

Raymond Ethan Goldstein FRS

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Date of birth: 01/12/61

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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 – 2023 Schlumberger Professor of Complex Physical Systems
 Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK
2023 – now Alan Turing 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.”
2003 Fellow of the American Physical Society, Division of Biological Physics
2009 Fellow of the Institute of Physics, UK
2010 Fellow of the Institute of Mathematics and its Applications, UK
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.”
2013 Fellow of the Royal Society, UK
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
- 2026 Doctor Honoris Causa, KU Leuven, Belgium

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- 1991 – 2024 24 PhD Students Completed (3 Princeton, 6 Arizona, 15 Cambridge): 5 now professors, 4 assistant professors or group leaders, 11 hold postdoctoral appointments, 4 in industry
- 1991 – 2024 21 Postdocs Supervised (1 Princeton, 2 Arizona, 16 Cambridge completed + 5 current): 2 are now tenured professors, 9 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 – 2022 Chair, Management Board, Sainsbury Laboratory, University of Cambridge
- 2021 – Board of Electors, Professorship of Plant Development, 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, Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France
- 2014 Chair, Max Delbrück 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 – 2023 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 – 2023 Advisory Board, *Flow*
2022 – Member, Scientific Advisory Board, Flatiron Institute (Simons Foundation), New York

GRANT SUPPORT (since move to UK in 2006)

Leverhulme Trust Research Grant: PI
“Cellular Biophysics of Choanoflagellate Sheets”
2024-2027 (£465,312)

Wellcome Trust Discovery Award: PI
"Physical Principles of Extracellular Matrix Generation in Multicellular Organisms"
2024-29 (£2,167,048)

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”
2018-23 (\$1,018,750)

Wellcome Trust Investigator Award: PI
"Biomechanics of Ciliated Tissues"
2017-23 (£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)
Stanley Corrsin Memorial Lecture, Johns Hopkins University (2023)
Simons Lecture, Department of Mathematics, MIT (2026)

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)
Complex Motion in Fluids, University of Cambridge (2023)

Selected additional invited 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)
Physics of Life, Harrogate, UK (2023)
EMBO Workshop: Physics of Living Systems: From Physical Principles to Biological Function, Dresden (2023)
EMBO/EMBL Symposium: Theory and Concepts in Biology, Heidelberg (2023)

PUBLICATIONS

Researcher ID: F-2932-2011

[ORCID](#)

[Google Scholar](#)

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 Coulet, 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 Coulet, *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).
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