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**Education**

September, 1975– Brown University, Providence, Rhode Island, A.B.,  
June, 1979 Applied Mathematics.

March, 1982– Stanford University, Stanford, California, Ph.D., Geophysics.  
January, 1986 Dissertation: Large near-surface anomalies, seismic reflection  
data, and simulated annealing  
Advisor: Prof. Jon F. Claerbout

**Employment**

August, 1979– Research Geophysicist, Western Geophysical Company,  
December, 1981 Houston, Texas and London, England.

March, 1986– Visiting Scientist, Department of Earth, Atmospheric, and  
August, 1986 Planetary Sciences, MIT, Cambridge, MA.

September, 1986– Assistant Professor of Geophysics, Department of Earth,  
June, 1990 Atmospheric, and Planetary Sciences, MIT, Cambridge, MA.

July, 1990– Associate Professor (Untenured) of Geophysics, Department of Earth,  
June, 1991 Atmospheric, and Planetary Sciences, MIT, Cambridge, MA.

July, 1991– Associate Professor (Tenured) of Geophysics, Department of Earth,  
June, 1996 Atmospheric, and Planetary Sciences, MIT, Cambridge, MA.

July, 1996– Professor of Geophysics, Department of Earth, Atmospheric,  
present and Planetary Sciences, MIT, Cambridge, MA.

**Selected visiting appointments**

Winter, 1992 Visiting Professor, Department of Geophysical Sciences  
and The James Franck Institute, The University of Chicago.

Fall, 1992 Professeur Invité, Ecole des Mines de Paris, France.

January, 1993– August, 1993    Directeur de Recherche Associé, Laboratoire de Physique Statistique, Centre National de la Recherche Scientifique, Ecole Normale Supérieure, Paris, France.

Summer, 1994    Professeur Invité, Ecole Normale Supérieure, Paris, France.

Summer, 1995    Physicien Invité, Institut Physique du Globe, Paris, France.

Summer, 1997    Professeur Invité, Université de Paris VII, Paris, France.

2007–2008    Fellow, Radcliffe Institute for Advanced Study, Harvard University.

Fall, 2016    Visiting Professor, Université de Paris Diderot, Paris, France.

**Doctoral dissertations supervised (and current academic position)**

- Andrew Gunstensen, Lattice-Boltzmann studies of multiphase flow through porous media, Ph.D., Geophysics, 1992.
- John Olson, Two-phase flow in sedimentary rock: complexity, transport, and simulation, Ph.D., Geophysics, December, 1995.
- Einat Aharonov, Solid-fluid interactions: processes that form rocks, Ph.D., Geophysics, December, 1995 (Professor, Institute of Earth Sciences, Hebrew University, Jerusalem, Israel).
- Olav van Genabeek, Velocity fluctuations in slow flow through porous media, Ph.D., Geophysics, July, 1998.
- Peter Dodds, Geometry of river networks, Ph.D., Applied Mathematics, June, 2000 (Professor, Department of Mathematics and Statistics, University of Vermont).
- Davide Stelitano, Elastic interfaces in fluids: Lattice-Boltzmann model and applications, Ph.D., Physics, June, 2000.
- Joshua Weitz, Generalized contact processes in ecology, Ph.D., Physics, June, 2003 (Professor, Department of Biology, Georgia Institute of Technology).
- Alexander Petroff, Streams, stromatolites, and the geometry of growth, Ph.D., Geophysics, June 2011 (Assistant Professor, Department of Physics, Clark University).
- David Forney, Carbon transit through degradation networks, Ph.D., Mechanical Engineering, June 2012.
- Christopher Follett, Heterogeneous reservoirs in the marine carbon cycle, Ph.D., MIT/WHOI Joint Program in Chemical Oceanography, March 2014 (Postdoc, MIT).
- Robert Yi, Emergent geometries of groundwater-fed rivers, Ph.D., Geophysics, September 2017.

### **Post-doctoral researchers supervised (and current academic position)**

- Eirik Grude Flekkoy, 1993–1994, Professor of Physics, University of Oslo, Norway.
- Romualdo Pastor-Satorras, 1996–1998, Associate Professor of Applied Physics, Universitat Politècnica de Catalunya, Barcelona, Spain.
- Norbert Schorghofer, 2000–2002, Associate Astronomer, University of Hawaii at Manoa.
- Alexander Lobkovsky, 2002–2007, IRTA Fellow, National Center for Biotechnology Information, National Institutes of Health.
- Mika Latva-Kokko, 2002–2005, Physics Instructor, Phillips-Andover Academy.
- Daniel Abrams, 2006-2009, Associate Professor, Department of Engineering Sciences and Applied Mathematics, Northwestern University.
- Olivier Devauchelle, 2008–2010, Institut Physique du Globe de Paris, CNRS, Paris, France.
- Daniel Reeves, 2010–2012.
- Hansjoerg Seybold, 2010–2014, ETH-Zurich, Switzerland.
- Yossi Cohen, 2012–2017.

### **Honors**

- Outstanding Paper in *Geophysics* (1986) (Publication 2.3)
- MIT Global Habitat Longevity Award (2007) [for “an important contribution to the scientific understanding of trends, phenomena, principles, and/or impact of natural or man-made phenomena on the long term evolution and health of the habitat and environment of Earth”]
- Jeanne Rosselet Fellow, Radcliffe Institute for Advanced Study (2007–2008).
- Fellow, American Physical Society (2012)
- Fellow, American Geophysical Union (2014)
- Levi L. Conant Prize, American Mathematical Society (2016) [for “the best expository paper published in either the *Notices of the AMS* or the *Bulletin of the AMS* in the preceding five years” (Publication 2.93)]

### **Recent courses taught**

Theoretical Environmental Analysis (12.009J / 18.352J)  
Modeling Environmental Complexity (12.086 / 12.586)  
Nonlinear Dynamics I: Chaos (12.006J / 18.353J / 2.050J)  
Undergraduate Seminar in Environmental Science (12.085)  
Dynamics of Complex Systems (12.517)

### **Selected synergistic activities**

- Member at Large, American Physical Society Topical Group on the Physics of Climate, 2013–2015.
- Member, Program Committee of the Topical Group on the Physics of Climate, American Physical Society, 2012–2014.
- Co-founder of the Lorenz Center at MIT, a privately funded interdisciplinary research center devoted to learning how climate works, 2011.
- Chair of the Committee on Mathematical Geophysics of the International Union of Geodesy and Geophysics, 2000–2011.
- Organizer of Optimal Transport Workshop III: Transport Systems in Geography, Geosciences, and Networks, Institute for Pure & Applied Mathematics, UCLA, 2008.
- Cross-cutting panelist, DOE Workshop on Basic Research Needs for Geosciences: Facilitating 21st Century Energy Systems, February 2007.
- Associate Editor of *Physical Review E*, 1998–2001.
- Member, Editorial Board of the *Journal of Statistical Physics*, 1997–1999.
- Secretary of the Committee on Mathematical Geophysics of the International Union of Geodesy and Geophysics, 1993–2000.
- Member, MIT Committee on the Undergraduate Program, 1996–1999.

### **Invited lectures since 2004**

- Physics Department Colloquium, University of Toronto, January 2004.
- Applied Math Lab Seminar, Courant Institute of the Mathematical Sciences, New York University, January 2004.
- Gordon Research Conference on Granular and Granular-Fluid Flow, Colby College, June 2004.
- IGERT Joint Program Colloquium in Applied Mathematics and Earth and Environmental Science, Columbia University, September 2004.
- Sixth Annual Boston Area Statistical Mechanics Meeting, Brandeis University, October 2004.
- Department of Physics Colloquium, University of Massachusetts-Amherst, October 2004.
- Department of Earth Science Colloquium, Dartmouth College, January 2005.
- Department of Geology and Geophysics Colloquium, Yale University, January 2005.

- Hoffman Group Seminar, Department of Earth and Planetary Sciences, Harvard University, May 2005.
- Department of Mechanical Engineering Colloquium, University of Illinois at Urbana-Champaign, October 2005.
- Department of Physics Colloquium, Northeastern University, November 2005.
- Widely Applied Math Seminar, Division of Engineering and Applied Science, Harvard University, February 2006.
- Department of Geophysics Colloquium, Stanford University, February 2006.
- Stanford Exploration Project Seminar, Department of Geophysics, Stanford University, February 2006.
- Department of Physics Colloquium, Brandeis University, March 2006.
- Sandia National Laboratories Geosciences Distinguished Lecture, March 2006.
- 26th Conference on Mathematical Geophysics, Sea of Galilee, Israel, June 2006.
- 16th Annual V.M. Goldschmidt Conference 2006, Melbourne, Australia, August 2006.
- 2006 Annual Meeting of the Norwegian Physical Society, Wadahl, Norway, September 2006.
- Department of Earth Sciences Colloquium, Boston University, October 2006.
- 15th 'Aha Huliko'a Winter Workshop on Physical Oceanography, University of Hawaii, January 2007.
- Biophysics Group Seminar, Department of Physics, MIT, March 2007.
- Robert Berg Lecture, Department of Geology and Geophysics, Texas A&M University, March 2007.
- St. Anthony Falls Laboratory Seminar, University of Minnesota, April, 2007.
- IUGG XXIV General Assembly, Perugia, Italy, July 2007.
- Radcliffe Institute for Advanced Study, Harvard University, October 2007.
- School of Chemistry Colloquium, Weizmann Institute of Science, Israel, November 2007.
- Widely Applied Math Seminar, Division of Engineering and Applied Science, Harvard University, November 2007.
- 98th Statistical Mechanics Meeting, Rutgers University, December 2007.
- Department of Earth System Science Colloquium, University of California-Irvine, January 2008.

- Seminar in Biological and Biomedical Sciences, University of New Mexico, February 2008.
- Santa Fe Institute Colloquium, February 2008.
- March Meeting of the American Physical Society, March 2008.
- Department of Geological Sciences Colloquium, University of Colorado-Boulder, April 2008.
- Optimal Transport Workshop III: Transport Systems in Geography, Geosciences, and Networks, Institute for Pure & Applied Mathematics, UCLA, May 2008
- Alpine Summer School XVI, Interaction and Coevolution of Climate and Biosphere, Val-savarenche, Valle d'Aosta, Italy, June, 2008.
- Department of Physics Colloquium, Georgia Institute of Technology, November 2008.
- Symposium in Honor of Jens Feder, Norwegian Academy of Science and Letters, January 2009.
- Applied Mathematics Colloquium, Northwestern University, February 2009
- Computations in Science Seminar, Department of Physics, University of Chicago, February 2009.
- Department of Geological Sciences Colloquium, Indiana University, April 2009.
- Ovalline Lecturer in Geological Sciences (3 lectures), Jackson School of Earth Sciences, University of Texas, May 2009.
- Nonlinear Dynamics Seminar, Department of Physics, University of Texas, May 2009.
- Environmental Geology and Geochemistry Seminar, Princeton University, October 2009
- Department of Earth and Planetary Sciences Colloquium, Harvard University, October 2009
- International Workshop on the Comparative Study of the Precambrian-Cambrian and Permian-Triassic Transitions, Nanjing, China, November 2009.
- American Geophysical Union Fall Meeting, San Francisco, CA, December 2009.
- Oceanography Sack Lunch Series, MIT, February 2010.
- First Tuesday Colloquium, James Franck Institute, University of Chicago, March 2010.
- Computations in Science Seminar, Department of Physics, University of Chicago, March 2010.
- Physical Applied Mathematics Seminar, MIT, April 2010.
- Summer School on Environmental Dynamics, Istituto Veneto di Scienze Lettere ed Arte, June 2010 (4 lectures).

- Department of Earth and Environmental Science, University of Pennsylvania, October 2010.
- Northeastern Granular Materials Workshop, MIT, June 2011.
- Workshop on Complex Phenomena in Materials, Porto de Galinhas, Brazil, January 2012.
- Ocean Sciences Meeting, Salt Lake City, Utah, February 2012.
- Department of Physics Colloquium, University of New Mexico, Albuquerque, NM, March 2012.
- Institut Physique du Globe de Paris Colloquium, Paris, France, March 2012.
- Center for Studies in Physics and Biology Seminar, Rockefeller University, New York, NY, April 2012
- International Workshop on Soft-Matter Physics and Complex Flows, Svolvær, Lofoten, Norway, May 2012.
- IUGG Conference on Mathematical Geophysics, Edinburgh, Scotland, June 2012.
- Fermor Meeting on the Neoproterozoic, Geological Society of London, London, England, September 2012.
- Vermont Complex Systems Center Colloquium, University of Vermont, September 2012.
- Outcomes of Graduate Education: from Condensed Matter to Biological Physics (LeoFest, in honor of Leo P. Kadanoff), University of Chicago, October 2012.
- Special Seminar, Institut d'Alembert, Université Pierre et Marie Curie, Paris, France, June 2013.
- Cyberseminar, Consortium of Universities for the Advancement of Hydrologic Science, November 2013.
- American Geophysical Union Fall Meeting, San Francisco, CA (two invited talks), December 2013.
- Current Events Bulletin, American Mathematical Society, Joint Mathematics Meeting, Baltimore, MD, January 2014.
- Lorenz Center Workshop on Water and Climate, Dedham, MA, February 2014.
- Physics Colloquium, MIT, February 2014.
- Workshop on Reacting and Deformable Porous Media, Oxford University, March 2014.
- Dynamics Days, Rice University, Houston, TX, January 2015.
- Origins of Extinction Workshop, Arizona State University, Tempe, AZ, February 2015.
- American Physical Society March Meeting, San Antonio, TX, March 2015.

- European Geophysical Union, Vienna, Austria, April 2015.
- Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, June 2015.
- Computations in Science Seminar, James Franck Institute, University of Chicago, November 2015.
- American Geophysical Union Fall Meeting, San Francisco, CA, December 2015.
- First MIT Meeting on Quantitative Ecology, MIT, January 2016.
- Institute for Quantitative Theory and Methods Seminar, Emory University, Atlanta, GA, February 2016.
- Mathematics and Climate Research Network (webinar), February 2016.
- Evolution of Life (One Day meeting), Cambridge Philosophical Society, Cambridge University, Cambridge, England, March 2016.
- International Institute of Physics Workshop on Physics and Mathematics of Complex Systems: Growing Interfaces, Nonlinear Dynamics, Integrability, Natal, Brazil, April 2016.
- Plenary Speaker, Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematics of Planet Earth, Philadelphia, PA, September 2016.
- Levi L. Conant Lecture, Worcester Polytechnic Institute, Worcester, MA, September 2016.
- Widely Applied Math Seminar, School of Engineering and Applied Science, Harvard University, September 2016.
- Memorial Symposium for Leo Kadanoff, University of Chicago, October 2016.
- BioLunch Seminar, Department of Applied Mathematics and Theoretical Physics, Cambridge University, Cambridge, UK, November 2016.
- Mathematics of Planet Earth Centre for Doctoral Training, Imperial College, London, November 2016.
- Geological Fluid Dynamics Seminar, Institut de Physique du Globe de Paris, France, December 2016.
- American Geophysical Union Fall Meeting, San Francisco, CA, December 2016.
- Gordon Conference on Metals in Biology, Ventura California, January 2017.
- Society for Industrial and Applied Mathematics (SIAM) Conference on Computational Science and Engineering, Atlanta, GA, March 2017.
- The Shape of Rivers: Perspectives from Art and Science, DeCordova Museum, Lincoln, MA, March 2017 (with Fritz Horstman).



## Publications of Daniel H. Rothman

### 1. Books

1. Rothman, D. H. and Zaleski, S., *Lattice-Gas Cellular Automata: Simple models of complex hydrodynamics*, Cambridge University Press, 1997.

### 2. Papers in refereed journals

1. Rothman, D. H., Levin, S., and Rocca, F., "Residual migration: applications and limitations," *Geophysics* **50**, 110-126, January 1985.
2. Rothman, D. H., "Nonlinear inversion, statistical mechanics, and residual statics estimation," *Geophysics* **50**, 2784-2796, December 1985.
3. Rothman, D. H., "Automatic estimation of large residual statics corrections," *Geophysics* **51**, 332-346, February 1986.
4. Rothman, D. H., "Modeling seismic P-waves with cellular automata," *Geophysical Research Letters* **14**, 17-20, January 1987.
5. Rothman, D. H., "Cellular-automaton fluids: a model for flow in porous media," *Geophysics* **53**, 509-518, April 1988.
6. Rothman, D. H. and Keller, J.M., "Immiscible cellular-automaton fluids," *Journal of Statistical Physics* **52**, 1119-1127, August 1988.
7. Rothman, D. H., "Negative-viscosity lattice gases," *Journal of Statistical Physics* **56**, 517-524, August 1989.
8. Rothman, D. H. and Zaleski, S., "Spinodal decomposition in a lattice-gas automaton," *Journal de Physique (France)* **50**, 2161-2174, August 1989.
9. Rothman, D. H., "Macroscopic laws for immiscible two-phase flow in porous media: results from numerical experiments," *Journal of Geophysical Research* **95**, 8663-8674, June 1990.
10. Cancelliere, A., Chang, C., Foti, E., Rothman, D. H., and Succi, S., "The permeability of a random medium: comparison of simulation with theory," *Physics of Fluids A* **2**, 2085-2088, December 1990.
11. Rothman, D. H., "Deformation, growth, and order in sheared spinodal decomposition," *Physical Review Letters* **65**, 3305-3308, December 24, 1990.
12. Gunstensen, A. and Rothman, D. H., "A lattice-gas model for three immiscible fluids," *Physica D* **47**, 47-52, January, 1991.
13. Gunstensen, A. and Rothman, D. H., "A Galilean-invariant immiscible lattice gas," *Physica D* **47**, 53-63, January, 1991.

14. Appert, C., Rothman, D. H., and Zaleski, S., "A liquid-gas model on a lattice," *Physica D* **47**, 85-96, January, 1991.
15. Rothman, D. H., "Complex rheology in a model of a phase-separating fluid," *Europhysics Letters* **14**, 337-342, February 15, 1991.
16. Gunstensen, A., Rothman, D. H., Zaleski, S., and Zanetti, G., "A lattice-Boltzmann model of immiscible fluids," *Physical Review A* **43**, 4320-4327, April 15, 1991.
17. Gunstensen, A. and Rothman, D. H., "Microscopic modeling of immiscible fluids in three dimensions by a lattice-Boltzmann method," *Europhysics Letters* **18**, 157-161, February 14, 1992.
18. Holme, R. and Rothman, D. H., "Lattice-gas and lattice-Boltzmann models of miscible fluids," *Journal of Statistical Physics* **68**, 409-430, August, 1992.
19. Gunstensen, A. and Rothman, D. H., "Lattice-Boltzmann studies of immiscible two-phase flow through porous media," *Journal of Geophysical Research* **98**, 6431-6441, April, 1993.
20. Aharonov, E. and Rothman, D. H., "Non-Newtonian flow (through porous media): a Lattice Boltzmann method," *Geophysical Research Letters* **20**, 679-682, April, 1993.
21. Rothman, D. H., "From ordered bubbles to random stripes: pattern formation in a hydrodynamic lattice gas," *Journal of Statistical Physics* **71**, 641-652, May, 1993.
22. Rothman, D. H., Grotzinger, J., and Flemings, P., "Scaling in turbidite deposition," *Journal of Sedimentary Research* **A64**, 59-67, January, 1994.
23. Adler, C., d'Humières, D., and Rothman, D. H., "Surface tension and interface fluctuations in immiscible lattice gases," *Journal de Physique I (France)* **4**, 29-46, January, 1994.
24. Rothman, D. H. and Kadanoff, L. P., "Bubble, bubble, boil and trouble," *Computers in Physics* **8**, 199-204, March/April, 1994.
25. Rothman, D. H. and Zaleski, S., "Lattice-gas models of phase separation: interfaces, phase transitions, and multiphase flow," *Reviews of Modern Physics* **66**, 1417-1479, October, 1994.
26. Flekkøy, E. and Rothman, D. H., "Fluctuating fluid interfaces," *Physical Review Letters* **75**, 260-263, July 10, 1995.
27. Ferréol, B. and Rothman, D. H., "Lattice-Boltzmann simulations of flow through Fontainebleau sandstone," *Transport in Porous Media* **20**, 3-20, August, 1995.
28. Rothman, D. H. and Grotzinger, J., "Scaling properties of gravity-driven sediments," *Non-linear Processes in Geophysics* **2**, 178-185, September, 1995.
29. Olson, J. and Rothman, D. H., "A three-dimensional immiscible lattice gas: application to sheared phase separation," *Journal of Statistical Physics* **81**, 199-222, October, 1995.

30. Adler, C., Boghosian, B., Flekkøy, E., Margolus, N., and Rothman, D. H., “Simulating three-dimensional hydrodynamics on a cellular-automata machine,” *Journal of Statistical Physics* **81**, 105–128, October, 1995.
31. Appert, C., Olson, J., Rothman, D. H., and Zaleski, S., “Phase separation in a three-dimensional two-phase hydrodynamic lattice gas,” *Journal of Statistical Physics* **81**, 181–197, October, 1995.
32. Flekkøy, E. and Rothman, D. H., “Fluctuating hydrodynamic interfaces: theory and simulation,” *Physical Review E* **53**, 1620–1641, February, 1996.
33. Aharonov, E. and Rothman, D. H., “Growth of correlated pore-scale structures in sedimentary rocks: a dynamical model,” *Journal of Geophysical Research* **101**, 2973–2987, February, 1996.
34. van Genabeek, O. and Rothman, D. H., “Macroscopic manifestations of microscopic flows through porous media: phenomenology from simulation,” *Annual Review of Earth and Planetary Sciences* **24**, 63–87, 1996.
35. Auzeais, F.M., Dunsmuir, J., Ferréol, B., Marty, N., Olson, J., Ramakrishnan, T. S., Rothman, D. H., and Schwartz, L. M., “Transport in sandstone: a study based on three-dimensional microtomography,” *Geophysical Research Letters* **23**, 705–708, April 1, 1996.
36. Grotzinger, J. and Rothman, D. H., “An abiotic model for stromatolite morphogenesis,” *Nature* **382**, 423–425, October 3, 1996.
37. Pot, V., Appert, C., Melayah, A., Rothman, D. H., and Zaleski, S., “Interacting lattice-gas automaton study of liquid-gas properties in porous media,” *Journal de Physique II France* **6**, 1517–1534, October, 1996.
38. Olson, J. and Rothman, D. H., “Two-phase flow in sedimentary rock: simulation, transport, and complexity,” *Journal of Fluid Mechanics* **341**, 343–370, June 25, 1997.
39. Aharonov, E., Rothman, D. H., and Thompson, A., “Transport properties and diagenesis in sedimentary rocks: the role of microscale geometry,” *Geology* **25**, 547–550, June, 1997.
40. Rothman, D. H., “Oscillons, spiral waves, and stripes in a model of vibrated sand,” *Physical Review E* **57**, R1239–R1242, February, 1998.
41. Pastor-Satorras, R. and Rothman, D. H., “Stochastic equation for the erosion of inclined topography,” *Physical Review Letters* **80**, 4349–4352, May 11, 1998.
42. Pastor-Satorras, R. and Rothman, D. H., “Scaling of a slope: the erosion of tilted landscapes,” *Journal of Statistical Physics* **93**, 477–500, November, 1998.
43. Dodds, P. and Rothman, D. H., “Unified view of scaling laws for river networks,” *Physical Review E* **59**, 4865–4877, May, 1999.
44. van Genabeek, O. and Rothman, D. H., “Critical behavior in flow through a rough-walled channel,” *Physics Letters A* **255**, 31–316, May 3, 1999.

45. Dodds, P. and Rothman, D. H., “Scaling, universality, and geomorphology,” *Annual Review of Earth and Planetary Sciences* **28**, 571–610, 2000.
46. Stelitano, D. and Rothman D. H., “Fluctuations of elastic interfaces in fluids: Theory, lattice-Boltzmann model, and simulation,” *Physical Review E* **62** 6667–6680, November, 2000.
47. Dodds, P. and Rothman D. H., “Geometry of River Networks I: Scaling, Fluctuations, and Deviations,” *Physical Review E* **63**, 016115 (13 pages), January, 2001.
48. Dodds, P. and Rothman D. H., “Geometry of River Networks II: Distributions of Component Size and Number,” *Physical Review E* **63**, 016116 (15 pages), January, 2001.
49. Dodds, P. and Rothman D. H., “Geometry of River Networks III: Characterization of Component Connectivity,” *Physical Review E* **63**, 016117 (10 pages), January, 2001.
50. Schorghofer, N. and Rothman D. H., “Basins of attraction on random topography,” *Physical Review E* **63**, 026112 (7 pages), February, 2001.
51. Dodds, P., Rothman, D. H., and Weitz, J., “Re-examination of the ‘3/4-law’ of metabolism,” *Journal of Theoretical Biology* **209**, 9–27, March, 2001.
52. Rothman, D. H., “Global biodiversity and the ancient carbon cycle,” *Proceedings of the National Academy of Sciences USA* **98**, 4305–4310, April 10, 2001.
53. Chan, K. and Rothman, D. H., “Coupled length scales in eroding landscapes,” *Physical Review E* **63**, 055102(R) (4 pages), May, 2001.
54. Aharonson O., Zuber, M., and Rothman, D. H., “Statistics of Mars’ topography from the Mars Orbiter Laser Altimeter: Slopes, correlations, and physical models,” *Journal of Geophysical Research* **106**, 23723–23735, October 25, 2001.
55. Aharonson O., Zuber, M., Rothman, D. H., Whipple, K., and Schorghofer, N., “Drainage basins and channel incision on Mars,” *Proceedings of the National Academy of Sciences USA* **99**, 1780-1783, February 19, 2002.
56. Rothman, D. H., “Atmospheric carbon dioxide levels for the last 500 million years,” *Proceedings of the National Academy of Sciences USA* **99**, 4167-4171, April 2, 2002.
57. Schorghofer, N. and Rothman, D. H., “Acausal relations between topographic slope and drainage area,” *Geophysical Research Letters* **29**, 10.1029/2002GL015144, 2002.
58. Rothman, D.H., Hayes, J. M., and Summons, R.E., “Dynamics of the Neoproterozoic carbon cycle” *Proceedings of the National Academy of Sciences USA* **100**, 8124-8129, July 8, 2003.
59. Weitz, J. S. and Rothman, D. H., “Scale-dependence of resource-biodiversity relationships,” *Journal of Theoretical Biology* **225**, 205-214, November 21, 2003.
60. Schorghofer, N., Jensen, B., Kudrolli, A., and Rothman, D. H., “Spontaneous channelization in permeable ground: Theory, experiment, and observation” *Journal of Fluid Mechanics* **503**, 357-374, March 2004.

61. Weitz, J. S. and Rothman, D. H., “Dynamics of a contact process with ontogeny,” *Physical Review E* **70**, 021915, August 2004.
62. Lobkovsky, A.E., Jensen, B., Kudrolli, A., and Rothman, D. H., “Threshold phenomena in erosion driven by subsurface flow,” *Journal of Geophysical Research-Earth Surface* **109**, Art. No. F04010, December 24, 2004.
63. Latva-Kokko, M. and Rothman, D. H., “Diffusion properties of gradient-based lattice Boltzmann models of immiscible fluids,” *Physical Review E* **71**, 056702, May 2005.
64. Latva-Kokko, M. and Rothman, D. H., “Static contact angle in lattice-Boltzmann models of immiscible fluids,” *Physical Review E* **72**, 046701, October 2005.
65. Lobkovsky, A.E., Smith, B. E., Kudrolli, A., Mohrig, D., and Rothman, D. H., “Erosive dynamics of channels incised by subsurface water flow,” *Journal of Geophysical Research-Earth Surface* **112**, F03S12, doi:10.1029/2006JF000517, March 2007.
66. Rothman, D.H. and Forney, D. C., “Physical model for the decay and preservation of marine organic carbon,” *Science* **316**, 1325–1328, June 1, 2007.
67. Latva-Kokko M. and Rothman D.H., “Scaling of dynamic contact angles in a lattice-Boltzmann model,” *Physical Review Letters* **98**, Art. No. 254503, June 22, 2007.
68. Straub, K.M, Jerolmack, D.J., Mohrig, D., and Rothman, D.H., “Channel network scaling laws in submarine basins,” *Geophysical Research Letters* **34**, L12613, doi:10.1029/2007GL030089, June 2007.
69. Rothman, D.H. and Forney, D. C., “Response to Comment on ‘Physical model for the decay and preservation of marine organic carbon’,” *Science* **319**, doi:10.1126/science.1148678, March 21, 2008
70. Lobkovsky, A. E., Orpe, A. V., Molloy, R., Kudrolli, A., and Rothman, D. H., “Erosion of a granular bed driven by laminar fluid flow,” *Journal of Fluid Mechanics*, **605**, June 25, 2008
71. Smith, B., Kudrolli, A., Lobkovsky, A. E., and Rothman, D. H., “Channel erosion due to subsurface flow,” *Chaos* **18**, 041105 (1 page), DOI:10.1063/1.2997333, December 31, 2008.
72. Abrams, D. M., Lobkovsky, A. E., Petroff, A. P., Straub, K. M., McElroy, B., Mohrig, D. C., Kudrolli, A, and Rothman, D. H., “Growth laws for channel networks incised by groundwater flow,” *Nature Geoscience* **2**, 193–196, March 2009.
73. Tosca, N. J., Johnston, D. T., Mushegian, A., Rothman, D. H., Summons, R. E., and Knoll, A. H., “Clay mineralogy, organic carbon burial, and redox evolution in Proterozoic basins,” *Geochimica et Cosmochimica Acta* **74**, 1579–1592, 1 March 2010.
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