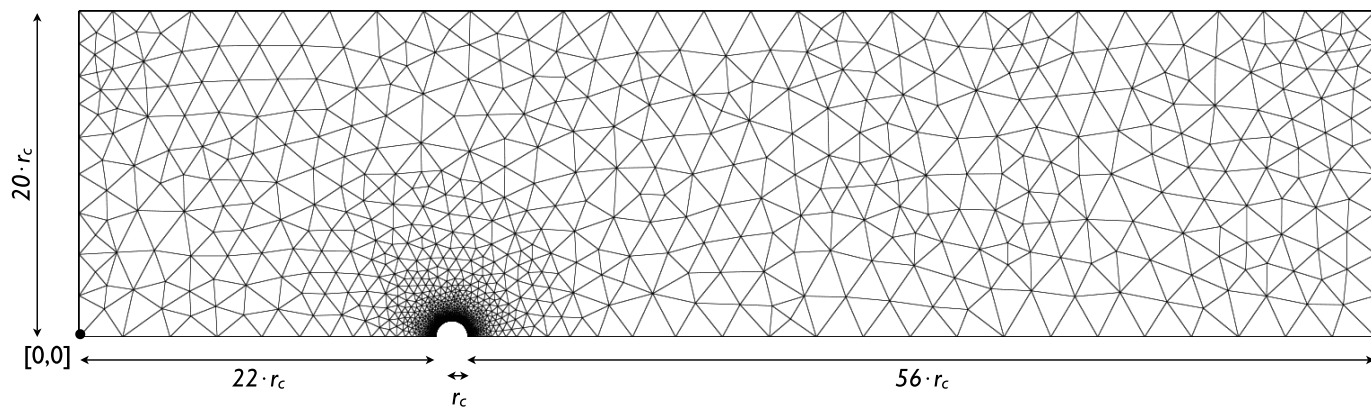


Fig. S2. The computational geometry for the cylinder. All dimensions are relative to the cylinder radius ( $r_c$ ). Fluid flow is from the left to the right. The left boundary describes a constant inlet velocity normal to the boundary, while the right boundary describes a constant outflow pressure. The upper boundary is an open boundary with normal stress conditions, whereas the lower (excluding the cylinder surface) is a symmetry boundary. A no-slip condition was applied to the surface of the cylinder. Mesh consists of 3,419 triangular elements.



Table S1. Filter feeder morphology

Taxon	Species	Mean element width, m	Source	Ref(s).
Ave	<i>Anas rhynchotis</i>	1.70E-04	Text	1
Ave	<i>Malacorhynchus membranaceus</i>	1.00E-04	Text	1
Bivalve	<i>Mytilus edulis</i>	6.00E-08	Text	2
Bryozoan	<i>Crisia eburnea</i>	1.00E-05	Micrograph	3
Bryozoan	<i>Plumatella repens</i>	1.50E-05	Text	4
Cetacean	<i>Balaena mysticetus</i>	3.34E-04	Text, Text	5, 6
Cetacean	<i>Balaenoptera acutorostrata</i>	2.85E-04	Text	6
Cetacean	<i>Balaenoptera borealis</i>	2.29E-04	Text	6
Cetacean	<i>Balaenoptera edeni</i>	5.77E-04	Text	6
Cetacean	<i>Balaenoptera musculus</i>	1.07E-03	Text	6
Cetacean	<i>Balaenoptera physalus</i>	7.65E-04	Text, Text	6, 7
Cetacean	<i>Caperea marginata</i>	7.25E-05	Text	6
Cetacean	<i>Eschrichtius robustus</i>	1.00E-03	Text	6
Cetacean	<i>Megaptera novaeangliae</i>	7.00E-04	Text	6
Choanoflagellate	<i>Codosiga botrytis</i>	1.70E-07	Text, Text	8, 9
Cnidarian	<i>Acropora cervicornis</i>	2.50E-04	Micrograph	10
Cnidarian	<i>Alcyonium siderum</i>	6.00E-05	Text	11
Cnidarian	<i>Anthopleura elegantissima</i>	2.00E-03	Text	12
Cnidarian	<i>Dendronephthya hemprichi</i>	5.00E-05	Text	13
Cnidarian	<i>Galaxea fascicularis</i>	7.50E-04	Micrograph	14
Cnidarian	<i>Metridium senile</i>	1.20E-03	Text	11
Cnidarian	<i>Montipora digitata</i>	1.38E-04	Micrograph	10
Cnidarian	<i>Palythoa variabilis</i>	1.00E-03	Text	15
Cnidarian	<i>Pocillopora damicornis</i>	1.60E-04	Micrograph	10
Cnidarian	<i>Porites cylindrica</i>	1.70E-04	Micrograph	10
Cnidarian	<i>Ptilosarcus gurneyi</i>	4.00E-05	Text	16
Crustacean	<i>Bosmina longirostris</i>	3.60E-07	Micrograph	17
Crustacean	<i>Centropages furcatus</i>	2.00E-06	Micrograph	18
Crustacean	<i>Centropages hamatus</i>	8.00E-07	Micrograph	19
Crustacean	<i>Centropages typicus</i>	3.60E-06	Text	20
Crustacean	<i>Ceriodaphnia lacustris</i>	1.50E-07	Micrograph	17
Crustacean	<i>Ceriodaphnia quadrangula</i>	8.00E-08	Text	21
Crustacean	<i>Chydorus sphaericus</i>	8.00E-08	Text	21
Crustacean	<i>Daphnia carinata</i>	2.90E-07	Text	22
Crustacean	<i>Daphnia cucullata</i>	1.10E-07	Text	21
Crustacean	<i>Daphnia galeata</i>	1.90E-07	Text	21
Crustacean	<i>Daphnia hyalina</i>	3.20E-07	Text	21
Crustacean	<i>Daphnia magna</i>	2.78E-07	Text, Text, Micrograph, Text	17, 21, 23, 24
Crustacean	<i>Daphnia parvula</i>	3.20E-07	Micrograph	17
Crustacean	<i>Daphnia pulicaria</i>	2.75E-07	Text	21
Crustacean	<i>Diaphanosoma brachyurum</i>	5.00E-08	Text	21
Crustacean	<i>Eubosmina coregoni</i>	2.10E-07	Text	21
Crustacean	<i>Eucalanus pileatus</i>	2.00E-06	Text	21
Crustacean	<i>Euphausia superba</i>	3.00E-07	Text	25
Crustacean	<i>Holopedium gibberum</i>	4.00E-07	Text	21
Crustacean	<i>Lepas pectinata</i>	2.80E-04	Scaled drawing	26
Crustacean	<i>Meganctiphanes norvegica</i>	4.00E-07	Text	25
Crustacean	<i>Nyctiphanes australis</i>	4.00E-07	Micrograph	27
Crustacean	<i>Pleuromamma borealis</i>	1.00E-06	Micrograph	19
Crustacean	<i>Sida crystallina</i>	3.00E-07	Text	21
Echinoderm	<i>Amphiura filiformis</i>	1.00E-04	Text	28
Echinoderm	<i>Antedon bifida</i>	2.90E-05	Micrograph	29
Echinoderm	<i>Capillaster multiradiatus</i>	4.70E-05	Text	30
Echinoderm	<i>Cenometra bella</i>	4.40E-05	Text	30
Echinoderm	<i>Colobometra perspinosa</i>	4.00E-05	Text	30
Echinoderm	<i>Comanthina schlegeli</i>	4.10E-05	Text	30
Echinoderm	<i>Comanthus bennetti</i>	5.50E-05	Text	30
Echinoderm	<i>Comanthus parvicirrus</i>	4.70E-05	Text	30
Echinoderm	<i>Comaster gracilis</i>	4.20E-05	Text	30
Echinoderm	<i>Comaster multifidus</i>	6.80E-05	Text	30
Echinoderm	<i>Comatella nigra</i>	5.40E-05	Text	30
Echinoderm	<i>Florometra serratissima</i>	2.69E-04	Micrograph	31
Echinoderm	<i>Himerometra magnipinna</i>	2.80E-05	Text	30
Echinoderm	<i>Himerometra robustipinna</i>	3.40E-05	Text	30

Taxon	Species	Mean element width, m	Source	Ref(s).
Echinoderm	<i>Lamprometra palmata</i>	3.60E-05	Text	30
Echinoderm	<i>Oligometra serripina</i>	4.00E-05	Text, Text	30, 32
Echinoderm	<i>Ophiopholis aculeata</i>	2.17E-04	Text	33
Echinoderm	<i>Ophiopteris antipodium</i>	4.00E-04	Text	34
Echinoderm	<i>Ophiothrix fragilis</i>	1.92E-04	Text	35
Echinoderm	<i>Pontiometra andersoni</i>	3.20E-05	Text	30
Echinoderm	<i>Tropiometra afra</i>	3.60E-05	Text	30
Fish	<i>Brevoortia tyrannus</i>	1.00E-05	Text	36
Fish	<i>Polyodon spathula</i>	3.39E-04	Text	37
Hemichordate	<i>Harrimania planktophilus</i>	3.00E-07	Micrograph	38
Hemichordate	<i>Rhabdopleura normani</i>	1.25E-05	Text	39
Holothurian	<i>Psolus chitinooides</i>	3.40E-04	Text	40
Insect	<i>Chimarra socia</i>	3.50E-07	Text	41
Insect	<i>Hydropsyche siltalai</i>	1.06E-05	Text	42
Insect	<i>Hydropsyche pellucida</i>	1.75E-05	Micrograph	43
Insect	<i>Isonychia campestris</i>	8.20E-06	Micrograph	44
Insect	<i>Macronema zebratum</i>	1.43E-06	Text	41
Insect	<i>Simulium vittatum</i>	5.00E-06	Micrograph, Text	22, 45
Phoronid	<i>Phoronis muelleri</i>	1.05E-05	Micrograph	46
Phoronid	<i>Phoronis muelleri</i> (larva)	2.50E-05	Micrograph	46
Polychaete	<i>Boccardia proboscidea</i>	1.90E-04	Text	47
Polychaete	<i>Chaetopterus variopedatus</i>	1.00E-08	Text	48
Polychaete	<i>Eupolymnia heterobranchia</i>	1.00E-04	Text	49
Polychaete	<i>Nereis diversicolor</i>	5.00E-09	Text	50
Polychaete	<i>Paraprionospio pinnata</i>	1.32E-04	Micrograph	51
Polychaete	<i>Phragmatopoma californica</i>	5.00E-05	Text	52
Polychaete	<i>Polydora ligni</i>	1.68E-04	Text	47
Polychaete	<i>Pseudopolydora kempji japonica</i>	1.61E-04	Text, Text	47, 53
Polychaete	<i>Pseudopolydora paucibranchiata</i>	1.14E-04	Text, Text	53, 54
Polychaete	<i>Pygospio elegans</i>	4.99E-04	Micrograph, Text	47, 55
Polychaete	<i>Sabellaria alveolata</i>	5.75E-05	Text	56
Polychaete	<i>Sabella pavonina</i>	1.70E-04	Text	40
Polychaete	<i>Scololepsis squamata</i>	1.15E-04	Micrograph, Micrograph	51, 55
Polychaete	<i>Spio filicornis</i>	9.00E-05	Micrograph	55
Protist	<i>Actinomonas mirabilis</i>	2.00E-07	Text	57
Protist	<i>Monosiga</i>	1.00E-07	Text	57
Pteropod	<i>Gleba cordata</i>	1.00E-06	Text	58
Tunicate	<i>Ascidella aspera</i>	1.50E-08	Text	59
Tunicate	<i>Ciona intestinalis</i>	1.88E-08	Text, Text	59, 60
Tunicate	<i>Doliolum nationalis</i>	2.90E-08	Text	61
Tunicate	<i>Halocynthia papillosa</i>	2.75E-08	Text	59
Tunicate	<i>Microcosmus sabatieri</i>	1.25E-08	Text	59
Tunicate	<i>Oikopleura labrodoriensis</i>	2.00E-08	Text, Text	62, 63
Tunicate	<i>Oikopleura vanhoeffeni</i>	2.03E-07	Text	64
Tunicate	<i>Pegea confoederata</i>	1.00E-07	Text	65
Tunicate	<i>Phallusia mammilata</i>	1.88E-08	Text, Text	59, 60
Tunicate	<i>Salpa fusiformis</i>	2.00E-07	Text	66
Tunicate	<i>Styela plicata</i>	1.50E-08	Text	59
Tunicate	<i>Thalia democratica</i>	4.00E-08	Text	67

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