

Steven H. Strogatz

Jacob Gould Schurman Professor of Applied Mathematics
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Employment

2009–present Professor of Mathematics, Cornell
2009–2014 Professor of Mechanical and Aerospace Engineering, Cornell
2007–present Jacob Gould Schurman Professor of Applied Mathematics, Cornell
2005–2012 Director, Center for Applied Mathematics, Cornell
2000–2009 Professor, Theoretical and Applied Mechanics, Cornell
1994–2000 Associate Professor, Theoretical and Applied Mechanics, Cornell
1993–1994 Associate Professor of Applied Mathematics, Dept. of Mathematics, MIT
1989–1993 Assistant Professor of Applied Mathematics, Dept. of Mathematics, MIT

Education

Ph. D. (1986), Applied Mathematics, Harvard University.
B. A., first class honours (1982) and M.A. (1986), Mathematics, Cambridge University.
A. B., summa cum laude (1980), Mathematics, Princeton University.

Research interests

Nonlinear dynamics, complex systems, networks, coupled oscillators, and their applications in physics, biology, and social science.

Honors and awards

Fellow of the American Physical Society (2014).

(“For seminal work on complex networks, nonlinear oscillators, and synchronization phenomena.”)

[Euler Book Prize](#) (2014).

(“The Euler Book Prize is awarded annually to an author or authors of an outstanding book about mathematics. The Prize is intended to recognize authors of exceptionally well written books with a positive impact on the public's view of mathematics and to encourage the writing of such books.” Past recipients are listed [here](#). Awarded by the Mathematical Association of America.)

[Public Engagement with Science Award](#) (2013).

(“For his exceptional commitment to and passion for conveying the beauty and importance of mathematics to the general public.” [Past recipients](#) include Carl Sagan,

Neil deGrasse Tyson, John Allen Paulos, and E.O. Wilson. Awarded by the American Association for the Advancement of Science.)

Fellow of the American Academy of Arts and Sciences (2012).

Fellow of the Society for Industrial and Applied Mathematics (2009).
 ("For investigations of small-world networks and coupled oscillators and for outstanding science communication.")

[Highly Cited Paper in Physics](#) (2008).
 (for "Collective dynamics of small-world networks," which ranked #6 on the list of most highly cited papers in physics for 1998-2008).

Jacob Gould Schurman Professor (2007).
 (A university-wide endowed chair at Cornell.)

Communications Award from the Joint Policy Board for Mathematics (2007).
 (A lifetime award, presented jointly by the four major American mathematical societies, "to reward journalists and other communicators who, on a sustained basis, bring accurate mathematical information to non-mathematical audiences. The award recognizes a significant accumulated contribution to the public understanding of mathematics.")

Tau Beta Pi Teaching Award (2006).
 ("Professor of the Year" in the College of Engineering, Cornell).

Robert '55 and Vanne '57 Cowie Teaching Award, College of Engineering, Cornell (2001).

President's Award for Outstanding Contributions in Support of Underrepresented Minorities, Cornell (2000).

J.P. and Mary Barger '50 Teaching Award, College of Engineering, Cornell (1997).

NSF Presidential Young Investigator (1990–1995).

E. M. Baker Award for Excellence in Undergraduate Teaching (1991).
 (MIT's highest teaching prize)

NSF Postdoctoral Fellowship in Mathematical Sciences (1986–1989).

Senior Scholarship and Tripos Prize, Trinity College, Cambridge, England (1982).

Marshall Scholar, Trinity College, Cambridge (1980–1982).

Prize Lectures and Named Lectures

Evnin Lecture, Princeton University (2012).

[Louis Clark Vanuxem Lecture](#), Princeton University (2011).
 ("...a series of public lectures before the University annually on subjects of scientific interest. ... Lecturers have included Edwin P. Hubble on "The Exploration of Space" (1931-1932); James B. Conant on "The Mobilization of American Scientists for the War"; and Carl Sagan on "Extraterrestrial Life" (1972-1973).)

[Simons Lecture Series](#), MIT (2011).
 ("The Department of Mathematics annually presents the Simons Lecture Series to celebrate the most exciting mathematical work by the very best mathematicians of our time.")

AMS-MAA-SIAM Gerald and Judith Porter Public Lecture, Joint Mathematics Meetings, Washington, DC (2010).

[Rouse Ball Lecture](#), University of Cambridge (2009).
 (Previous lecturers include Einstein, Dirac, Pauli, Mandelbrot, Lorenz, and numerous Nobel laureates and Fields Medalists.)

I. E. Block Community Lecturer, SIAM Annual Meeting, San Diego (2001).

Grants

Cyber-Enabled Discovery and Innovation Program, “CDI Type II: Complex dynamics in the Internet: A computational analytic approach,” Co-Principal Investigator, National Science Foundation CCF-0835706, 2008-2012, \$1,500,000.

“Nonlinear dynamics of oscillator networks,” Principal Investigator, National Science Foundation, 2004-2007, \$524,061.

Integrative Graduate Education and Research Training (IGERT) grant, “Program in Nonlinear Systems,” Co-Principal Investigator, National Science Foundation DGE-0333366, 2003-2008, \$3,436,000.

“Nonlinear dynamics of oscillator networks,” Principal Investigator, National Science Foundation, 2000-2003, \$312,042.

Integrative Graduate Education and Research Training (IGERT) grant, “Program in Nonlinear Systems,” Principal Investigator, National Science Foundation, 1998-2003, \$2,245,997.

“Mutual synchronization of biological oscillators,” Principal Investigator, National Science Foundation, 1996-1999, \$180,000.

“Synchronization and communication in nonlinear optical systems,” Co-Principal Investigator, National Science Foundation, 1996-1999, \$268,123.

“Nonlinear dynamics of oscillator arrays,” Principal Investigator, National Science Foundation, 1995-1998, \$180,000.

“Large systems of coupled nonlinear oscillators in physics and biology,” Principal Investigator, National Science Foundation, 1992-1995, \$75,000.

National Science Foundation Presidential Young Investigator Award, 1990–1995, \$205,000 (\$125,000 base grant + \$40,000 grant from AT&T + \$40,000 matching money from NSF).

“Large systems of coupled nonlinear oscillators,” Principal Investigator, National Science Foundation, 1989–1991, \$37,000.

National Science Foundation Postdoctoral Fellowship, 1986–89, \$66,000.

Teaching summary

Department of Mathematics Teaching Award, Cornell (2012).

Swanson Teaching Award, College of Engineering, Cornell (2009).

Tau Beta Pi Teaching Award (“Professor of the Year” in the College of Engineering, chosen by the students in the engineering honor society) (2006).

Robert ’55 and Vanne ’57 Cowie Excellence in Teaching Award, College of Engineering, Cornell (2001).

J.P. and Mary Barger ’50 Teaching Award, College of Engineering, Cornell (1997).

Awarded MIT’s top teaching prize, the E. M. Baker Award for Outstanding Teaching (1991).

Awarded four Certificates for Distinction in Teaching, Harvard University, Committee on Undergraduate Education (1983, 1984, 1985, 1987).

Courses taught at Cornell: “Calculus” (Math 192, Math 293); “Advanced Engineering Analysis” (TAM 310); “Applied Complex Analysis” (Math 4220); “Intermediate Dynamics” (TAM 570); “Nonlinear Dynamics and Chaos” (TAM 578); “Methods of Applied Mathematics” (TAM 610, 611); “Perturbation Methods” (TAM 613); “Complex Systems” (TAM 678); “Applied Dynamical Systems” (Math 717/TAM 776); “History of Mathematics” (Math 4030); “Mathematical Explorations” (Math 1300).

Courses taught at MIT: “Principles of Applied Mathematics” (1994); “Calculus” (1993); “Nonlinear Dynamics and Chaos” (1990–1993); “Complex Variables” and “Mathematical Methods for Engineers” (1989–1993).

Science communication and outreach

New York Times series and Op-Eds:

[Me, Myself and Math](#) – a six-part online series in 2012

[Singular Sensations](#) (Sep. 10, 2012)

[Friends You Can Count On](#) (Sep. 17, 2012)

[Proportion Control](#) (Sep 24, 2012)

[It's My Birthday Too, Yeah](#) (Oct. 1, 2012)

[Dangerous Intersection](#) (Oct. 8, 2012)

[Visualizing Vastness](#) (Oct. 15, 2012)

Steven Strogatz on [The Elements of Math](#). The New York Times, Opinionator blog (Spring 2010).

[The Hilbert Hotel](#) (May 9, 2010)

[Group Think](#) (May 2, 2010)

[Chances Are](#) (April 25, 2010)

[It Slices, It Dices](#) (April 18, 2010)

[Change We Can Believe In](#) (April 11, 2010)

[Take It to the Limit](#) (April 4, 2010)

[Power Tools](#) (March 28, 2010)

[Think Globally](#) (March 21, 2010)

[Square Dancing](#) (March 14, 2010)

[Finding Your Roots](#) (March 7, 2010)

[The Joy of X](#) (Feb. 28, 2010)

[Division and Its Discontents](#) (Feb. 21, 2010)

[The Enemy of My Enemy](#) (Feb. 14, 2010)

[Rock Groups](#) (Feb. 7, 2010)

[From Fish to Infinity](#) (Jan. 31, 2010)

[Like water for money](#). The New York Times, Wild Side guest column (June 2, 2009).

[Loves me, loves me not \(Do the math\)](#). The New York Times, Wild Side guest column (May 26, 2009).

[Math and the city](#). The New York Times, Wild Side guest column (May 19, 2009).

[A journey to baseball's alternate universe](#). (with Sam Arbesman) The New York Times, Op-Ed page (March 30, 2008).

[How the blackout came to life](#). The New York Times, Op-Ed page (August 25, 2003).

[The real scientific hero of 1953](#). The New York Times, Op-Ed page (March 4, 2003).

Huffington Post:

S. Strogatz. [The 3 Most Confusing Things Your Math Teacher Ever Told You](#)”, Huffington Post, Dec. 13, 2012.

S. Strogatz. [Could you park safely on the world’s steepest street?](#) Huffington Post, August 22, 2014.

S. Strogatz and C. Ratti. [Taking rides with strangers](#). Huffington Post, Sep. 2, 2014.
http://www.huffingtonpost.com/steven-strogatz/taking-rides-with-strange_b_5754520.html

Radio and Web appearances

Radiolab

["What a Slinky Knows"](#) (9/10/12)

["Loops"](#) (10/4/11)

["The Good Show"](#) (12/14/10)

["Limits"](#) (4/16/10)

["Numbers"](#) (10/9/09)

["Are We Coins?" podcast](#) (6/29/09)

["Yellow Fluff and Other Curious Encounters"](#) (12/12/08)

["\(So-Called\) Life"](#) (3/14/08)

["Emergence"](#) (2/18/05)

LA Theatre Works

["Proof"](#) - explores themes of women in math, the nature of genius, creativity, proof, intuition, and elegance

["Arcadia"](#) - about the history and significance of chaos theory and fractal geometry as they relate to the play

["Six Degrees of Separation"](#) - about human connections, the small-world effect, and networks

Science Friday

["Steven Strogatz: The Joy of x"](#) (10/5/12)

["Steven Strogatz Talks Math"](#) (2/26/10)

["Scientists Debate 'Six Degrees of Separation'"](#) (1/25/08)

Other radio and Web appearances

[VIP \(Very Important Puzzler\) on NPR/WNYC quiz show Ask Me Another](#) (8/2/13)

["The heart of the beat"](#) - CBC Radio Ideas (4/22/13)

["The Joy of x" - GigaOm](#) (10/16/12)

["The Joy of x" - Literary New England](#) (10/8/12)

["Pi: A window on infinity" -- Colin McEnroe Show](#) (3/14/11)

[Ideas Network -- Wisconsin Public Radio](#) (6/24/10)

["Swarm in here ... or is it just me?" -- SETI](#) (6/21/10)

["Math for the nonmathetic" -- Colin McEnroe Show](#) (3/15/10)

["Who are You Connected To?" -- Morning Edition](#) (6/4/98)

Television

[World of Numbers](#) - The Agenda with Steve Paikin, TVO (TVOntario), Aug. 26, 2011.

[How Kevin Bacon Cured Cancer](#) (also known as [Connected: The Power of Six Degrees](#))

Documentary about networks, aired on ABC Australia, Oct. 28, 2008; Discovery Canada, Jan. 8, 2009; Discovery Science Channel US, Feb. 15, 2009; BBC Two, United Kingdom, May 5, 2009. 2009 winner of the Australian Museum [Eureka Prize](#), the most prestigious award in Australian science. 2010 winner of Best Film, SCINEMA Festival of Science Film Competition.

[Sync: The Emerging Science of Spontaneous Order](#) - C-SPAN BookTV, 92nd St Y, Mar. 25, 2003, conversation with Alan Alda

Video

[TED Talk](#) on how things in nature tend to sync up (Monterey, CA, Feb. 2004)

[Parabolas \(etc.\) from WNYC/NPR Radio Lab](#)

(a video inspired by Radio Lab episode “Yellow fluff and other curious encounters.”)

[Induction speech at American Academy of Arts and Sciences](#) (10/6/12)

[Simons Lecture Series](#), Mathematics Department, MIT (2011).

("The Department of Mathematics annually presents the Simons Lecture Series to celebrate the most exciting mathematical work by the very best mathematicians of our time.")

[1. Coupled oscillators that synchronize themselves](#)

[2. Social networks that balance themselves](#)

[3. Blogging about math for the New York Times](#)

[Louis Clark Vanuxem Lecture](#), Princeton University (2011).

[A Well-Lighted Place](#) (interview about writing)

[Math for the Masses](#) (lecture about writing ["The Elements of Math"](#) blog for the NY Times)

[The Calculus of Friendship \(conversation with Alan Alda\)](#)

[The Calculus of Friendship \(trailer on YouTube\)](#)

[The Calculus of Friendship \(one-hour lecture\)](#)

[Fractal lecture from Chaos: The Teaching Company](#)

SEED Magazine: Salon with architect and designer Carlo Ratti, SEED Magazine, December 2008. [Video version](#) [Transcript](#)

[A Simple Rhythm](#) -- Documentary about synchronization in nature

(aired at [Calgary International Film Festival](#) and [Vancouver International Film Festival](#), 2010)

Selected Press

Physics Today (October 2012) [Exotic chimera dynamics glimpsed in experiments](#)
Boston Globe (9/27/12) [Steven Strogatz teaches math to the masses](#)
Science News (9/22/12) [When networks network](#)
New York Times (11/9/10) [Voices: What's next in science](#)
Harvard Business Review (4/29/10) [The best New York Times business columnist you've never heard of](#)
Nature Physics (2010) [News and Views: Spontaneous synchrony breaking](#)
O, The Oprah Magazine (9/18/09) [Social not-working: The perils of too much communication](#)
New York Times (11/8/05) [All together now: Synchrony explains swaying](#)
Discovery News (8/21/03) [Language's status drives its survival](#)
New York Times (12/26/00) [First cells, then species, now the web](#)
New York Times (6/16/98) [Mathematicians prove that it's a small world](#)
Nature (6/4/98) [News and Views: It's a small world](#)
New York Times (1/6/98) [Flirting male crabs found to wave claws in unison](#)
New York Times (8/13/91) [A mystery of nature: Mangroves full of fireflies blinking in unison](#)
New York Times (1/8/85) [Strange scroll-like wave is linked to biological processes](#)

Outreach

Adviser and interviewee on [MATHeMatics Illuminated](#), a 13-part video and web-based educational series (2007-08), produced by Oregon Public Broadcasting and funded by the Annenberg Foundation. The series won a WebVisionary Award in 2008, in the “educational/resource” category.

Science adviser, Radio Lab, WNYC (2006-present)

Science consultant, “QED” – a Broadway play about Richard Feynman (2001-2002).

Interviewed and quoted by the New York Times, Washington Post, Baltimore Sun, National Journal, and San Jose Mercury Sun, about how “six degrees of separation” makes us all feel personally affected by the World Trade Center attack (September 2001).

Professional activities

Advisory Council, Museum of Mathematics (2010-present).

Science adviser, RadioLab, WNYC (2006-present).

Advisory Board, SIAM Dynamical Systems Activity Group (2006-2007).

External Faculty, Santa Fe Institute (2004-2010).

Editorial Boards:

Notices of the American Mathematical Society (2013-2015)

Quanta Magazine, Simons Foundation (2013–present)

Math Horizons (2013–present).

Co-Editor, Princeton Studies in Complexity (2004-present)

Journal of Nonlinear Science (2003-2006)

International Journal of Bifurcation and Chaos (1999-present)

SIAM Review (1997-2002)

SIAM Journal on Applied Mathematics (1995–1998)

Organizer, SIAM Conference on Applications of Dynamical Systems (1997).

Director, SIAM Activities Group on Dynamical Systems (1996-1999).

Co-Chairman, Gordon Research Conference on Theoretical Biology (1992).

Research summary

Models of social dynamics and social networks.

(with J. Kleinberg, S. Marvel, S. Arbesman, and R. Kleinberg)

Chimera states for coupled oscillators.

(with E. Martens, D. Abrams, D. Wiley, and R. Mirollo, 2005-2008)

Crowd synchronization on London's wobbly Millennium Bridge.

(with D. Abrams, A. McRobie, B. Eckhardt, and E. Ott, 2005)

Dynamics of language death.

(with graduate student D. Abrams, 2003).

Random graphs and their applications.

(with M. Newman, D. Callaway, D. Watts, J. Hopcroft, J. Kleinberg, 2000-2003)

Small-world networks.

(with D. Watts, 1997-2000)

Mathematical models of cricket chorusing.

(with T. Forrest, 1996-2000)

Nonlinear dynamics of lasers and laser arrays.

(with R. Roy and H. Abarbanel, 1995–1999)

Dynamics of superconducting Josephson junction arrays.

(with K. Wiesenfeld, R. Mirollo, K. Tsang, J. Swift, S. Watanabe, H. van der Zant, M. Barahona, and T. Orlando, 1989–1998)

Synchronized chaotic circuits, with applications to private communications.

(with K. Cuomo and A. Oppenheim, 1993–1994)

Dynamics of switching in charge-density waves.

(with C. Marcus, R. Westervelt, and R. Mirollo, 1988–1989)

Collective behavior of coupled nonlinear oscillators.

(with R. Mirollo and P. Matthews, 1988–present; Postdoctoral research with N. Kopell, 1986–1989)

Mathematical models and data analysis of the human sleep-wake cycle.

(Ph.D. research with R. Kronauer and C. Czeisler, 1983–1986)

Topology of three-dimensional chemical waves.

(with A. Winfree, 1982–1983)

Topology of chromatin and supercoiled DNA.

(Undergraduate thesis work with F. Almgren and A. Worcel, 1980)

Ph.D. students supervised

MIT:

1. Shinya Watanabe (Applied Mathematics, 1995)

2. Mauricio Barahona (Physics, 1996)

Cornell:

3. Duncan Watts (Theoretical and Applied Mechanics, 1997)

4. M.K. Stephen Yeung (Theoretical and Applied Mechanics, 1999)

5. Duncan Callaway (Theoretical and Applied Mechanics, 2001)

6. Joel Ariaratnam (Applied Mathematics, 2002)

7. Michelle Girvan (Physics, 2003)

8. Daniel Wiley (Applied Mathematics, 2006)

9. Danny Abrams (Theoretical and Applied Mechanics, 2006)

10. Sam Arbesman (Computational Biology, 2008)

11. Erik Martens (Theoretical and Applied Mechanics, 2009)

12. Lauren Childs (Applied Mathematics, 2010)

13. Seth Marvel (Applied Mathematics, 2011)

14. Tim Novikoff (Applied Mathematics, 2012)

15. Isabel Kloumann (Applied Mathematics, expected 2016)

16. Danielle Toupo (Applied Mathematics, expected 2016)

17. Kevin O’Keeffe (Physics, expected 2016)

Master's students supervised

John Weisenfeld (TAM, 1997)

Postdoctoral fellows supervised

Ricardo Oliva (2001)

Basant Sharma (2004)

Marc Timme (2005)

Diversity

Co-PI of Cornell’s Summer Mathematics Institute, (2006-present), a summer “boot camp” for mathematically talented women and minority undergraduates who are headed for graduate school and desire a stronger foundation in analysis and algebra.

Publications

A. Worcel, S. Strogatz, and D. Riley. Structure of chromatin and the linking number of DNA. *Proceedings of the National Academy of Sciences USA* 78, 1461-1465 (1981).

S. Strogatz. Estimating the torsional rigidity of DNA from supercoiling data. *Journal of Chemical Physics* 77, 580-581 (1982).

S. Strogatz. Topology of zig-zag chromatin. *Journal of Theoretical Biology* 103, 601-607 (1983).

A.T. Winfree and S.H. Strogatz. Singular filaments organize chemical waves in three dimensions. I. Geometrically simple waves. *Physica D* 8, 35-49 (1983).

A.T. Winfree and S.H. Strogatz. Singular filaments organize chemical waves in three dimensions. II. Twisted waves. *Physica D* 9, 65-80 (1983).

A.T. Winfree and S.H. Strogatz. Singular filaments organize chemical waves in three dimensions. III. Knotted waves. *Physica D* 9, 333-345 (1983).

A.T. Winfree and S.H. Strogatz. Singular filaments organize chemical waves in three dimensions. IV. Wave taxonomy. *Physica D* 13, 221-233 (1984).

S.H. Strogatz, M.L. Prueitt, and A.T. Winfree. Exotic shapes in chemistry and biology. *IEEE Computer Graphics and Applications* 4 (1), 66-69 (1984).

A.T. Winfree and S.H. Strogatz. Organising centres for three-dimensional chemical waves. *Nature* 311, 611-615 (1984).

S. Strogatz. Yeast oscillations, Belousov-Zhabotinsky waves, and the non-retraction theorem. *Mathematical Intelligencer* 7 (2), 9-17 (1985).

S.H. Strogatz and R.E. Kronauer. Circadian wake-maintenance zones and insomnia in man. *Sleep Research* 14, 219 (1985).

S.H. Strogatz, R.E. Kronauer, and C.A. Czeisler. Circadian regulation dominates homeostatic control of sleep length and prior wake length in humans. *Sleep* 9, 353-364 (1986).

C.A. Czeisler, J.S. Allan, S.H. Strogatz, J.M. Ronda, R. Sanchez, C.D. Rios, W.O. Freitag, G.S. Richardson, and R.E. Kronauer. Bright light resets the human circadian pacemaker independent of the timing of the sleep-wake cycle. *Science* 233, 667-671 (1986).

S.H. Strogatz. A comparative analysis of models of the human sleep-wake cycle. In: *Lectures on Mathematics in the Life Sciences*, Vol. 19: ed. G. Carpenter, American Mathematical Society, Providence, pp. 1-37 (1987).

- S.H. Strogatz, R.E. Kronauer, and C.A. Czeisler. Circadian pacemaker interferes with sleep onset at specific times each day: role in insomnia. *American Journal of Physiology* 253, R172-R178 (1987).
- S.H. Strogatz. Human sleep and circadian rhythms: a simple model based on two coupled oscillators. *Journal of Mathematical Biology* 25, 327-347 (1987).
- S.H. Strogatz. Author's summary in Open Peer Commentary on "The Mathematical Structure of the Human Sleep-Wake Cycle." *Journal of Biological Rhythms* 2, 317-321 (1987).
- S.H. Strogatz. Love affairs and differential equations. *Mathematics Magazine* 61, 35 (1988).
- S.H. Strogatz and R.E. Mirollo. Phase-locking and critical phenomena in lattices of coupled nonlinear oscillators with random intrinsic frequencies. *Physica D* 31, 143-168 (1988).
- S.H. Strogatz and R.E. Mirollo. Collective synchronisation in lattices of non-linear oscillators with randomness. *Journal of Physics A: Mathematical and General* 21, L699-L705 (1988).
- S.H. Strogatz, C.M. Marcus, R.M. Westervelt, and R.E. Mirollo. Simple model of collective transport with phase slippage. *Physical Review Letters* 61, 2380-2383 (1988).
- S.H. Strogatz, C.M. Marcus, R.M. Westervelt, and R.E. Mirollo. Collective dynamics of coupled oscillators with random pinning. *Physica D* 36, 23-50 (1989).
- C.M. Marcus, S.H. Strogatz, and R.M. Westervelt. Delayed switching in a phase-slip model of charge-density wave transport. *Physical Review B* 40, 5588-5592 (1989).
- S.H. Strogatz and R.M. Westervelt. Predicted power laws for delayed switching of charge-density waves. *Physical Review B* 40, 10501-10508 (1989).
- R.E. Mirollo and S.H. Strogatz. Jump bifurcations and hysteresis in an infinite-dimensional dynamical system of coupled spins. *SIAM Journal on Applied Mathematics* 50, 108-124 (1990).
- S.H. Strogatz. Interpreting the human phase response curve to multiple bright-light exposures. *Journal of Biological Rhythms* 5, 169-174 (1990).
- R.E. Mirollo and S.H. Strogatz. Amplitude death in an array of limit-cycle oscillators. *Journal of Statistical Physics* 60, 245-262 (1990).
- P.C. Matthews and S.H. Strogatz. Phase diagram for the collective behavior of limit-cycle oscillators. *Physical Review Letters* 65, 1701-1704 (1990).
- R.E. Mirollo and S.H. Strogatz. Synchronization of pulse-coupled biological oscillators. *SIAM Journal on Applied Mathematics* 50, 1645-1662 (1990).

R.E. Mirollo and S.H. Strogatz. Integral representation of a finite spike. *American Mathematical Monthly* 97, 901-903 (1990).

P.C. Matthews and S.H. Strogatz. Chaotic mappings and probability distributions. *College Mathematics Journal* 22, 45-47 (1991).

K.Y. Tsang, S.H. Strogatz, and K. Wiesenfeld. Reversibility and noise sensitivity of Josephson arrays. *Physical Review Letters* 66, 1094-1097 (1991).

K.Y. Tsang, R.E. Mirollo, S.H. Strogatz, and K. Wiesenfeld. Dynamics of a globally coupled oscillator array. *Physica D* 48, 102-112 (1991).

S.H. Strogatz and R.E. Mirollo. Stability of incoherence in a population of coupled oscillators. *Journal of Statistical Physics* 63, 613-635 (1991).

P.C. Matthews, R.E. Mirollo, and S.H. Strogatz. Dynamics of a large system of coupled nonlinear oscillators. *Physica D* 52, 293-331 (1991).

H.A. Stone, A. Nadim, and S.H. Strogatz. Chaotic streamlines inside drops immersed in steady Stokes flows. *Journal of Fluid Mechanics* 232, 629-646 (1991).

J.J. Tyson and S.H. Strogatz. The differential geometry of scroll waves. *International Journal of Bifurcations and Chaos* 1, 723-744 (1991).

J.W. Swift, S.H. Strogatz, and K. Wiesenfeld. Averaging of globally coupled oscillators. *Physica D* 55, 239-250 (1992).

S.H. Strogatz, R.E. Mirollo, and P.C. Matthews. Coupled nonlinear oscillators below the synchronization threshold: relaxation by generalized Landau damping. *Physical Review Letters* 68, 2730-2733 (1992).

S.H. Strogatz and R.E. Mirollo. Splay states in globally coupled Josephson arrays: analytical prediction of Floquet multipliers. *Physical Review E* 47, 220-227 (1993).

S. Watanabe and S.H. Strogatz. Integrability of a globally coupled oscillator array. *Physical Review Letters* 70, 2391-2394 (1993).

S.H. Strogatz and I. Stewart. Coupled oscillators and biological synchronization. *Scientific American* 269 (6), December, 102-109 (1993).

K.M. Cuomo, A.V. Oppenheim, and S.H. Strogatz. Synchronization of Lorenz-based chaotic circuits, with applications to communications. *IEEE Transactions on Circuits and Systems II* 40, 626-633 (1993).

K.M. Cuomo, A.V. Oppenheim, and S.H. Strogatz. Robustness and signal recovery in a synchronized chaotic system. *International Journal of Bifurcations and Chaos* 3, 1629-1638 (1993).

S.H. Strogatz. Norbert Wiener's brain waves. In *Frontiers in Mathematical Biology*, edited by S. Levin. *Lecture Notes in Biomathematics*, Vol. 100, Springer-Verlag, New York, pp. 122-138 (1994).

S. Watanabe and S.H. Strogatz. Constants of motion for superconducting Josephson arrays. *Physica D* 74, 197-253 (1994).

W.-J. Rappel and S.H. Strogatz. Stochastic resonance in an autonomous system with a nonuniform limit cycle. *Physical Review E* 50, 3249-3250 (1994).

H.S.J. van der Zant, T.P. Orlando, S. Watanabe, and S.H. Strogatz. Vortices trapped in discrete Josephson rings. *Physica B* 203, 490-496 (1994).

H.S.J. van der Zant, T.P. Orlando, S. Watanabe, and S.H. Strogatz. Kink propagation in a highly discrete system: observation of phase-locking to linear waves. *Physical Review Letters* 74, 174-177 (1995).

S. Watanabe, S.H. Strogatz, H.S.J. van der Zant, and T.P. Orlando. Whirling modes and parametric instabilities in the discrete sine-Gordon equation: experimental tests in Josephson rings. *Physical Review Letters* 74, 379-382 (1995).

P. Saha and S.H. Strogatz. The birth of period three. *Mathematics Magazine* 68 (1), 42-47 (1995).

Hohl, H.J.C van der Linden, R. Roy, G. Goldsztein, F. Broner, and S.H. Strogatz. Scaling laws for dynamical hysteresis in a multidimensional laser system. *Physical Review Letters* 74, 2220-2223 (1995).

G. Goldsztein and S.H. Strogatz. Stability of synchronization in a network of digital phase-locked loops. *International Journal of Bifurcations and Chaos* 5, 983-990 (1995).

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