

Raymond Ethan Goldstein FRS

Researcher ID: F-2932-2011; ORCID: 0000-0003-2645-0598

Date of birth: 01/12/61

Nationality: UK & US (dual citizen)

Homepage: <http://www.damtp.cam.ac.uk/user/gold>

EDUCATION

- 1988 PhD Physics, Cornell University, USA, Supervisor: Prof Neil W Ashcroft
- 1986 M.S. Physics, Cornell University, USA
- 1983 S.B. Physics, Massachusetts Institute of Technology, USA
- 1983 S.B. Chemistry, Massachusetts Institute of Technology, USA

CURRENT POSITION

- 2006 – now Schlumberger Professor of Complex Physical Systems
Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK

PREVIOUS POSITIONS

- 1996 – 2006 Associate Professor, then Professor of Physics & Applied Mathematics, University of Arizona, USA
- 1991 – 1996 Assistant Professor of Physics, Princeton University, USA
Associated Faculty, Program in Applied and Computational Mathematics
- 1988 – 1991 Postdoc, James Franck and Enrico Fermi Institutes, University of Chicago, USA
- 1988 Visiting Scientist, Service de Physique Théorique, CEA Saclay, Gif-sur-Yvette, France

FELLOWSHIPS, AWARDS AND PRIZES

- 1983 Apker Award, American Physical Society
- 1983 – 1988 Fannie and John Hertz Foundation Graduate Fellowship, Cornell University
- 1988 Robert McCormick Postdoctoral Fellowship, Enrico Fermi Institute, University of Chicago
- 1989 – 1990 National Science Foundation Postdoctoral Research Fellowship, University of Chicago
- 1990 31st Arthur H. Compton Lecturer, University of Chicago
- 1992 – 1996 Alfred P. Sloan Research Fellow, Princeton University
- 1993 – 1998 NSF Presidential Faculty Fellow, Princeton University & University of Arizona
- 2000 Stephanos Pnevmatikos Award in Nonlinear Science, Foundation for Research and Technology, Hellas *“For his contributions to the understanding of pattern formation involving the dynamics of filaments, interfaces and surfaces, combining powerful mathematical methods with penetrating physical arguments, numerical computations and experiments to clarify nonlinear phenomena in a wide variety of physical and biological systems.”*
- 2011 William Hopkins Prize, Cambridge Philosophical Society, UK *“For his work on the physical phenomena exhibited by living systems, in particular measuring and analysing the flow fields around individual swimming micro-organisms and colonies of them, and in the interior of large plant cells, and interpreting the findings in terms of biological fitness.”*
- 2012 Outstanding Referee, American Physical Society
- 2012 Ig Nobel Prize in Physics, (joint with P.B. Warren, R.C. Ball, and J.B. Keller)
“... for calculating the balance of forces that shape and move the hair in a human ponytail.”
- 2015 – 2020 EPSRC Established Career Fellowship (Mathematics Programme), UK
- 2016 G.K. Batchelor Prize in Fluid Mechanics, IUTAM *“for ... pioneering research into active matter fluid mechanics, including work on collective behaviour in bacterial suspensions, synchronisation of flagella in eukaryotic cells and the surface interactions of swimming microorganisms. In particular, the Prize acknowledges the extraordinary degree of experimental sophistication employed to measure flow fields around active suspensions, which, coupled with*

theoretical insight, has led to significant advances in the understanding of cell transport and the evolution of multicellular systems."

- 2016 Rosalind Franklin Medal and Prize, Institute of Physics, UK "... for revealing the physical basis for fluid motion in and around active cells and its importance for the evolution of multicellularity, cell differentiation, and the synchronicity of eukaryotic flagella."
- 2017 Schlumberger Chair for Mathematical Sciences, IHES, Bures-sur-Yvette, France

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- 1991 – 2020 24 PhD Students Completed (3 Princeton, 6 Arizona, 15 Cambridge): 5 now professors, 3 assistant professors or group leaders, 11 hold postdoctoral appointments, 4 in industry
- 1991 – 2020 21 Postdocs Supervised (1 Princeton, 2 Arizona, 15 Cambridge completed + 6 current): 2 are now tenured professors, 8 are assistant professors, lecturers or group leaders, 5 hold postdoctoral appointments, 2 are in industry

TEACHING ACTIVITIES

- 1991 – 2006 Undergraduate and graduate teaching in standard physics curriculum (mechanics, E&M, statistical physics, solid state physics, biological physics, experimental labs, etc.)
- 2006 – now Undergraduate and graduate lecturing in the Mathematical Tripos, with a focus on Mathematical Biology (3rd year undergraduate) and Biological Physics (Masters level)

ORGANISATION OF SCIENTIFIC MEETINGS

- 2000 – 2003 Co-organizer, Complex Systems Summer School, Santa Fe Institute, USA
- 2015 Co-organizer, 3rd International *Volvox* Conference, Cambridge UK
- 2016 Co-organizer, Meeting on "Evolution of Life", Cambridge Philosophical Society
- 2019 Co-organizer, Royal Society Theo Murphy meeting on "Unity and Diversity of Ciliary Systems in Locomotion and Development", UK

INSTITUTIONAL RESPONSIBILITIES

- 2010 – 2014 Research Policy Committee, University of Cambridge
- 2014 – Board of Electors, Lucasian Professorship of Mathematics, University of Cambridge
- 2016 – Board of Electors, Professorship of Nonlinear Mathematical Science, U. of Cambridge
- 2016 – Chair, Management Board, Sainsbury Laboratory, University of Cambridge

COMMISSIONS OF TRUST

- 1996 – 1999 Adjunct Associate Editor for Biological Physics, *Physical Review Letters*
- 1997 – 1998 Member, then Chair, Buckley Prize Selection Committee, American Physical Society
- 1997 – 1999 Secretary-Treasurer, Dynamical Systems Group, SIAM, USA
- 2000 – 2002 Divisional Associate Editor for Biological Physics, *Physical Review Letters*
- 2001 – 2002 Editorial Board, *Nonlinearity*
- 2001 – 2003 Editorial Board, *Physica D*
- 2001 – 2004 Vice-Chair, Chair-Elect, then Chair, Division of Biological Physics, APS
- 2002 – 2008 Editorial Board (covering Biological Physics), *Reviews of Modern Physics*
- 2009 – 2012 Biological Physics Group, Institute of Physics, UK; Member
- 2010 – 2015 Scientific Council, Institute des Hautes Études Scientifiques, Bures-sur-Yvette, France
- 2014 Chair, Max Delbruck Prize Selection Committee, American Physical Society
- 2015 – 2018 Associate Editor, *Journal of Fluid Mechanics* (JFM Perspectives)
- 2017 – Advisory Board, Max Planck - University of Twente Centre for Complex Fluid Dynamics
- 2018 – Board of Reviewing Editors (Physics of Living Systems), *eLife*
- 2018 – 2020 Member IUPAP C3 (Statistical Physics)
- 2018 – 2021 Member, Sectional Committee 1 (Mathematics), Royal Society, UK
- 2019 – Scientific Advisory Board (University level), Technical University of Eindhoven (TU/e)

2020 – Advisory Board, *Flow*
2022 – Member, Scientific Advisory Board, Flatiron Institute (Simons Foundation), New York

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2003 Fellow of the American Physical Society, USA
2009 Fellow of the Institute of Physics, UK
2010 Fellow of the Institute of Mathematics and its Applications, UK
2013 Fellow of the Royal Society, UK

GRANT SUPPORT (since move to UK in 2006)

John Templeton Foundation: PI
Physical Aspects of Early Multicellular Development
2021-24 (\$998,485)

Gordon and Betty Moore Foundation: PI
A Quantitative Approach to Marine Ecosystem Dynamics: From the Individual to the Collective
2018-21 (\$1,018,750)

Wellcome Trust Investigator Award: PI
"Biomechanics of Ciliated Tissues"
2017-22 (£1,656,325)

EPSRC Mathematics Programme: PI, Established Career Fellowship
"Geometric, Topological, and Statistical Dynamics in Soft Matter and Mathematical Biology"
2015-20 (£1,171,149)

BBSRC Research Grant: Co-I with Dr Isabel Palacios (Zoology, Cambridge)
"A biophysical study on how the actin and microtubule cytoskeletons dynamically collaborate to regulate cellular organization"
2013-16 (£515,380)

BBSRC Research Grant: Co-I with Prof. George Salmond (Biochemistry, Cambridge)
"The Molecular Microbiology and Physics of Bacterial Flotation"
2012-15 (£418,802)

Marie-Curie Intra-European Fellowship - Dr. Yongyun Hwang (DAMTP): Sponsor
"Pattern Formation in Microorganism Suspensions: Shear and Confinement"
2012-14 (£174,195)

Wellcome Trust Senior Investigator Award: PI
"Synchronization of Cilia"
2012-17 (£1,343,684)

ERC Advanced Investigator Grant: PI
"BIOCOMPLEX"
2010-14 (+ one year no-cost extension through 2015) (€2,500,000)

EPSRC Mathematics Programme: Co-I with Dr. A.I. Pesci and Prof. H.K. Moffatt (DAMTP)
"Dynamics of Topological Transitions of Soap Films Spanning Deformable Contours"
2011-14 (£309,943)

BBSRC Research Grant: PI
Engineering and Biological Sciences Division
“Physical Aspects of Evolutionary Transitions to Multicellularity”
2008-11 (£566,923)

Marie Curie Postdoctoral Fellowship – Dr. Marco Polin: Sponsor
“Cyclosis: The Biophysics of Cytoplasmic Streaming in Chara Corallina”
2008-10 (£128,527)

Leverhulme Trust Visiting Professorship – Prof. Jerry P. Gollub: Sponsor
2008-09 (£58,908)

Leverhulme Trust Research Grant:PI
“Microfluidics of Cytoplasmic Streaming”
2008-11 (£217,731)

Royal Society Research Grant
“Physical and Mathematical Aspects of Inhomogeneous Photosynthetic Activity”
2007-08 (£14,993)

Schlumberger Corporation
Schlumberger Chair Fund
2006-09 (£300,000)

Recent Named lectureships

G.I. Taylor Lecture, Cambridge Philosophical Society (2010)
5th Lorenz Kramer Memorial Lecture, University of Bayreuth (2010)
PACM Distinguished Lecture, Princeton University (2011)
Disquisitiones Mechanicae, Dept. of Mechanical Science and Engineering, University of Illinois (2011)
100th Van Leeuwenhoek Lecture, University of Leiden (2012)
Distinguished Visitor Lecture, European Molecular Biology Laboratory, Heidelberg, Germany (2015)
Collingwood Lecture, University of Durham, UK (2016)
Lighthill Lecture, Imperial College, London (2017)
Edward L. Reiss Memorial Lectures, Engineering and Applied Sciences, Northwestern University (2018)
Leigh Page Prize Lectures, Department of Physics, Yale University (2019)

Recent Plenary Lectures at International Conferences

National Meeting of the French Physical Society (Paris, 2009)
Dynamics Days (Evanston, IL, 2010)
SIAM National Meeting (Pittsburgh, 2010)
28th International Colloquium on Group-Theoretical Methods in Physics (Newcastle, 2010)
Equadiff (Loughborough, UK, 2011)
8th Liquid Matter Conference (Vienna, 2011)
Division of Fluid Dynamics Meeting, APS (San Diego, 2012)
10th European Biophysics Congress (Dresden, 2015)
EUFOAM (Dublin, 2016)
Batchelor Prize Lecture, ICTAM (Montreal, 2016)
DPG Spring Meeting of the Condensed Matter Section with EPS (Berlin, 2018).

Further Recent Invited Conference and Workshop Presentations

Keynotes

12th Rencontre du Non Linéaire, Institute Henri Poincare, Paris, (2009)
Opening of the Quantitative Biology Institute, University of Utah (2009)
IoP meeting on Complexity and Nonlinear Phenomena in Biological Systems, University of Bath (2010)
Young Researchers in Mathematics, University of Warwick, UK (2011)
Fluid & Elasticity, La Jolla, CA (2012)
BIOMS/EMBL Conference on Physics of Cells and Tissues, Heidelberg, Germany (2015)

Gordon Research Conferences

GRC on Soft Condensed Matter Physics, Colby-Sawyer College, New London, NH (2009)
GRC on Cilia, Mucus, and Mucociliary Interactions, Lucca, Italy (2013)
GRC on Soft Matter, Colby-Sawyer College, New London, NH (2015)

Heraeus Seminars

Physics of Motile Cilia, Bad Honnef, Germany (2019)

Lectures at Summer and Winter Schools

Les Houches, New Trends in the Physics and Mechanics of Biological Systems (2009)
Geilo Advanced Study Institute "Order, Robustness and Instabilities in Complex Systems," (2009)
Fluid Dynamics of Sustainability and the Environment, University of Cambridge, UK (2012)
Swiss International Biophysics Winter School, Monte Verita, Switzerland (2012)
XV Giambiagi Winter School, "Information Processing in Biological Systems: From Cells to Equations, and Back", Buenos Aires (2013)
Condensed Matter Centre for Doctoral Training Summer School, University of St. Andrews (2017)

Selected additional lectures

"Trends in Physics", March Meeting, APS (2012)
EPSRC Grand Challenge Network on Understanding the Physics of Life, London (2013)
Annual Meeting of the Genetics Society (UK), London (2013)
British Society of Rheology Midwinter Meeting, Durham, UK (2014)
Crick Symposium, The Francis Crick Institute, London (2015)
Biophysical Society Annual Meeting, Los Angeles (2016).

PUBLICATIONS

Researcher ID: F-2932-2011

ORCID: <https://orcid.org/0000-0003-2645-0598>

1. Theory of Multiple Phase Separations in Binary Mixtures: Phase Diagrams, Thermodynamic Properties, and Comparisons with Experiments, Raymond E. Goldstein and James S. Walker, *Journal of Chemical Physics* **78**, 1492 (1983).
2. Substituent Effects on Intermolecular Hydrogen Bonding from a Lattice Gas Theory for Lower Critical Solution Points: Comparisons with Experiments on Aqueous Solutions of Alkylpyridines, Raymond E. Goldstein, *Journal of Chemical Physics* **79**, 4439 (1983).
3. On the Theory of Lower Critical Solution Points in Hydrogen-Bonded Mixtures, Raymond E. Goldstein, *Journal of Chemical Physics* **80**, 5340 (1984).
4. Potts Model for Solvent Effects on Polymer Conformation, Raymond E. Goldstein, *Physics Letters* **104A**, 285 (1984).
5. Phenomenological Theory of Multiply Reentrant Solubility, Raymond E. Goldstein, *Journal of Chemical Physics* **83**, 1246 (1985).
6. Thermodynamic Functions and Critical Properties from a Cluster-Decimation Approximation, Raymond E. Goldstein and James S. Walker, *Journal of Physics A* **18**, 1275 (1985).
7. Interaction-Driven Asymmetric Coexistence Curves and the Singular Diameter, James S. Walker and Raymond E. Goldstein, *Physics Letters* **112A**, 53 (1985).
8. Origin of the Singular Diameter in the Coexistence Curve of a Metal, Raymond E. Goldstein and Neil W. Ashcroft, *Physical Review Letters* **55**, 2164 (1985).
9. Model for Phase Equilibria in Micellar Solutions of Nonionic Surfactants, Raymond E. Goldstein, *Journal of Chemical Physics* **84**, 3367 (1986).
10. Beyond the Pair-Potential Model of Fluids at the Liquid-Vapor Critical Point, Raymond E. Goldstein, Alberto Parola, Neil W. Ashcroft, Martin W. Pestak, Moses H.W. Chan, John R. deBruyn, and David A. Balzarini, *Physical Review Letters* **58**, 41 (1987).
11. Three-Body Interactions, Scaling Variables, and Singular Diameters in the Coexistence Curves of Fluids, Martin W. Pestak, Raymond E. Goldstein, Moses H.W. Chan, John R. deBruyn, David A. Balzarini, and Neil W. Ashcroft, *Physical Review B* **36**, 599 (1987).
12. Revised Scaling Variables in Systems with Many-Body Interactions, Raymond E. Goldstein and Alberto Parola, *Physical Review A* **35**, 4770 (1987).
13. Broken Particle-Hole Symmetry in Critical Fluids, Raymond E. Goldstein and Alberto Parola, *Journal of Chemical Physics* **88**, 7059 (1988).
14. Stretched-Exponential Relaxation of Birefringence in a Critical Binary Mixture, Roberto Piazza, Tomaso Bellini, Vittorio Degiorgio, Raymond E. Goldstein, Stanislas Leibler, and Reinhard Lipowsky, *Physical Review B* **38**, 7223 (1988).
15. Model for the Lamellar Phases of Interacting Lipid Membranes, Raymond E. Goldstein and Stanislas Leibler, *Physical Review Letters* **61**, 2213 (1988).
16. Liquid-Vapor Asymmetry at the Critical Point, Raymond E. Goldstein and Alberto Parola, *Accounts of Chemical Research* **22**, 77 (1989).
17. Continuum Theory of Critical Phenomena in Polymer Solutions. Formalism and Mean Field Approximation, Raymond E. Goldstein and Binny J. Cherayil, *Journal of Chemical Physics* **90**, 7448 (1989).

18. Structural Phase Transition of Interacting Membranes, Raymond E. Goldstein and Stanislas Leibler, *Physical Review A* **40**, 1025 (1989).
19. Fluctuating Pseudoatoms in Metallic Fluids, Raymond E. Goldstein, Alberto Parola, and Arthur P. Smith, *Journal of Chemical Physics* **91**, 1843 (1989).
20. Parity-Breaking Transitions of Modulated Patterns in Hydrodynamic Systems, Pierre Couillet, Raymond E. Goldstein, and Gemunu H. Gunaratne, *Physical Review Letters* **63**, 1954 (1989).
21. Stretched-Exponential Relaxation of Birefringence in Dilute Polymer Solutions, Vittorio Degiorgio, Tomaso Bellini, Roberto Piazza, Francesco Montegazza, and Raymond E. Goldstein, *Physical Review Letters* **64**, 1043 (1990).
22. Electric Double Layers Near Modulated Surfaces, Raymond E. Goldstein, Adriana I. Pesci, and Victor Romero-Rochin, *Physical Review A* **41**, 5504 (1990).
23. Defects and Traveling-Wave States in Hydrodynamic Systems with Broken Parity, Raymond E. Goldstein, Gemunu H. Gunaratne, and Lionel Gil, *Physical Review A* **41**, 5731 (1990).
24. Geometrical and Topological Aspects of Electric Double Layers Near Curved Surfaces, Bertrand Duplantier, Raymond E. Goldstein, Victor Romero-Rochin, and Adriana I. Pesci, *Physical Review Letters* **65**, 508 (1990).
25. Thermodynamics of Rough Colloidal Surfaces, Raymond E. Goldstein, Thomas C. Halsey, and Michael W. Leibig, *Physical Review Letters* **66**, 1551 (1991).
26. Hydrodynamic and Interfacial Patterns with Broken Space-Time Symmetry, Raymond E. Goldstein, Gemunu H. Gunaratne, Lionel Gil, and Pierre Couillet, *Physical Review A* **43**, 6700 (1991).
27. The Korteweg-de-Vries Hierarchy as Dynamics of Closed Curves in the Plane, Raymond E. Goldstein and Dean M. Petrich, *Physical Review Letters* **67**, 3203 (1991).
28. Comment on: Rectilinear Diameters and Extended Corresponding States Theory, John R. de Bruyn and Raymond E. Goldstein, *Journal of Chemical Physics* **95**, 9424 (1991).
29. The Internal Dynamics of DNA Probed by Transient Electric Birefringence, Mi K. Hong, Onuttom Narayan, Raymond E. Goldstein, Erramilli Shyamsunder, Robert H. Austin, Daniel S. Fisher, and Michael Hogan, *Physical Review Letters* **68**, 1430 (1992).
30. Solitons, Euler's Equation, and Vortex Patch Dynamics, Raymond E. Goldstein and Dean M. Petrich, *Physical Review Letters* **69**, 555 (1992).
31. Dynamics of Labyrinthine Pattern Formation in Magnetic Fluids, Stephen A. Langer, Raymond E. Goldstein, and David P. Jackson, *Physical Review A* **46**, 4894 (1992).
32. Topology Transitions and Singularities in Viscous Flows, Raymond E. Goldstein, Adriana I. Pesci, and Michael J. Shelley, *Physical Review Letters* **70**, 3043 (1993).
33. Droplet Breakup in a Model of the Hele-Shaw Cell, Peter Constantin, Todd F. Dupont, Raymond E. Goldstein, Leo P. Kadanoff, Michael J. Shelley, and Su-Min Zhou, *Physical Review E* **47**, 4169 (1993).
34. Finite-Time Singularity Formation in Hele-Shaw Systems, Todd F. Dupont, Raymond E. Goldstein, Leo P. Kadanoff, and Su-Min Zhou, *Physical Review E* **47**, 4182 (1993).
35. Labyrinthine Pattern Formation in Magnetic Fluids, Akiva J. Dickstein, Shyamsunder Erramilli, Raymond E. Goldstein, David P. Jackson, and Stephen A. Langer, *Science* **261**, 1012 (1993).
36. Nonlocal Contour Dynamics Model for Chemical Front Motion, Dean M. Petrich and Raymond E. Goldstein, *Physical Review Letters* **72**, 1120 (1994).
37. Hydrodynamics of Fingering Instabilities in Dipolar Fluids, David P. Jackson, Raymond E. Goldstein, and Andrejs O. Cebers, *Physical Review E* **50**, 298 (1994).

38. Domain Shape Relaxation and the Spectrum of Thermal Fluctuations in Langmuir Monolayers, Raymond E. Goldstein and David P. Jackson, *Journal of Physical Chemistry* **98**, 9626 (1994).
39. Attracting Manifold for a Viscous Topology Transition, Raymond E. Goldstein, Adriana I. Pesci, and Michael J. Shelley, *Physical Review Letters* **75**, 3665 (1995).
40. Nonlinear Dynamics of Stiff Polymers, Raymond E. Goldstein and Stephan A. Langer, *Physical Review Letters* **75**, 1094 (1995).
41. Competing Patterns of Signaling Activity in *Dictyostelium discoideum*, Kyoung J. Lee, Edward C. Cox, and Raymond E. Goldstein, *Physical Review Letters* **76**, 1174 (1996).
42. Interface Proliferation and the Growth of Labyrinths in a Reaction-Diffusion System, Raymond E. Goldstein, Dean M. Petrich, and David J. Muraki, *Physical Review E* **53**, 3933 (1996).
43. Hydrodynamics of Monolayer Domains at the Air-Water Interface, David K. Lubensky and Raymond E. Goldstein, *Physics of Fluids* **8**, 843 (1996).
44. Front Propagation in the Pearling Instability of Tubular Vesicles, Raymond E. Goldstein, Philip Nelson, Thomas Powers, and Udo Seifert, *Journal de Physique* **6**, 767 (1996).
45. Current-Loop Model for the Intermediate State of Type-I Superconductors, Raymond E. Goldstein, David P. Jackson, and Alan T. Dorsey, *Physical Review Letters* **76**, 3818 (1996).
46. Traveling-Wave Chemotaxis, Raymond E. Goldstein, *Physical Review Letters* **77**, 775 (1996).
47. Biotechnology at Low Reynolds Numbers, James P. Brody, Paul Yaeger, Raymond E. Goldstein, and Robert H. Austin, *Biophysical Journal* **71**, 3430 (1996).
48. Pearling and Pinching: Propagation of Rayleigh Instabilities, Thomas R. Powers and Raymond E. Goldstein, *Physical Review Letters* **78**, 2555 (1997).
49. Elastohydrodynamic Study of Actin Filaments Using Fluorescence Microscopy, D. Riveline, C.H. Wiggins, R.E. Goldstein, and A. Ott, *Physical Review E* **56**, 1330 (1997).
50. Selection for Spiral Waves in the Social Amoebae *Dictyostelium*, Eirikur Palsson, Kyoung J. Lee, Raymond E. Goldstein, Jakob Franke, Richard H. Kessin, and Edward C. Cox, *Proceedings of the National Academy of Sciences USA* **94**, 13719 (1997).
51. Trapping and Wiggling: Elastohydrodynamics of Driven Microfilaments, Chris H. Wiggins, Daniel X. Riveline, Albrecht Ott, and Raymond E. Goldstein, *Biophysical Journal* **74**, 1043 (1998).
52. The Shapes of Flux Domains in the Intermediate State of Type-I Superconductors, Alan T. Dorsey and Raymond E. Goldstein, *Physical Review B* **57**, 3058 (1998).
53. Flexive and Propulsive Dynamics of Elastica at Low Reynolds Numbers, Chris H. Wiggins and Raymond E. Goldstein, *Physical Review Letters* **80**, 3879 (1998).
54. Propagation of a Topological Transition: the Rayleigh Instability, Thomas R. Powers, Dengfu Zhang, Raymond E. Goldstein, and Howard A. Stone, *Physics of Fluids* **10**, 1052 (1998).
55. Viscous Nonlinear Dynamics of Twist and Writhe, Raymond E. Goldstein, Thomas R. Powers, and Chris H. Wiggins, *Physical Review Letters* **80**, 5232 (1998).
56. Instabilities and Singularities in Hele-Shaw Flow, Raymond E. Goldstein, Adriana I. Pesci, and Michael J. Shelley, *Physics of Fluids* **10**, 2701 (1998).
57. Domain of Convergence of Perturbative Solutions for Hele-Shaw Flow, Near Interface Collapse, Adriana I. Pesci, Raymond E. Goldstein, and Michael J. Shelley, *Physics of Fluids* **11**, 2809 (1999).
58. Twirling and Whirling: Dynamics of Rotationally Forced Elastic Filaments, Charles W. Wolgemuth, Thomas R. Powers, and Raymond E. Goldstein, *Physical Review Letters* **84**, 1623 (2000).

59. Chiral Self-Propulsion of Growing Bacterial Macrofibers on a Solid Surface, Neil H. Mendelson, Joelle E. Sarlls, Charles W. Wolgemuth, and Raymond E. Goldstein, *Physical Review Letters* **84**, 1627 (2000).
60. Bistable Helices, Raymond E. Goldstein, Alain Goriely, Greg Huber, and Charles W. Wolgemuth, *Physical Review Letters* **84**, 1631 (2000).
61. Quantum Suppression of the Rayleigh Instability in Nanowires, Frank Kassubek, Charles A. Stafford, Hermann Grabert, and Raymond E. Goldstein, *Nonlinearity* **14**, 167 (2001).
62. Resetting Waveforms in *Dictyostelium* Territories, Kyoung J. Lee, Raymond E. Goldstein, and Edward C. Cox, *Physical Review Letters* **87**, 068101 (2001).
63. cAMP Waves in *Dictyostelium* Territories, Kyoung J. Lee, Raymond E. Goldstein, and Edward C. Cox, *Nonlinearity* **15**, C1 (2002).
64. Fluid-Membrane Tethers: Minimal Surfaces and Elastic Boundary Layers, Thomas R. Powers, Greg Huber, and Raymond E. Goldstein, *Physical Review E* **65**, 041901 (2002).
65. Periodic Chirality Transformations Propagating on Bacterial Flagella, Daniel Coombs, Greg Huber, John O. Kessler, and Raymond E. Goldstein, *Physical Review Letters* **89**, 118102 (2002).
66. Quantum Necking in Stressed Metallic Nanowires, Jerome Burki, Raymond E. Goldstein, and Charles A. Stafford, *Physical Review Letters* **91**, 254501 (2003).
67. Inertially-Driven Buckling and Overturning of Jets in a Hele-Shaw Cell, Adriana I. Pesci, Martin A. Porter, and Raymond E. Goldstein, *Physical Review E* **68**, 056305 (2003).
68. Dynamic Supercoiling Bifurcations of Growing Elastic Filaments, Charles W. Wolgemuth, Raymond E. Goldstein, and Thomas R. Powers, *Physica D* **190**, 266 (2004).
69. Tubular Precipitation and Redox Gradients on a Bubbling Template, David A. Stone and Raymond E. Goldstein, *Proceedings of the National Academy of Sciences USA* **101**, 11537 (2004).
70. Self-Concentration and Large-Scale Coherence in Bacterial Dynamics, Christopher Dombrowski, Luis Cisneros, Sunita Chatkaew, John O. Kessler, and Raymond E. Goldstein, *Physical Review Letters* **93**, 098103 (2004).
71. Mapping of the Classical Kinetic Balance Equations onto the Schrödinger Equation, Adriana I. Pesci and Raymond E. Goldstein, *Nonlinearity* **18**, 211 (2005).
72. Mapping of the Classical Kinetic Balance Equations onto the Pauli Equation, Adriana I. Pesci, Raymond E. Goldstein, and Hermann Uys, *Nonlinearity* **18**, 227 (2005).
73. Mapping of the Relativistic Kinetic Balance Equations onto the Klein-Gordon and Second-Order Dirac Equations, Adriana I. Pesci, Raymond E. Goldstein, and Hermann Uys, *Nonlinearity* **18**, 1295 (2005).
74. Stalactite Growth as a Free-Boundary Problem: A Geometric Law and its Platonic Ideal, Martin B. Short, James C. Baygents, J. Warren Beck, David A. Stone, Rickard S. Toomey, III, and Raymond E. Goldstein, *Physical Review Letters* **94**, 018501 (2005).
75. Bacterial Swimming and Oxygen Transport Near Contact Lines, Idan Tuval, Luis Cisneros, Christopher Dombrowski, Charles W. Wolgemuth, John O. Kessler, and Raymond E. Goldstein, *Proceedings of the National Academy of Sciences USA* **102**, 2277 (2005).
76. Teaching Biological Physics, Raymond E. Goldstein, Philip C. Nelson, and Thomas R. Powers, *Physics Today* **58**(3), 46 (2005).
77. Boundary Layer Model for Vortex-Fingers in Type II Superconductors, Chiara Baggio, Raymond E. Goldstein, Adriana I. Pesci, and Wim van Saarloos, *Physical Review B: Rapid Communications* **72**, 060503 (2005).
78. Stalactite Growth as a Free-Boundary Problem, Martin B. Short, James C. Baygents, and Raymond E. Goldstein, *Physics of Fluids* **17**, 083101 (2005).

- 79.** Coiling, Entrainment, and Hydrodynamic Coupling of Decelerated Fluid Jets, Christopher Dombrowski, Braddon Lewellyn, Adriana I. Pesci, Juan M. Restrepo, John O. Kessler, and Raymond E. Goldstein, *Physical Review Letters* **95**, 184501 (2005).
- 80.** Precipitative Growth Templated by a Fluid Jet, David A. Stone, Braddon Lewellyn, James C. Baygents, and Raymond E. Goldstein, *Langmuir* **21**, 10916 (2005).
- 81.** Hermitization and the Poisson Bracket-Commutator Correspondence as a Consequence of Averaging, Adriana I. Pesci, Raymond E. Goldstein, and Hermann Uys, *Journal of Physics A: Mathematical and General* **39**, 789 (2006).
- 82.** Multicellularity and the Functional Interdependence of Motility and Molecular Transport, Cristian A. Solari, Sujoy Ganguly, John O. Kessler, Richard E. Michod, and Raymond E. Goldstein, *Proceedings of the National Academy of Sciences USA* **103**, 1353 (2006).
- 83.** Reversal of Bacterial Locomotion at an Obstacle, Luis Cisneros, Christopher Dombrowski, Raymond E. Goldstein and John O. Kessler, *Physical Review E: Rapid Communications* **73**, 030901 (2006).
- 84.** Flows Driven by Flagella of Multicellular Organisms Enhance Long-Range Molecular Transport, Martin B. Short, Cristian A. Solari, Sujoy Ganguly, Thomas R. Powers, John O. Kessler, and Raymond E. Goldstein, *Proceedings of the National Academy of Sciences USA* **103**, 8315 (2006).
- 85.** Dynamic Buckling of Morphoelastic Filaments, Raymond E. Goldstein and Alain Goriely, *Physical Review E: Rapid Communications* **74**, 010901 (2006).
- 86.** A Free-Boundary Theory for the Shape of the Ideal Dripping Icicle, Martin B. Short, James C. Baygents, and Raymond E. Goldstein, *Physics of Fluids* **18**, 083101 (2006).
- 87.** The Flagellar Cytoskeleton of the Spirochetes, Charles W. Wolgemuth, Nyles W. Charon, Stuart F. Goldstein, and Raymond E. Goldstein, *Journal of Molecular Microbiology and Biotechnology* **11**, 221 (2006).
- 88.** Model for Dynamical Coherence in Thin Films of Self-Propelled Microorganisms, Igor S. Aranson, Andrey Sokolov, John O. Kessler, and Raymond E. Goldstein, *Physical Review E: Rapid Communications* **75**, 040901 (2007).
- 89.** Concentration Dependence of the Collective Dynamics of Swimming Bacteria, Andrey Sokolov, Igor S. Aranson, Raymond E. Goldstein, and John O. Kessler, *Physical Review Letters* **98**, 158102 (2007).
- 90.** Motility, Mixing, and Multicellularity, Cristian A. Solari, John O. Kessler, and Raymond E. Goldstein, *Genetic Programming and Evolvable Machines* **8**, 115 (2007).
- 91.** Fluid Dynamics of Self-Propelled Micro-organisms, From Individuals to Concentrated Populations, Luis H. Cisneros, Ricardo Cortez, Christopher Dombrowski, Raymond E. Goldstein, and John O. Kessler, *Experiments in Fluids* **43**, 737 (2007).
- 92.** Microfluidics of Cytoplasmic Streaming and its Implications for Intracellular Transport, Raymond E. Goldstein, Idan Tuval, and Jan-Willem van de Meent, *Proceedings of the National Academy of Sciences USA* **105**, 3663 (2008).
- 93.** Nature's Microfluidic Transporter: Rotational Cytoplasmic Streaming at High Péclet Numbers, Jan-Willem van de Meent, Idan Tuval, and Raymond E. Goldstein, *Physical Review Letters* **101**, 178102 (2008).
- 94.** *Volvox barberi*, the Fastest Swimmer of the Volvocales (Chlorophyceae), Cristian A. Solari, Richard E. Michod, and Raymond E. Goldstein, *Journal of Phycology* **44**, 1395 (2008).
- 95.** How to Track Protists in Three Dimensions, Knut Drescher, Kyriacos Leptos, and Raymond E. Goldstein, *Review of Scientific Instruments* **80**, 014301 (2009).
- 96.** Dancing *Volvox*: Hydrodynamic Bound States of Swimming Algae, Knut Drescher, Kyriacos Leptos, Takuji Ishikawa, Timothy J. Pedley, and Raymond E. Goldstein, *Physical Review Letters* **102**, 168101 (2009).

- 97.** The Elastic Basis for the Shape of *Borrelia burgdorferi*, Christopher Dombrowski, Wanxi Kan, Md. Abdul Motaleb, Nyles W. Charon, Raymond E. Goldstein and Charles W. Wolgemuth, *Biophysical Journal* **96**, 4409 (2009).
- 98.** *Chlamydomonas* Swims With Two ‘Gears’ in a Eukaryotic Version of Run-and-Tumble Locomotion, Marco Polin, Idan Tuval, Knut Drescher, J.P. Gollub, and Raymond E. Goldstein, *Science* **325**, 487 (2009).
- 99.** Enhanced Mixing and Spatial Instability in Concentrated Bacterial Suspensions, Andrey Sokolov, Raymond E. Goldstein, Felix I. Feldchtein, and Igor S. Aranson, *Physical Review E* **80**, 031903 (2009).
- 100.** Noise and Synchronization in Pairs of Beating Eukaryotic Flagella, Raymond E. Goldstein, Marco Polin, and Idan Tuval, *Physical Review Letters* **103**, 168103 (2009).
- 101.** Dynamics of Enhanced Tracer Diffusion in Suspensions of Swimming Eukaryotic Microorganisms, Kyriacos C. Leptos, Jeffrey S. Guasto, J.P. Gollub, Adriana I. Pesci, and Raymond E. Goldstein, *Physical Review Letters* **103**, 198103 (2009).
- 102.** Measurement of Cytoplasmic Streaming in Single Plant Cells by Magnetic Resonance Velocimetry, Jan-Willem van de Meent, Andy J. Sederman, Lynn F. Gladden, and Raymond E. Goldstein, *Journal of Fluid Mechanics* **642**, 5 (2010).
- 103.** On the Mechanisms of Ice Evolution, Jerome A. Neufeld, Raymond E. Goldstein, and M. Grae Worster, *Journal of Fluid Mechanics* **647**, 287 (2010).
- 104.** Cytoplasmic Streaming Enhances the Distribution of Molecules and Vesicles in Large Plant Cells, Jeanmarie Verchot-Lubicz and Raymond E. Goldstein, *Protoplasma* **240**, 99 (2010).
- 105.** Fidelity of Adaptive Phototaxis, Knut Drescher, Raymond E. Goldstein, and Idan Tuval, *Proceedings of the National Academy of Sciences USA* **107**, 11171 (2010).
- 106.** Direct Measurement of the Fluid Flow Around Swimming Microorganisms, Knut Drescher, Raymond E. Goldstein, Nicolas Michel, Marco Polin, and Idan Tuval, *Physical Review Letters* **105**, 168101 (2010).
- 107.** Fluid Velocity Fluctuations in a Suspension of Swimming Protists, I. Rushkin, V. Kantlser, and R.E. Goldstein, *Physical Review Letters* **105**, 188101 (2010).
- 108.** Soap-Film Möbius Strip Changes Topology With a Twist Singularity R.E. Goldstein, H.K. Moffatt, A.I. Pesci, and R.L. Ricca, *Proceedings of the National Academy of Sciences (USA)* **107**, 21979-21984 (2010).
- 109.** Growth and Instability of a Laminar Plume in a Strongly Stratified Environment, M. Lombardi, C.P. Caulfield, C.P. Cossu, A.I. Pesci, and R.E. Goldstein, *Journal of Fluid Mechanics*, **671**, 184-206 (2011).
- 110.** The Flagellar Photoresponse in Volvox Species (Volvocaceae, Chlorophyceae), C.A. Solari, K. Drescher, and R.E. Goldstein, *Journal of Phycology* **47**, 580-583 (2011).
- 111.** Dynamics of Swimming Bacteria: Transition to Directional Order at High Concentration, L.H. Cisneros, J.O. Kessler, S. Ganguly, and R.E. Goldstein, *Physical Review E* **83**, 061907 (2011).
- 112.** Fluid Dynamics and Noise in Bacterial Cell-Cell and Cell-Surface Scattering, K. Drescher, J. Dunkel, L.H. Cisneros, S. Ganguly, and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **108**, 10940-10945 (2011).
- 113.** Flagellar Phenotypic Plasticity in Volvocalean Algae Correlates With Péclet Number, C.A. Solari, K. Drescher, S. Ganguly, J.O. Kessler, R.E. Michod, and R.E. Goldstein, *Journal of the Royal Society Interface* **8**, 1409-1417 (2011).
- 114.** Insights Into the Evolution of Vitamin B12 Auxotrophy From Sequenced Algal Genomes, K.E. Helliwell, G.L. Wheeler, K.C. Leptos, R.E. Goldstein, and A.G. Smith, *Molecular Biology and Evolution* **28**, 2921-2933 (2011).
- 115.** Emergence of Synchronized Beating During the Regrowth of Eukaryotic Flagella, R.E. Goldstein, M. Polin, and I. Tuval, *Physical Review Letters* **107**, 148103 (2011).

- 116.** Fluctuations, Dynamics, and the Stretch-Coil Transition of Single Actin Filaments in Extensional Flows, V. Kantsler and R.E. Goldstein, *Physical Review Letters* **108**, 038103 (2012).
- 117.** Shape of a Ponytail and the Statistical Physics of Hair Fiber Bundles, R.E. Goldstein, P.B. Warren, and R.C. Ball, *Physical Review Letters* **108**, 078101 (2012).
- 118.** A Ratchet Trap for Leidenfrost Drops, T.R. Cousins, R.E. Goldstein, J.W. Jaworski, and A.I. Pesci, *Journal of Fluid Mechanics* **696**, 215-227 (2012).
- 119.** Coupling of Active Motion and Advection Shapes Intracellular Cargo Transport, P. Khuc Trong, J. Guck, and R.E. Goldstein, *Physical Review Letters* **109**, 028104 (2012).
- 120.** Shear-Driven Circulation Patterns in Lipid Membrane Vesicles, F.G. Woodhouse and R.E. Goldstein, *Journal of Fluid Mechanics* **705**, 165-175 (2012).
- 121.** Topological Constraints and Their Breakdown in Dynamical Evolution, R.E. Goldstein, H.K. Moffatt, and A.I. Pesci, *Nonlinearity* **25**, R85-R98 (2012).
- 122.** Dance of the Microswimmers, E. Lauga and R.E. Goldstein, *Physics Today* **65**, 30-35 (2012).
- 123.** Meso-scale turbulence in living fluids", H.H. Wensink, J. Dunkel, S. Heidenreich, K. Drescher, R.E. Goldstein, H. Löwen, and J.M. Yeomans, *Proceedings of the National Academy of Sciences USA* **109**, 14308-14313 (2012).
- 124.** Cytoplasmic Streaming in Drosophila Oocytes Varies with Kinesin Activity and Correlates With the Microtubule Cytoskeleton Architecture, S. Ganguly, L.S. Williams, I.M. Palacios, and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **109**, 15109-15114 (2012).
- 125.** Spontaneous Circulation of Confined Active Suspensions, F.G. Woodhouse and R.E. Goldstein, *Physical Review Letters* **109**, 168105 (2012).
- 126.** Collective Chemotactic Dynamics in the Presence of Self-Generated Fluid Flows, E. Lushi, R.E. Goldstein, and M.J. Shelley, *Physical Review E: Rapid Communications* **86**, 040902 (2012).
- 127.** Hydrodynamic Synchronization and Metachronal Waves on the Surface of the Colonial Alga *Volvox carteri*, D.R. Brumley, M. Polin, T.J. Pedley, and R.E. Goldstein, *Physical Review Letters* **109**, 268102 (2012).
- 128.** Swimming Like Algae: Biomimetic Soft Artificial Cilia, S. Sareh, J. Rossiter, A. Conn, K. Drescher, and R.E. Goldstein, *Journal of the Royal Society Interface* **10**, 20120666 (2013).
- 129.** Ciliary Contact Interactions Dominate Surface Scattering of Swimming Eukaryotes, V. Kantsler, J. Dunkel, M. Polin, and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **110**, 1187-1192 (2013).
- 130.** A General Allometric and Life-History Model for Cellular Differentiation in the Transition to Multicellularity, C.A. Solari, J.O. Kessler and R.E. Goldstein, *American Naturalist*, **181**, 369-380 (2013).
- 131.** Minimal Continuum Theories of Structure Formation in Dense Active Fluids, J. Dunkel, S. Heidenreich, M. Bär, and R.E. Goldstein, *New Journal of Physics* **15**, 045016 (2013).
- 132.** Fluid Dynamics of Bacterial Turbulence, J. Dunkel, S. Heidenreich, K. Drescher, H.H. Wensink, M. Bär, and R.E. Goldstein, *Physical Review Letters* **110**, 228102 (2013).
- 133.** Confinement Stabilizes a Bacterial Suspension into a Spiral Vortex, H. Wioland, F.G. Woodhouse, J. Dunkel, J.O. Kessler, and R.E. Goldstein, *Physical Review Letters* **110**, 268102 (2013).
- 134.** Membrane Viscosity Determined From Shear-Driven Flow In Giant Vesicles, A.R. Honerkamp-Smith, F.G. Woodhouse, V. Kantsler, and R.E. Goldstein, *Physical Review Letters* **111**, 038103 (2013).
- 135.** Cytoplasmic Streaming in Plant Cells Emerges Naturally by Microfilament Self-Organization, F.G. Woodhouse and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **110**, 14132-14137 (2013).
- 136.** Antiphase Synchronization in a Flagellar-Dominance Mutant of *Chlamydomonas*, K.C. Leptos, K.Y. Wan, M. Polin, I. Tuval, A.I. Pesci, and R.E. Goldstein, *Physical Review Letters* **111**, 158101 (2013).

- 137.** Controlling Active Self-Assembly Through Broken Particle-Shape Symmetries, H.H. Wensink, V. Kantsler, R.E. Goldstein, and J. Dunkel, *Physical Review E: Rapid Communications* **89**, 010302 (2014).
- 138.** Lag, Lock, Sync, Slip: The Many 'Phases' of Coupled Flagella, K.Y. Wan, K.C. Leptos, and R.E. Goldstein, *Journal of the Royal Society Interface* **11**, 20131160 (2014).
- 139.** Rheotaxis Facilitates Upstream Navigation of Mammalian Sperm Cells, V. Kantsler, J. Dunkel, M. Blayney, and R.E. Goldstein, *eLife* **3**, e02403 (2014).
- 140.** Boundary Singularities Produced by the Motion of Soap Films, R.E. Goldstein, J. McTavish, H.K. Moffatt, and A.I. Pesci, *Proceedings of the National Academy of Sciences USA* **111**, 8339-8344 (2014).
- 141.** Fluid Flows Created by Swimming Bacteria Drive Self-Organization in Confined Suspensions, E. Lushi, H. Wioland, and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **111**, 9733-9738 (2014).
- 142.** Instability of a Gravity Current Within a Soap Film, R.E. Goldstein, H.E. Huppert, H. Keith Moffatt, and A.I. Pesci, *Journal of Fluid Mechanics* **753**, R1:1-11 (2014).
- 143.** Flagellar Synchronization Through Direct Hydrodynamic Interactions, D.R. Brumley, K.Y. Wan, M. Polin, and R.E. Goldstein, *eLife* **3**, e02750 (2014).
- 144.** Rhythmicity, Recurrence, and Recovery of Flagellar Beating, K.Y. Wan and R.E. Goldstein, *Physical Review Letters* **113**, 238103 (2014).
- 145.** Do Dissolving Objects Converge to a Universal Shape?, E. Nakouzi, R.E. Goldstein, and O. Steinbock, *Langmuir* **31**, 4145-4150 (2015).
- 146.** Green Algae as Model Organisms for Biological Fluid Dynamics, R.E. Goldstein, *Annual Review of Fluid Mechanics* **47**, 343-375 (2015).
- 147.** Instability of a Möbius Strip Minimal Surface and a Link with Systolic Geometry, A.I. Pesci, R.E. Goldstein, G.P. Alexander, and H.K. Moffatt, *Physical Review Letters* **114**, 127801 (2015).
- 148.** Dynamics of a *Volvox* Embryo Turning Itself Inside Out, S. Höhn, A.R. Honerkamp-Smith, P.A. Haas, P. Khuc Trong, and R.E. Goldstein, *Physical Review Letters* **114**, 178101 (2015).
- 149.** A Physical Perspective on Cytoplasmic Streaming, R.E. Goldstein and J.-W. van de Meent, *Interface Focus* **5**, 20150030 (2015).
- 150.** Metachronal Waves in the Flagellar Beating of *Volvox* and Their Hydrodynamic Origin", D.R. Brumley, M. Polin, T.J. Pedley, and R.E. Goldstein, *Journal of the Royal Society Interface* **12**, 20141358 (2015).
- 151.** Feeding Ducks, Bacterial Chemotaxis, and the Gini Index, F.J. Peaudecerf and R.E. Goldstein, *Physical Review E* **92**, 022701 (2015).
- 152.** From Chemical Gardens to Chemobionics, L.M. Barge, S.S.S. Cardoso, J.H.E. Cartwright, G.J.T. Cooper, L. Cronin, A. De Wit, I.J. Dolobo, B. Escibano, R.E. Goldstein, F. Haudin, D.E.H. Jones, A.L. Mackay, J. Maseko, J.J. Pagano, J. Pantaleone, M.J. Russell, C. Ignacio Sainz-Diaz, O. Steinbock, D.A. Stone, Y. Tanimoto, and N.L. Thomas, *Chemical Reviews* **115**, 8652-8703 (2015).
- 153.** Cortical Microtubule Nucleation Can Organise the Cytoskeleton of *Drosophila* Oocytes to Define the Anteroposterior Axis, P. Khuc Trong, H. Doeringer, J. Dunkel, D. St. Johnston, and R.E. Goldstein, *eLife* **4**, e06088 (2015).
- 154.** Elasticity and Glocality: Initiation of Embryonic Inversion in *Volvox*, P.A. Haas and R.E. Goldstein, *Journal of the Royal Society Interface* **12**, 20150671 (2015).
- 155.** Motility of Colonial Choanoflagellates and the Statistics of Aggregate Random Walkers, J.B. Kirkegaard, A.O. Marron, and R.E. Goldstein, *Physical Review Letters* **116**, 038102 (2016).
- 156.** Ferromagnetic and Antiferromagnetic Order in Bacterial Vortex Lattices, H. Wioland, F.G. Woodhouse, J. Dunkel, and R.E. Goldstein, *Nature Physics* **12**, 341-345 (2016).

- 157.** Coordinated Beating of Algal Flagella is Mediated by Basal Coupling, K.Y. Wan and R.E. Goldstein, *Proceedings of the National Academy of Sciences USA* **113**, E2784-93 (2016).
- 158.** Squirmer with Swirl - a Model for *Volvox* Swimming, T.J. Pedley, D.R. Brumley, and R.E. Goldstein, *Journal of Fluid Mechanics* **798**, 165-186 (2016).
- 159.** Directed Collective Motion of Bacteria Under Channel Confinement, H. Wioland, E. Lushi, and R.E. Goldstein, *New Journal of Physics* **18**, 075002 (2016).
- 160.** Instabilities and Solitons in Minimal Strips, T. Machon, G.P. Alexander, R.E. Goldstein, and A.I. Pesci, *Physical Review Letters* **117**, 017801 (2016).
- 161.** A Model for the Effects of Germanium on Silica Biomineralization in Choanoflagellates, A.O. Marron, H. Chappell, S. Ratcliffe, and R.E. Goldstein, *Journal of the Royal Society Interface* **13**, 20160485 (2016).
- 162.** Batchelor Prize Lecture: Fluid Dynamics at the Scale of the Cell, R.E. Goldstein, *Journal of Fluid Mechanics* **807**, 1-39 (2016).
- 163.** Soap-Film Dynamics and Topological Jumps Under Continuous Deformation (Invited), H.K. Moffatt, R.E. Goldstein and A.I. Pesci, *Physical Review Fluids* **1**, 060503 (2016).
- 164.** Filter-Feeding, Near-Field Flows, and the Morphologies of Colonial Choanoflagellates", J.B. Kirkegaard and R.E. Goldstein, *Physical Review E* **94**, 052401 (2016).
- 165.** Elastohydrodynamic Synchronization of Adjacent Beating Flagella, R.E. Goldstein, E. Lauga, A.I. Pesci, and M.R.E. Proctor, *Physical Review Fluids* **1**, 073201 (2016).
- 166.** The Evolution of Silicon Transport in Eukaryotes", A.O. Marron, S. Ratcliffe, G.L. Wheeler, R.E. Goldstein, N. King, F. Not, C. de Vargas, and D.J. Richter, *Molecular Biology and Evolution* **33**, 3226-3248 (2016).
- 167.** Aerotaxis in the Closest Relatives of Animals, J.B. Kirkegaard, A. Bouillant, A.O. Marron, K.C. Leptos, and R.E. Goldstein, *eLife* **5**, e18109 (2016).
- 168.** A Biology Journal Provides a Lesson in Peer Review, R.E. Goldstein, *Physics Today* **69**, 10 (2016).
- 169.** Long-range Interactions, Wobbles and Phase Defects in Chains of Model Cilia, D.R. Brumley, N. Bruot, J. Kotar, R.E. Goldstein, P. Cicuti, and M. Polin, *Physical Review Fluids* **1**, 081201(R) (2016).
- 170.** Theory of Shape-Shifting Droplets, P.A. Haas, R.E. Goldstein, S.K. Smoukov, D.Cholakova, and N.Denkov, *Physical Review Letters* **118**, 088001 (2017).
- 171.** Traces of Surfactants Can Severely Limit the Drag Reduction of Superhydrophobic Surfaces, F.J. Peaudecerf, J.R. Landel, R.E. Goldstein, and P. Luzzatto-Fegiz, *Proceedings of the National Academy of Sciences USA* **114**, 7254-7259 (2017).
- 172.** Scattering of Biagellate Microswimmers from Surfaces, E. Lushi, V. Kantsler, and R.E. Goldstein, *Physical Review E* **96**, 023102 (2017).
- 173.** Localised Dynactin Protects Growing Microtubules to Deliver Oskar mRNA to the Posterior Cortex of the *Drosophila* Oocyte, R. Nieuwburg, D. Nashchekin, M. Jakobs, A. Carter, P. Khuc Trong, R.E. Goldstein, and D. St Johnston, *eLife* **6**, e27237 (2017).
- 174.** Spontaneous Oscillations of Elastic Filaments Induced by Molecular Motors, G. De Canio, E. Lauga, and R.E. Goldstein, *Journal of the Royal Society Interface* **14**, 20170491 (2017).
- 175.** Mutualism Between Microbial Populations in Structured Environments: The Role of Geometry in Diffusive Exchanges, F.J. Peaudecerf, F. Bunbury, V. Bhardwaj, M.A. Bees, A.G. Smith, R.E. Goldstein, and O.A. Croze, *Physical Review E* **97**, 022411 (2018).
- 176.** Why Clothes Don't Fall Apart: Tension Transmission in Staple Yarns, P.B. Warren, R.C. Ball, and R.E. Goldstein, *Physical Review Letters* **120**, 158001 (2018).
- 177.** Are Theoretical Results 'Results'?, R.E. Goldstein, *eLife* **7**, e40018 (2018).

- 178.** The Role of Tumbling Frequency and Persistence in Optimal Run-and-Tumble Chemotaxis, J.B. Kirkegaard and R.E. Goldstein, *IMA Journal of Applied Mathematics (John Blake Special Issue)* **83**, 700-719 (2018).
- 179.** The Noisy Basis of Morphogenesis: Mechanisms and Mechanics of Cell Sheet Folding Inferred from Developmental Variability, P.A. Haas, S. Höhn, A.R. Honerkamp-Smith, J.B. Kirkegaard, and R.E. Goldstein, *PLOS Biology* **16**, e2005536 (2018).
- 180.** Time-Irreversibility and Criticality in the Motility of a Flagellate Microorganism, K.Y. Wan and R.E. Goldstein, *Physical Review Letters* **121**, 058103 (2018).
- 181.** Coffee Stains, Cell Receptors, and Time Crystals: Lessons From the Old Literature, R.E. Goldstein, *Physics Today* **71**, 32 (2018).
- 182.** Nonlinear Concentration Patterns and Bands in Auto-Chemotactic Suspensions, E. Lushi, R.E. Goldstein, and M.J. Shelley, *Physical Review E* **98**, 052411 (2018).
- 183.** Embryonic Inversion in *Volvox carteri*: The Flipping and Peeling of Elastic Lips, P.A. Haas and R.E. Goldstein, *Physical Review E* **98**, 052415 (2018).
- 184.** Evaporation-Driven Convective Flows in Suspensions of Non-Motile Bacteria, J. Dunstan, K.J. Lee, S.F. Park, Y. Hwang, and R.E. Goldstein, *Physical Review Fluids* **3**, 123102 (2018).
- 185.** Nonlinear and Nonlocal Elasticity in Coarse-Grained Differential-Tension Models of Epithelia, P.A. Haas and R.E. Goldstein, *Physical Review E* **99**, in press (2019).
- 186.** Swimming Eukaryotic Microorganisms Exhibit a Universal Speed Distribution, Maciej Lisicki, Marcos F. Velho Rodrigues, Raymond E. Goldstein, and Eric Lauga, *eLife* **8**, e44907 (2019).
- 187.** Shape-Shifting Polyhedral Droplets, Pierre A. Haas, Diana Cholakova, Nikolai Denkov, Raymond E. Goldstein, and Stoyan K. Smoukov, *Physical Review Research* **1**, 023017 (2019).
- 188.** A Theory for the Slip and Drag of Superhydrophobic Surfaces with Surfactant, Julien R. Landel, François J. Peaudecerf, Fernando Temprano-Coleto, Frédéric Gibou, Raymond E. Goldstein, and Paolo Luzzatto-Fegiz, *Journal of Fluid Mechanics* **883**, A18 (2020).
- 189.** A Compact Eulerian Representation of Axisymmetric Inviscid Vortex Sheet Dynamics, Adriana I. Pesci, Raymond E. Goldstein, and Michael J. Shelley, *Communications on Pure and Applied Mathematics* **73**, 239 (2020).
- 190.** Optimal Design of Multi-Layer Fog Collectors, Mussadaq Azeem, Adrien Guérin, Thomas Dumais, Luis Caminos, Raymond E. Goldstein, Adriana I. Pesci, Juan de Dios Rivera, María Josefine Torres, Jakub Wiener, Jose Luis Campos, and Jacques Dumais, *ACS Applied Materials & Interfaces* **12**, 7736-7743 (2020).
- 191.** Phototaxis in *Gonium*, the Simplest Differentiated Colonial Algae, Hélène de Maleprade, Frédéric Moisy, Takuji Ishikawa, and Raymond E. Goldstein, *Physical Review E* **101**, 022416 (2020).
- 192.** CCDC61/VFL3 is a Paralog of SAS6 and Promotes Ciliary Functions, T. Ochi, V. Quarantotti, H. Lin, J. Jullien, I. Rosa e Silva, F. Boselli, D.D. Barnabas, C.M. Johnson, S.H. McLaughlin, S.M.V. Freund, A.N. Blackford, Y. Kimata, R.E. Goldstein, S.P. Jackson, T.L. Blundell, S.K. Dutcher, F. Gergely, and M. van Breugel, *Structure* **28**, 674-689 (2020).
- 193.** Subpopulations and Stability in Microbial Communities, Pierre A. Haas, Nuno M. Oliveira, and Raymond E. Goldstein, *Physical Review Research: Rapid Communications* **2**, 022036(R) (2020).
- 194.** Stress-Induced Dinoflagellate Bioluminescence at the Single Cell Level, Maziyar Jalaal, Nico Schramma, Antoine Dode, Hélène de Maleprade, Christophe Raufaste, and Raymond E. Goldstein, *Physical Review Letters* **125**, 028102 (2020).
- 195.** Stability of Dancing *Volvox*, Takuji Ishikawa, T.J. Pedley, K. Drescher, and Raymond E. Goldstein, *Journal of Fluid Mechanics* **903**, A11 (2020).
- 196.** Nuclear Crowding and Nonlinear Diffusion During Interkinetic Nuclear Migration in the Zebrafish Retina, Afnan Azizi, Anne Herrmann, Salvatore J.R.P. Buse, Yinan Wan, Phillip J. Keller, Raymond E. Goldstein, and

William A. Harris, *eLife* **9**, e58635 (2020).

197. Swirling Instability of the Microtubule Cytoskeleton, David B. Stein, Gabriele De Canio, Eric Lauga, Michael J. Shelley and Raymond E. Goldstein, *Physical Review Letters* **126**, 028103 (2021).

198. Morphoelasticity of Large Bending Deformations of Cell Sheets During Development, P.A. Haas and R.E. Goldstein, *Physical Review E* **102**, 022411 (2021).

199. The Fluid Dynamics of Collective Vortex Structures of Plant-Animal Worms, G.T. Fortune, A. Worley, Ana B. Sendova-Franks, N.R. Franks, K.C. Leptos, E. Lauga, and R.E. Goldstein, *Journal of Fluid Mechanics* **914**, A20 (2021).

200. Direct Measurement of Unsteady Microscale Stokes Flow Using Optically Driven Microspheres, Nicolas Bruot, Pietro Cicuta, Hermes Gadelha, Raymond E. Goldstein, Jurij Kotar, Eric Lauga, and François Nadal, *Physical Review Fluids* **6**, 053102 (2021).

201. Turing’s Diffusive Threshold in Random Reaction-Diffusion Systems, P.A. Haas and R.E. Goldstein, *Physical Review Letters* **126**, 238101 (2021).

202. Comment on “Faceting and Flattening of Emulsion Droplets: A Mechanical Model”, P.A. Haas, R.E. Goldstein, D. Cholakova, N. Denkov, and S.K. Smoukov, *Physical Review Letters* **126**, 259801 (2021).

203. Geometry of Catenoidal Soap Film Collapse Induced by Boundary Deformation, R.E. Goldstein, A.I. Pesci, C. Raufaste, and J.D. Shemilt, *Physical Review E* **104**, 035105 (2021).

204. An “Occlusive Thrombosis-on-a-Chip” Microfluidic Device for Investigating the Effects of Anti-Thrombotic Drugs, J. Berry, F.J. Peaudecerf, N.A. Masters, K.B. Neeves, R.E. Goldstein, and M.T. Harper, *Lab on a Chip* **21**, 4104-4117 (2021).

205. Fluid Mechanics of Mosaic Ciliated Tissues, F. Boselli, J. Jullien, E. Lauga, and R.E. Goldstein, *Physical Review Letters* **127**, 198102 (2021).

206. Cellular Organization in Lab-Evolved and Extant Multicellular Species Obeys a Maximum Entropy Law, T.C. Day, S.S. Hohn, S.A. Zamani-Dehaj, D. Yanni, A. Burnett, J. Pentz, A.R. Honerkamp-Smith, H. Wioland, H.R. Sleath, W.C. Ratcliff, R.E. Goldstein, and P.J. Yunker, *eLife* **11**, e72707 (2022).

207. Biofilm Growth Under Elastic Confinement, G.T. Fortune, N.M. Oliveira, and R.E. Goldstein, *Physical Review Letters* **128**, 178102 (2022).