

## **PHILIP JOHN HOLMES: Curriculum Vitae and Publications** (updated Jan 2012.)

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### **Education**

Oxford University; B.A. (Hons). Engineering Science: 1967.  
Southampton University; Ph.D. Engineering: 1974.

### **Experience and Academic Posts**

Industrial apprenticeship with Rolls-Royce Ltd. (Aero Engine Division): 1963-1964, 1967-1968.  
Self-employed man of letters, travels in Europe and the Near East, first volume of poems: 1968-1970.  
Research Assistant, Institute of Sound and Vibration Research, Southampton University: 1970-1974.  
Research Fellow, Institution of Sound and Vibration Research: 1974-1977.  
Assistant Professor of Theoretical and Applied Mechanics, Cornell University: 1977-1980.  
Visiting Scholar, Department of Mathematics, University of California at Berkeley: Jan-June 1981.  
Associate Professor of Theoretical and Applied Mechanics, Cornell University: 1980-1984.  
Director, Center for Applied Mathematics and Graduate Field Representative, Cornell University: 1981-86.  
Member, Graduate Field of Mathematics, Cornell University: 1983-94.  
Professor of Theoretical and Applied Mechanics and Mathematics, Cornell University: 1984-94.  
Applied Analysis Program Coordinator, Mathematical Sciences Institute, Cornell University: 1985-88, 90-91.  
Sherman Fairchild Distinguished Scholar, California Institute of Technology: 1988-1989.  
Professeur Associé, Université de Nice: July 1989.  
Charles N. Mellowes Professor of Engineering and Professor of Mathematics, Cornell University: 1992-94.  
Professeur Associé, Université de Paris-Sud: June-July 1993.  
Professor of Mechanics and Applied Mathematics, Princeton University: 1994-.  
Director, Program in Applied and Computational Mathematics, Princeton University: 1994-97, 2010-11.  
Associated Faculty Member, Department of Mathematics, Princeton University: 2002-.  
Visiting Member, School of Mathematics, Institute for Advanced Study, Princeton: Spring 2003.  
Interim Chair, Department of Mechanical and Aerospace Engineering, Princeton University: 2006-07.  
Eugene Higgins Professor of Mechanical and Aerospace Engineering, Princeton University: 2008-.

### **Honours, Awards and Major Invited Lectures**

Eric Gregory Award for part of second collection of poems, "A Place to Stand", 1975.  
Vollmer-Fries Lectureship, Rensselaer Polytechnic Institute, February 1983.  
Invited Lecturer, DD4, Beijing, PRC, August 1983.  
Chaire Aisenstadt, Centre de Recherches Mathématiques, Université de Montréal, 1985-6.  
Watson Distinguished Speaker, S.U.N.Y. Binghamton, NY, March 1986.  
Midwest Mechanics Seminar Speaker, 1986-7.  
North British Differential Equations Seminar Speaker, May 1988.  
Mark Kac Memorial Lecturer, Los Alamos National Lab, April 1989.  
Plenary Speaker, XI USNC TAM, Tucson, AZ, May 1990.  
Sectional Lecturer, ICM, Kyoto, Japan, August 1990.

Graduiertenkolleg Lecturer, Universität Stuttgart, June 1991.  
 Rufus Bowen Lecturer, Department of Mathematics, University of California at Berkeley, October 1991.  
 John Simon Guggenheim Memorial Fellow, 1993-4.  
 Southwest Mechanics Lecture Series Speaker, 1994.  
 Elected Member of the American Academy of Arts and Sciences, 1994.  
 SERC Applied Nonlinear Mathematics Spring School lecturer, University of Leeds, UK, 1994.  
 Short course lecturer, IV Latin American Workshop on Nonlinear Phenomena, San Carlos de Bariloche, Argentina, September 1995.  
 Plenary Speaker, AMS Winter Annual Meeting, Orlando, FL, January 1996.  
 Lansdowne Visiting Professor, University of Victoria, BC, Canada, March 1996.  
 Short course lecturer, ICCMP Workshop on Nonlinear Dynamics, Universidade de Brasília, Brazil, July 1997.  
 Distinguished Lecturer, Oberlin College, OH, April 1998.  
 Erdős Visiting Professor, Paul Erdős Mathematical Center, Budapest, Hungary, January 2000.  
 Phillips Distinguished Visitor, Haverford College, Haverford, PA, January 2001.  
 Elected Honorary Member of the Hungarian Academy of Sciences, 2001.  
 Blumberg Lecturer, University of Texas, Austin, TX, March 2002.  
 Plenary Speaker, SIAM 50th Anniversary Meeting, Philadelphia, PA, July 2002.  
 Schmidt Distinguished Visiting Professor, Florida Atlantic University, Boca Raton, FL, September 2002.  
 Listed among Highly Cited Researchers by the American Society for Information Science & Technology, 2003  
[ISIHighlyCited.com](http://ISIHighlyCited.com).  
 Visiting Member, Institute for Advanced Study, Princeton, Spring 2003.  
 Plenary Speaker, International Symposium on Nonlinear Theory and its Applications (NOLTA2004), Fukuoka, Japan, December 2004.  
 Opening Plenary Speaker, Fifth EUROMECH Nonlinear Dynamics Conference (ENOC-2005), Eindhoven University of Technology, the Netherlands, August 2005.  
 Math Matters Public Lecture, Institute for Mathematics and Its Applications, Minneapolis, MN, December 2005.  
 Short course lecturer in 19th Canberra International Physics Summer School on Turbulence, Australian National University, Canberra, January, 2006.  
 IAM, PIMS and MITACS Distinguished Colloquium, University of British Columbia, Canada, March, 2006.  
 Appointed to SIAM Visiting Lecturer Program, 2006.  
 Rainich Lecturer, Department of Mathematics, University of Michigan, October-November 2006.  
 Elected Fellow of the American Physical Society, 2006.  
 Lyapunov Award, American Society of Mechanical Engineers' Technical Committee on Multibody Systems and Nonlinear Dynamics, 2009.  
 Safra Distinguished Visiting Professor, Faculty of Mechanical Engineering, Technion, Israel, February-March 2009.  
 Plenary Speaker, 16th International Congress on Mathematical Physics, Prague, Czech Republic, August 3-8, 2009.  
 Marvin I. Freedman Memorial Colloquium, Department of Mathematics, Boston University, March 2010.  
 Opening Plenary Speaker, SIAM Conference on Life Sciences, Pittsburgh, PA, July 12-15, 2010.  
 Elected Fellow of the Society for Industrial and Applied Mathematics, 2011.  
 Invited speaker, International Congress on Industrial and Applied Mathematics, Vancouver, BC, July 18-22, 2011.  
 T.K. Caughey Award, American Society of Mechanical Engineers' Applied Mechanics Division, 2011.  
 Karl Menger Lecturer, Applied Mathematics Dept., Illinois Institute of Technology, Chicago, IL, April 23-24, 2012.

### **Theses Directed** (Ph.D., unless stated otherwise)

B.D. Greenspan (1981); J. Belair (1983); S.W. Shaw (1983); S.R. Wiggins (1985); N. MacGiolla Mhuiris (1986); K.G. Hockett (1986); J.J.P. Veerman (1986); A. Szeri (1988); E. Stone (1989); T. Kiemel (1990); V. Brunsden (MSc., 1990); O. O'Reilly (1990); C. Moore (1991); S.A. Campbell (1991); G. Berkooz (1991); P.J. Swart (1991); B. Zombro (1993); J. Duan (1993); W. Kalies (1994); H. Dankowicz (1995); B.D. Coller (1995); R.W. Ghrist (1995); D.A. Taylor (MSc., 1996); R.W. Wittenberg (1998); J.J. Jenkins (MSc., 1999); J.M. Schmitt (2001); J. Cisternas (2003); T.R. Smith (2003); E.T. Brown (2004); R.M. Ghigliazza (2004); J. Seipel (2006); J. Gao (2007); Y. Liu (2007); P. Eckhoff (2009); R. Kukillaya (2010); J. Proctor (2011); A. Nedic (2011).

### **Current Graduate Students** (Ph.D., unless stated otherwise)

S. Feng; S. Goldfarb\*; P. Reverdy\* (\* denotes co-advised with N.E. Leonard).

### **Postdoctoral Scholars**

D.C. Whitley (1982-83); I.M. Moroz (1983-84); D. Armbruster (1986-88); A. Mielke (1986-87); J. Elezgaray (1989-91); G. Domokos (1991-92); A. Doelman (1992-93); D. Begie (1993-95); J.N. Kutz (1995-97); R. Goodman (1999-2001); H. Hanßmann (2000-01); J. Moehlis (2000-03); R. Bogacz (2001-04); T. McMillen (2003-06); P. Simen (2004-11); A.J. Yu (2005-08); M. Srinivasan (2006-09); P. Varkonyi (2006-07); KF. Wong-Lin (2006-10); E. Fuchs (2008-); D. Tomlin (2008-); F. Balci (2008-10); M. Schwemmer (2010-).

### **Editorial Board Memberships**

Addison-Wesley, monographs on Global Analysis and Its Applications: 1981-1985. SIAM Journal on Applied Mathematics: 1984-1990. Archive for Rational Mechanics and Analysis: 1986-2003. Complex Systems: 1986-1988. Journal of Nonlinear Science: 1990-; Managing Editor 2001-2005. Nonlinear Science Today: 1990-96. Proceedings of the Edinburgh Mathematical Society: 1991-96. Regular & Chaotic Dynamics: 1996-. Springer Verlag, Applied Mathematics Series and Texts in Applied Mathematics, 1997-; Co-Editor in Chief of 4 book series (AMS, TAM, IAM and STAM), 2010-. Annual Reviews of Fluid Mechanics, guest editor, 1998. SIAM Journal on Applied Dynamical Systems, 2001-. Applied Mathematics Research eXpress, 2001-.

### **Advisory Board Memberships**

Centre de Recherches Mathématiques, Université de Montréal: 1986-1991. S.E.R.C. Nonlinear Systems Panel (U.K.): 1986-1990. Theory Center, Cornell University: 1987-1989. L'Institut des Sciences Mathématiques, Montréal: 1991-96. US National Committee on Theoretical and Applied Mechanics: 1996-2000. AMS NSF Postdoctoral Fellowship Selection Committee: 1998-2000 (Chair, 1999). AMS/SIAM Wiener Prize Committee: 2003. SIAM Jürgen Moser Prize Selection Committee: 2006. Membership Panel, American Academy of Arts and Sciences: 1997-98 and 2004-7 (Chair, 2005-7). Centrum voor Wiskunde en Informatica, Amsterdam Advisory Council, 2008-.

### **Conference and Workshop Organization**

IUTAM Symposium on Stochastic Problems In Dynamics, Southampton, U.K., July 19-23, 1976: co-organizer. Engineering Foundation Conference on New Approaches to Nonlinear Problems in Dynamics, Pacific Grove, California, Dec. 9-14, 1979: chairman. SIAM Symposium on Nonlinear Dynamics, Alexandria, Virginia, July 6-8, 1980: chairman. Society for Natural Philosophy 25th Annual Meeting, Ithaca, Sept. 23-36, 1982: chairman. Engineering Foundation Conference on New Approaches to Nonlinear Problems II, Henniker, N.H., June 8-13, 1986: co-chairman. US National Congress on Applied Mechanics, Austin, TX, June 16-20, 1986: symposium organizer. MSI Workshop on Infinite Dimensional Dynamical Systems, Ithaca, NY, May 20-22,

1987: organizer. CRM Special Year in Dynamical Systems, Montréal, Quebec, 1993-94: co-organizer. MSRI Special Semester in Dynamical Systems and Probabilistic Methods for PDE, Spring, 1994: organizing committee member. Fourth International Congress on Industrial and Applied Mathematics, Edinburgh, Scotland, July 4-9, 1999: minisymposium co-organiser. Fifth International Congress on Industrial and Applied Mathematics, Sydney, Australia, 2003: international Program Committee member. Mathematical Biology Institute (Ohio State University) special year on Bioengineering, 2007-8: workshop organiser. Equadiff 2011, Loughborough University, UK, Aug 1-5, 2011: Scientific Advisory Board member. IUTAM Symposium on 50 Years of Chaos: Applied and Theoretical, Kyoto University, Japan, Nov 28-Dec 2, 2011: scientific committee member.

### Professional Society Memberships

American Mathematical Society (AMS representative to US National Committee on Theoretical and Applied Mechanics, 1996-2000); American Physical Society; International Society for the Interaction of Mechanics and Mathematics; Society for Industrial and Applied Mathematics (Council member, 1987-89, Chair of Dynamical Systems Activity Group, 2006-7, Major Awards Committee, 2008-10); Society for Natural Philosophy; Society for Neuroscience.

### Reviewing activities

AMS Notices; American Scientist; Applied Mechanics Reviews; Bulletin of the AMS; IMA Journal; Journal of Applied Mechanics; Journal of Sound and Vibration; Physics Today; Physics World; Shock and Vibration Digest; SIAM Review.

### Refereeing Activities

AMS Journals; Applied Mathematical Modelling; Automatica; Communications in Mathematical Physics; Ergodic Theory and Dynamical Systems; Handbook of Acoustics; Icarus; IEEE Journals; Journal of Applied Mechanics; Journal of Atmospheric Sciences; Journal of Differential Equations; Journal of Dynamic Systems and Control; Journal of Fluid Mechanics; Journal of Knot Theory and its Ramifications; Journal of Mathematical Biology; Journal of Theoretical Biology; Journal of Sound and Vibration; Lecture notes on Biomathematics; Mechanics Research Communications; Memory and Cognition; Nonlinearity; Physica D (Nonlinear Phenomena); Physical Review (PRL and PRE); Physics of Fluids; Physics Letters; Reviews of Modern Physics; Rocky Mountain Journal of Mathematics; The Royal Society Journals; SIAM Journals; Theoretical and Computational Fluid Dynamics; Transport Theory and Statistical Physics.

### Current Research Funding

The National Science Foundation, the Air Force Office of Scientific Research, and the National Institutes of Health and of Mental Health currently support my work. I also participate in graduate training programs sponsored by the National Institutes of Health.

### Publications

#### (1) Archival Journal Articles

[1.1] P.J. Holmes and R.G. White (1972) *J. Sound Vib.* 25 (2), 217-243. Data analysis criteria and instrumentation requirements for the transient measurement of mechanical impedance.

[1.2] P.J. Holmes (1974) *J. Sound Vib.* 25 (4), 525-529. On the practical estimation of spectra and correlation functions of transient signals.

[1.3] P.J. Holmes (1974) *J. Sound Vib.* 35 (2), 253-275 and 277-297. The experimental characterization of

wave propagation systems: I - non-dispersive waves in lumped systems; II - continuous systems and the effects of dispersion.

[1.4] P.J. Holmes and D.A. Rand (1976) *J. Sound Vib.* 44 (2), 237-253. The bifurcations of Duffing's equation: an application of catastrophe theory.

[1.5] P.J. Holmes and D.A. Rand (1978) *Quart. Appl. Math.* 35, 495-509. Bifurcation of the forced van der Pol oscillator.

[1.6] P.J. Holmes and C.A. Mercer (1976) *J.A.S.A.* 60 (4), 951-2. Comments on "Measurement of frequency responses and the multiple coherence function of the noised generation system of a diesel engine" by J.Y. Chung, M.J. Crocker and J.F. Hamilton, (*J.A.S.A.* 58 (3), 635-642, 1975).

[1.7] P.J. Holmes (1977) *J. Sound Vib.* 53 (4), 471-503. Bifurcations to divergence and flutter in flow-induced oscillations: a finite dimensional analysis.

[1.8] P.J. Holmes (1977) *Int. J. Nonlinear Mech.* 12, 323-326. Behavior of an oscillator with even nonlinear damping.

[1.9] P.J. Holmes and Y.K. Lin (1978) *Trans. A.S.M.E. J. Appl. Mech.* 45, 165-169. Deterministic stability analysis of a wind-loaded structure.

[1.10] Y.K. Lin and P.J. Holmes (1978) *Proc. A.S.C.E. J. Eng. Mech.* 104 (EM2), 421-440. Stochastic stability analyses of a wind-loaded structure.

[1.11] P. Holmes (1977) *Applied Mathematical Modelling* 7 (1), 362-366. 'Strange' phenomena in dynamical systems and their physical implications.

[1.12] P. Holmes and D. Rand (1980) *Int. J. Nonlinear Mech.* 15, 449-458. Phase portraits and bifurcations of the nonlinear oscillator  $\ddot{x} + (\alpha + \gamma x^2)\dot{x} + \beta x + \delta x^3 = 0$ .

[1.13] P. Holmes and J. Marsden (1978) *Automatica* 14 (4), 367-384. Bifurcations to divergence and flutter in flow-induced oscillations: an infinite dimensional analysis.

[1.14] P. Holmes (1979) *Phil. Trans. Roy. Soc. Lond. A292 (1394)*, 419-448. A nonlinear oscillator with a strange attractor.

[1.15] P.J. Holmes (1979) *Trans. A.S.M.E. J. Appl. Mech.* 45, 619-622. Pipes supported at both ends cannot flutter.

[1.16] D.R.J. Chillingworth and P.J. Holmes (1980) *J. Math. Geol.* 12 (1), 41-59. Dynamical systems and models for reversals of the earth's magnetic field.

[1.17] P. Holmes (1980) *Rocky Mountain J. Math* 10 (4), 679-693. Periodic, non-periodic and irregular motions in a Hamiltonian system.

[1.18] P.J. Holmes (1979) *Trans. A.S.M.E. J. Appl. Mech.* 46 (3), 672-676. Domains of stability in a wind induced oscillation problem.

[1.19] P. Holmes and D. Lewis (1981) *Int. J. Nonlinear Mech.* 16 (3,4), 233-246. A periodically forced scalar ordinary differential equation.

[1.20] F.C. Moon and P.J. Holmes (1979) *J. Sound Vib.* 65 (2), 275-296. A magneto-elastic strange attractor (also (1980) *J. Sound Vib.*, 69 (2), 339. Addendum).

[1.21] P.J. Holmes (1980) *SIAM J. Appl. Math.* 38 (1), 65-80. Averaging and chaotic motion in forced oscillations (also (1981) *SIAM J. Appl. Math.* 40 (1), 167-168. Erratum and addendum).

[1.22] P.J. Holmes (1981) *Physica D* 2, 449-481. Center manifolds, normal forms and bifurcations of vector fields with applications to coupling between periodic and steady motions.

[1.23] P.J. Holmes (1980) *J. Diff. Eqns.* 37, 382-403. A strange family of three dimensional vector fields near a degenerate singularity.

[1.24] P. Holmes and J. Marsden (1981) *Arch. Rat. Mech. Anal.* 76, 135-165. A partial differential equation with infinitely many periodic orbits: Chaotic oscillations of a forced beam.

[1.25] P. Holmes and D.S. Stewart (1982) *Stud. Appl. Math.* 66, 121-143. The existence of one-dimensional steady detonation waves in a simple model problem.

[1.26] R.H. Rand and P.J. Holmes (1980) *Int. J. Nonlinear Mech.* 15, 387-399. Bifurcation of periodic motions in two weakly coupled van der Pol oscillators.

- [1.27] P.J. Holmes (1981) Space- and time-periodic perturbations of the Sine-Gordon equation. In “Proc. Warwick Symposium on Dynamical Systems”, 164-191, ed. D.A. Rand and L.S. Young. Springer Lecture Notes in Mathematics, 898, Springer-Verlag, New York.
- [1.28] S. Leibovich and P. Holmes (1981) *Physics of Fluids* 24 (3), 548-549. Global stability of the Burgers vortex.
- [1.29] C. Holmes and P. Holmes (1981) *J. Sound Vib.* 78 (2), 161-174. Second order averaging and bifurcations to period two in Duffing’s equation.
- [1.30] P. Holmes (1982) *Quart. Appl. Math.* 50 (1), 53-62. On a second order boundary value problem arising in combustion theory.
- [1.31] P. Holmes and D. Spence (1984) *Quart J. Mech. Appl. Math.* 37 (4), 525-538. On a Painlevé type boundary value problem.
- [1.32] P.J. Holmes and B.D. Greenspan (1983) Homoclinic orbits, subharmonics and global bifurcations in forced oscillations. In “Nonlinear Dynamics and Turbulence”, 172-214, ed. D.D. Joseph, G. Iooss and G. Barenblatt, Pitman, London.
- [1.33] A. Cohen, P.J. Holmes and R.H. Rand (1982) *J. Math Biol.* 13, 345-369. The nature of coupling between segmental oscillators of the lamprey spinal generator for locomotion: a model.
- [1.34] P.J. Holmes and J.E. Marsden (1982) *Comm. Math. Phys.* 82, 523-544. Horseshoes in perturbations of Hamiltonian systems with two degrees of freedom.
- [1.35] P.J. Holmes and J.E. Marsden (1982) *J. Math. Phys.* 23, 669-675. Melnikov’s method and Arnold diffusion for perturbations of integrable Hamiltonian systems.
- [1.36] P.J. Holmes and J.E. Marsden (1983) *Indiana U. Math. J.* 32, 273-309. Horseshoes and Arnold diffusion for Hamiltonian systems on Lie groups.
- [1.37] P.J. Holmes (1982) *J. Sound Vib.* 84 (2), 173-189. The dynamics of repeated impacts with a sinusoidally vibrating table.
- [1.38] P.J. Holmes (1982) *Physica D* 5, 335-347. Proof of non-integrability for the Henon-Heiles Hamiltonian near an exceptional integrable case.
- [1.39] B.D. Greenspan and P.J. Holmes (1984) *SIAM J. Math Anal.* 15, 69-97. Repeated resonance and homoclinic bifurcation in a periodically forced family of oscillators.
- [1.40] P. Holmes and D. Whitley (1983) *Physica D* 7, 111-123. On the attracting set for Duffing’s equation II: A geometrical model for moderate force and damping.
- [1.41] P. Holmes and D. Whitley (1984) On the attracting set for Duffing’s Equation I: Analytical methods for small force and damping. In “Partial Differential equations and Dynamical Systems”, 211-240, ed. W. E. Fitzgibbon III. Pitman (1984).
- [1.42] S.W. Shaw and P.J. Holmes (1983) *J. Sound Vib.* 90, 129-155. A periodically forced piecewise linear oscillator.
- [1.43] J. Belair and P. Holmes (1983) *Quart. Appl. Math.* 42, 193-219. On linearly coupled relaxation oscillations.
- [1.44] P.J. Holmes and F.C. Moon (1983) *Trans. ASME J. Appl. Mech.* 50 (4b), 1021-1032. Strange attractors and chaos in nonlinear mechanics.
- [1.45] S.W. Shaw and P.J. Holmes (1983) *Trans. ASME J. Appl. Mech.* 50 (4A), 849-857. A periodically forced impact oscillator with large dissipation.
- [1.46] P. Holmes and D. Whitley (1984) *Phil. Trans. Roy. Soc. Lond. A311 (1515)*, 43-102. Bifurcations of one and two dimensional maps (also (1984) *Phil. Trans. Roy. Soc. Lond. A312 (1523)*, 601. Erratum).
- [1.47] S.W. Shaw and P. Holmes (1983) *Phys. Rev. Lett.* 51 (8), 623-626. A periodically forced linear oscillator with impacts: chaos and long period motions.
- [1.48] P. Holmes (1984) *Phys. Lett.* 104A, 299-302. Bifurcation sequences in horseshoe maps: infinitely many routes to chaos.
- [1.49] P. Veerman and P. Holmes (1985) *Physica D* 14, 177-192. The existence of arbitrarily many distinct periodic orbits in a two degree of freedom Hamiltonian system.
- [1.50] P. Holmes (1985) *Trans. ASME J. Dyn. Sys. Control* 107, 159-165. Dynamics of a nonlinear oscillator with feedback control I. Local analysis.

- [1.51] P. Holmes and R.F. Williams (1985) *Arch. Rat. Mech. Anal.* 90, 115-194. Knotted periodic orbits in suspensions of Smale's horseshoe: torus knots and bifurcation sequences.
- [1.52] I.M. Moroz and P. Holmes (1984) *J. Atmospheric Sciences* 41 (21), 3147-3160. Double Hopf bifurcation and quasiperiodic flow in a model for baroclinic instability.
- [1.53] S. Wiggins and P. Holmes (1987) *SIAM J. Math. Anal.* 18 (3), 592-611. Periodic orbits in slowly varying oscillators.
- [1.54] A.H. Cohen, R.H. Rand and P.J. Holmes (1988) Systems of coupled oscillators as models of central pattern generators. In "Neural Control of Rhythmic Movements in Vertebrates", 333-367, eds A. H. Cohen, S. Rossignol, S. Grillner, Wiley, New York.
- [1.55] K. Hockett and P. Holmes (1986) *Ergodic Theory and Dynamical Systems* 6, 205-239. Josephson's junction, annulus maps, horseshoes and rotation sets.
- [1.56] P. Holmes (1986) *J. Fluid Mech.* 162, 365-388. Chaotic motions in a weakly nonlinear model for surface waves.
- [1.57] S. Wiggins and P. Holmes (1987) *SIAM J. Math. Anal.* 18, 612-629. Homoclinic orbits in slowly varying oscillators (also (1988) *SIAM J. Math. Anal.* 19 (5), 1254-1255. Erratum).
- [1.58] P. Veerman and P.J. Holmes (1985) *Physica D* 20, 413-422. Resonance bands in a two degree of freedom Hamiltonian system.
- [1.59] P.J. Holmes (1985) *Physica D* 21, 7-41. Knotted periodic orbits in suspensions of Smale's horseshoe: period multiplying and cabled knots.
- [1.60] F.C. Moon, J. Cusumano and P.J. Holmes (1987) *Physica D* 24, 383-390. Evidence for homoclinic orbits as a precursor to chaos in a magnetic pendulum.
- [1.61] K. Hockett and P. Holmes (1988) *Nonlinearity* 1 (4), 603-616. Bifurcation to rotating Cantor sets in maps of the circle.
- [1.62] P. Holmes (1986) *Physica D* 23, 84-90. Spatial structure of time-periodic solutions of the Ginzburg-Landau equation.
- [1.63] K. Hockett and P. Holmes (1987) *Proc. I.E.E.E.*, 75 (8), 1071-1080. Nonlinear oscillations, iterated maps, symbolic dynamics and knotted orbits.
- [1.64] P.J. Holmes (1987) *Proc. Roy. Soc. Lond.* A411 (1841), 351-378. Knotted periodic orbits in suspensions of annulus maps.
- [1.65] T. Kiemel and P. Holmes (1987) *IMA J. of Math. Appl. to Biology and Medicine* 4, 145-169. A model for the periodic synaptic inhibition of a neuronal oscillator.
- [1.66] P. Holmes (1988) Knots and orbit genealogies in nonlinear oscillators. In "New Directions in Dynamical Systems", 150-191, ed. T. Bedford and J. Swift. Cambridge University Press, Cambridge, U.K.
- [1.67] N. Aubry, P. Holmes, J.L. Lumley and E. Stone (1988) *J. Fluid Mech.* 192, 115-173. The dynamics of coherent structures in the wall region of a turbulent boundary layer (also (1996) *J. Fluid Mech.* 324, 407-408. Corrigendum).
- [1.68] V. Brunson and P. Holmes (1987) *Phys. Rev. Lett.* 58 (17), 1699-1702. Power spectra of strange attractors near homoclinic orbits.
- [1.69] A. Szeri and P. Holmes (1988) *Phil. Trans. Roy. Soc. Lond.* A326 (1590), 327-354. Nonlinear stability of axisymmetric swirling flows (also (1988) *Phil. Trans. Roy. Soc. Lond.* A326 (1593), 697. Erratum).
- [1.70] K. Hockett and P. Holmes (1988) *Proc. A.M.S.* 102 (4), 1031-1051. Bifurcation to badly ordered orbits in one parameter families of circle maps, or Angels fallen from the Devil's staircase.
- [1.71] J. Guckenheimer and P. Holmes (1988) *Math. Proc. Camb. Phil. Soc.* 103, 189-192. Structurally stable heteroclinic cycles.
- [1.72] D. Armbruster, J. Guckenheimer and P. Holmes (1988) *Physica D* 29, 257-282. Heteroclinic cycles and modulated travelling waves in systems with  $O(2)$  symmetry.
- [1.73] A. Mielke and P. Holmes (1988) *Arch. Rat. Mech. Anal.* 101, 319-348. Spatially complex equilibria of buckled rods.
- [1.74] D. Armbruster, J. Guckenheimer and P.J. Holmes (1989) *SIAM J. on Appl. Math.* 49, 676-691. Kuramoto-Sivashinsky dynamics on the center-unstable manifold.

- [1.75] P. Holmes, J.E. Marsden and J. Scheurle (1988) *Contemporary Mathematics* 81, 213-244. Exponentially small splitting of separatrices in KAM theory and degenerate bifurcations.
- [1.76] E. Stone and P.J. Holmes (1990) *SIAM J. on Appl. Math* 50, 726-743. Random perturbations of heteroclinic attractors.
- [1.77] V. Brunnsden, J. Cortell and P.J. Holmes (1989) *J. Sound Vib.* 130, 1-25. Power spectra of chaotic oscillations of a buckled beam.
- [1.78] N. Aubry, J.L. Lumley and P. Holmes (1990) *Theoretical and Computational Fluid Dynamics* 1 (4), 229-248. The effect of modeled drag reduction on the wall region (also (1996) *Theoretical and Computational Fluid Dynamics* 8 (6), 449-450. Errata).
- [1.79] P. Holmes (1989) *Physica D* 40, 42-64. Knotted periodic orbits in suspensions of Smale's horseshoe: extended families and bifurcation sequences.
- [1.80] P. Holmes (1989) Can dynamical systems approach turbulence? In "Whither Turbulence? Turbulence at the Crossroads", 195-249 and 306-309, ed. J.L. Lumley, Springer Lecture Notes in Applied Physics 357, Springer-Verlag, New York.
- [1.81] P. Holmes (1990) *Physics Reports* 193 (3), 137-163. Poincaré, celestial mechanics, dynamical systems theory and "chaos."
- [1.82] D.M. Kammen, P.J. Holmes and C. Koch (1989) Cortical architecture and oscillations in neuronal networks: feedback versus local coupling. In "Models of Brain Function", 273-284, ed. R.M.J. Cotterill, Cambridge University Press, Cambridge, U.K.
- [1.83] J.M. Ball, P.J. Holmes, R.D. James, R.L. Pego and P.J. Swart (1991) *J. Nonlinear Sci.* 1 (1), 17-70. On the dynamics of fine structure.
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[2.4]\* P.J. Holmes and D.A. Rand (1977) Identification of vibrating systems by generic modelling. In "Proc. Int. Symposium on Shipboard Acoustics", 89-105, Delft. (Technische Physische Dienst and Netherlands Maritime Institute: published by Elsevier)

[2.5] P.J. Holmes and J.E. Marsden (1977) Bifurcations to Divergence and flutter in flow induced oscillations: an infinite dimensional analysis. IFAC Symposium on Control of Distributed Parameter Systems, Warwick, U.K. June 28-July 1, 1977.

[2.6]\* P.J. Holmes and J.E. Marsden (1977) Bifurcations of dynamical systems and nonlinear oscillations in engineering systems. In "Proc. Indiana Conf. on Nonlinear Partial Differential Equations, November 1976", 163-206. Springer Lecture Notes in Mathematics No. 648, Springer-Verlag, New York.

[2.7] P.J. Holmes (1977) Identification of Vibration Transmission Systems by Generic Modelling. In "Proc. 9th Intl. Congress on Acoustics", Madrid, Vol. II.

[2.8]\* P.J. Holmes and J.E. Marsden (1977) Qualitative techniques for the bifurcation analysis of complex systems. In "Proc. N.Y. Acad. Sci. meeting on Bifurcation Theory", *Ann. N.Y. Acad. Sci.* 316; 608-622.

[2.9] P.J. Holmes (1978) Nonlinear stability of pipes by Liapunov's second method. 8th U.S Congress on Applied Mechanics, Los Angeles.

[2.10]\* P.J. Holmes (1978) Global bifurcation and chaos in the forced oscillations of buckled structures. In "Proc. 17th IEEE Conference on Decision and Control", 181-185, IEEE Service Center, Piscataway, NJ. (Invited paper.)

[2.11] P.J. Holmes (1979) Recurrent periodic and nonperiodic behavior in simple dynamical systems. In "Proc. Joint National Meeting" TIMS/ORSA, Bulletin 7, 107. (Invited paper.)

[2.12]\* P.J. Holmes (1979) Bifurcations in coupled nonlinear oscillators with applications to flutter and divergence. In "Proc. ASME Winter Annual Meeting, New York, December 1979" *A.S.M.E. monograph on Nonlinear Dynamics*, ed. J.K. Hedrick and H.M. Paynter. (Invited paper.)

[2.13]\* P.J. Holmes (1980) Unfolding a degenerate nonlinear oscillator. In "Proc. International Conference on Nonlinear Dynamics, New York, December 17-21, 1979", *Ann. N.Y. Acad. Sci.* 357, 473-488). (Invited paper.)

[2.14]\* J.E. Marsden and P.J. Holmes (1980) A horseshoe in the dynamics of a forced beam. In "Proc. International Conference on Nonlinear Dynamics, New York, December 17-21, 1979", *Ann. N.Y. Acad. Sci.* 357, 313-321. (Invited paper.)

[2.15] P.J. Holmes (1980) Phase locking and chaos in coupled limit cycle oscillators. In "Proc. International Conference on Recent Advances in Structural Dynamics, Southampton, July 7-11, 1980."

[2.16] J.E. Marsden and P.J. Holmes (1980) Dynamical systems and invariant manifolds. In "New Approaches to Nonlinear Problems in Dynamics", 3-25, ed. P.J. Holmes. SIAM Publications, Philadelphia.

[2.17] P.J. Holmes (1981) Bifurcations and chaotic motions in nonlinear dynamical systems. Society of Engineering Science 18th Annual Meeting, Providence, RI, September 2-4 1981. (Invited paper.)

[2.18] P.J. Holmes (1981) Global bifurcation and chaos in nonlinear oscillations. Society for Natural Philosophy 24th Meeting, Urbana-Champaign, IL, December 3-5, 1981. (Invited paper.)

[2.19] P.J. Holmes (1982) Qualitative theory and bifurcation to chaotic motions in nonlinear mechanics. 9th U.S. Congress on Theoretical and Applied Mechanics, Ithaca, NY June 21-24 (Invited paper.)

[2.20] P.J. Holmes (1982) One and two dimensional maps as models of periodically forced nonlinear oscillations. Canadian Math. Soc. Winter Annual Meeting, Toronto, Ontario, December 11-13, 1982. (Invited

paper.)

[2.21] P.J. Holmes (1983) The tangled bifurcations of one and two dimensional maps: Spaghetti in  $R^2$ . Chaos in Dynamical Systems, College Park, MD, March 16-18.

[2.22] P.J. Holmes (1983) This elegant hope: reflections on order and chaos in nonlinear dynamics. Applied Math Days, Ithaca, NY, May 23-24.

[2.23] P.J. Holmes (1983) Attracting sets for Duffing's equation. In "Proc. Fourth International Symposium on Differential Equations and Differential Geometry", Beijing, People's Republic of China, August 29-September 9. (Invited paper.)

[2.24]\* P.J. Holmes (1984) Some remarks on chaotic particle paths in time periodic three-dimensional swirling flows. *Contemporary Math* 28, 393-404. (Proc. AMS Summer Conference on Fluids and Plasmas, Geometry and Dynamics, Boulder, CO, July 17-23, 1983.) (Invited paper.)

[2.25] P.J. Holmes (1984) Bifurcations of One and Two Dimensional Maps. Dynamics Days, La Jolla, CA, Jan. 3-5, 1984. (Invited paper.)

[2.26] P.J. Holmes (1984) Tying shoelaces: knotted periodic orbits and bifurcation sequences in suspensions of horseshoes. Workshop on Topology and Geometry of Smooth Dynamical Systems, MSRI, Berkeley, CA, June 4-8, 1984. (Invited paper.)

[2.27] A.H. Cohen and P.J. Holmes (1984) Swimming in Lamprey: a neuronal central pattern generator. Gordon Conference on Theoretical Biology and Biomathematics, New London, NH, July 2-6, 1984.

[2.28] P.J. Holmes (1984) Knotted orbits and bifurcation sequences in periodically forced oscillations. XVIth ICTAM, Lyngby, Denmark, August 19-25, 1984.

[2.29] P.J. Holmes (1984) Global bifurcation and chaos in nonlinear structures. Computational Mechanics, A workshop at the NASA Lewis Research Center, Cleveland, OH, September 24-25, 1984. (Invited paper.)

[2.30] P.J. Holmes (1984) Vibrations, impacts, knots, horseshoes and chaos. Chaos: Applications of Nonlinear Dynamics in the Sciences, Boston University, October 24-25, 1984. (Invited paper.)

[2.31] P.J. Holmes (1984) Global bifurcations in nonlinear oscillators. First Inaugural Conference of Berkeley Research Group in Nonlinear Systems and Dynamics, University of California, Berkeley, January 7-8, 1985. (Invited paper.)

[2.32] P.J. Holmes (1985) Period multiplying and iterated torus knots in nonlinear oscillations. 89th AMS Summer Meeting, Laramie, WY, August 12-15, 1985. (Invited paper.)

[2.33] P.J. Holmes and S.R. Wiggins (1985) Slowly varying oscillations. 89th AMS Summer Meeting, Laramie, WY, August 12-15, 1985. (Invited paper.)

[2.34] P.J. Holmes (1986) Chaotic motions in a weakly nonlinear model for surface waves. Conference on the Dynamics of Fluids, Plasmas and Hamiltonian Systems, Berkeley, CA January 15-17, 1986. (Invited paper.)

[2.35] P.J. Holmes (1986) Perturbations of integrable Hamiltonian systems: global bifurcation and chaos I and II. Applications Physiques des Systems Non-Lineaires: Ondes dans les Fluides et Plasmas, Univ. de Montréal, Montréal, Quebec, Canada, May 1986. (Invited papers.)

[2.36] P.J. Holmes (1986) Spatial Structure of time-periodic solutions of the Ginzburg-Landau equation. Fourth Army Conference on Applied Mathematics and Computing, Cornell University, Ithaca, NY, May 27-30, 1986.

[2.37] N. Aubry, P.J. Holmes, J.L. Lumley and E. Stone (1986) Models for coherent structures in the wall layer. First European Turbulence Conference, Lyon, France, July, 1986.

[2.38] P.J. Holmes (1986) Low Dimensional Models of turbulent boundary layers in the wall region. 23rd Society of Engineering Science Annual Meeting, Buffalo, NY, August 25-27, 1986.

[2.39] P.J. Holmes (1986) (a) Dynamics of coherent structures in a turbulent boundary layer and (b) Rotating Cantor sets and periodic orbits in maps of the annulus. Penn State Dynamical Systems Conference, State College, PA, September 23-26, 1986.

[2.40] P.J. Holmes (1987) Knots and orbits genealogies in nonlinear oscillations. Knotting Phenomena in the Natural Sciences, Chicago, Feb 14-15, 1986. (Invited paper.)

[2.41] P.J. Holmes (1987) The dynamics of coherent structures in boundary layers. University of California Conference on Nonlinear Science, Santa Barbara, CA, March 27-28.

- [2.42] P.J. Holmes, J.E. Marsden, J. Scheurle (1987). Exponentially small splittings of separatrices in KAM theory and degenerate bifurcations. AMS Summer Research Conference on Infinite and Finite Dimensional Dynamical Systems, Boulder, CO, July 19-25.
- [2.43] P.J. Holmes (1987) Knots and Orbit Genealogies in Nonlinear Oscillations. XI International Conference on Nonlinear Oscillations, Budapest, Hungary, Aug.17-23. (Invited paper.)
- [2.44] P.J. Holmes (1987) Dynamics of coherent structures in boundary layers. SIAM 35th Anniversary Meeting, Denver, CO, Oct. 12-15, 1987.
- [2.45] P.J. Holmes (1987) Knots and Orbit Genealogies in Nonlinear Oscillations. CMS Winter Meeting, Vancouver, BC, Dec 13-15, 1987. (Invited paper.)
- [2.46] P.J. Holmes (1988) Angels Fallen from the Devil's Staircase. Dynamics Days Texas, Houston, Jan. 5-8, 1988. (Invited paper.)
- [2.47] P.J. Holmes, J. Marsden, J. Scheurle (1988) Exponentially Small Splitting of Separatrices. Society for Natural Philosophy 25th Anniversary Meeting, Johns Hopkins University, March 21-23, 1988.
- [2.48] N. Aubry, P.J. Holmes, J.L. Lumley and E. Stone (1988) Behavior of coherent structures in the wall region by dynamical systems theory. Zoran Zuric Memorial Meeting, Dubrovnik, Yugoslavia, May 16-20, 1988.
- [2.49]\* P.J. Holmes (1988) Nonlinear oscillations and the Smale horseshoe map. *Proc. Symp. Appl. Math.* 39, 25-39. (Short Course on Chaos and Fractals, Aug. 6-7 at the AMS Centennial Meeting, Providence, RI.) AMS publications, Providence, RI.
- [2.50] P.J. Holmes (1988) Knots and Orbit Genealogies. Mini-Symposium on Differential and Dynamical Systems, University of Southern California, Los Angeles, CA, Nov. 14-16, 1988.
- [2.51]\* N. Aubry, P.J. Holmes, J. L. Lumley and E. Stone (1988) A simple model for the wall region of a turbulent boundary layer. Chaotic Motion Session, ASME Int. Symp. on Flow-Induced Vibration and Noise, 1988 ASME Winter Meeting, Buffalo, NY, Nov. 26-Dec. 2, 1988. In "Nonlinear Interaction Effects and Chaotic Motions", Vol. 7, M.M. Reischman, M.P. Paidoussis and R.J. Hanseh, eds., 53-62.
- [2.52]\* A. Szeri and P.J. Holmes (1990) Nonlinear stability and bifurcation in Hamiltonian systems with symmetry. AMS Annual Meeting, Phoenix, AZ, January 11-14, 1989. In *Cont. Math.* 108, 33-62.
- [2.53] P.J. Holmes (1990) Nonintegrability and chaos in classical mechanics. AAAS Annual Meeting, Non-linear Mathematics Sessions, San Francisco, CA, January 14-19, 1990.
- [2.54]\* E. Stone and P.J. Holmes (1989) Noise induced intermittency in a model of a turbulent boundary layer. Los Alamos Turbulence Meeting, May 1988. In *Physica D* 37 (1-3), 20-32 (also *Physica D* 104 (2), 212-213. Erratum.)
- [2.55] P.J. Holmes (1989) Can dynamical systems approach turbulence? Sherwood Theory Meeting (Plasma Physics), San Antonio, TX, April 3-5, 1989.
- [2.56] P.J. Holmes (1990) How attractive is chaos? Nonlinear models in neurobiology. Mathematical Approaches to Cardiac Arrhythmias, New York, October 16-18, 1990. In *Proc. N.Y. Acad. Sci.* 591, 301-302.
- [2.57] P.J. Holmes (1990) Nonlinear dynamics, chaos and mechanics. US National Congress on Theoretical and Applied Mechanics, Tucson, AZ, May 21-25, 1990 (plenary lecture), also session presentation: A mathematical cartoon for the dynamics of fine structure.
- [2.58]\* P.J. Holmes (1993) Symmetries, heteroclinic cycles and intermittency in fluid flow. In "Turbulence in Fluid Flows: A Dynamical System Approach", 49-58, ed. C. Foias, G.R. Sell and R. Temam, IMA Volumes in Mathematics and its Applications 55, Springer Verlag, New York.
- [2.59]\* D.M. Kammien, C. Koch and P.J. Holmes (1990) Collective oscillations in the visual cortex. In "Advances in Neural Network Information Processing Systems 2", 76-83, ed. D.S. Touretzky, Morgan-Kaufman, San Mateo, CA.
- [2.60] G. Berkooz, J. Guckenheimer, P.J. Holmes, J.L. Lumley, J.E. Marsden, N. Aubry and E. Stone (1990) Dynamical systems theory approach to the wall region. AIAA Fluid Dynamics, Plasma Dynamics and Lasers Conference, Seattle, WA, June 18-20, 1990.
- [2.61] P.J. Holmes (1991) A mathematical cartoon for the dynamics of fine structure. 8th Army Conference on Applied Mathematics and Computing, Ithaca, NY, June 19-22, 1990. In *ARO Report* 91-1, 11-21.
- [2.62]\* P.J. Holmes (1991) A degenerate Hamiltonian System and a slow flow with jumps. Eleventh Conference on Ordinary and Partial Differential Equations, Dundee, Scotland, July 3-6, 1990. In "Ordinary and Partial

Differential Equations III”, 95-105, eds B.D. Sleeman and R.S. Jarvis, Longmans, Harlow, UK.

[2.63]\* P.J. Holmes (1993) On paradigm and method. Smalefest, Berkeley, CA, August 5-9, 1990. In “From Topology to Computation: Proceedings of the Smalefest”, 534-544, ed M.W. Hirsch, J.E. Marsden, M. Shub, Springer-Verlag, New York.

[2.64]\* P.J. Holmes, G. Berkooz and J.L. Lumley (1991). Turbulence, dynamical systems and the unreasonable effectiveness of empirical eigenfunctions. ICM-90, Kyoto, Japan, August 21-29, 1990. In “Proceedings of the International Congress of Mathematicians”, 1607-1617, ed. I. Satake, Springer-Verlag, Tokyo.

[2.65]\* P.J. Holmes and E. Stone (1991) Heteroclinic cycles, exponential tails and intermittency in turbulence production. The Lumley Symposium: Recent Developments in Turbulence, ICASE, NASA Langley Research Center, VA, November 12-13, 1990. In “Studies in Turbulence”, 179-189, ed. T.B. Gatski, S. Sarkar and C.G. Speziale, Springer-Verlag, New York.

[2.66] P.J. Holmes (1990) Nonlinear, nonplanar, nonperiodic oscillations of a taut string. Canadian Mathematical Society Winter Annual Meeting, University of Waterloo, Ontario, December 9-11, 1990.

[2.67] P.J. Holmes (1991) An evolution equation with everything to lose but nowhere to go. Dynamics Days Texas, Houston, Texas, January 6-9, 1991.

[2.68]\* J. Scheurle, J. Marsden and P. Holmes (1991) Exponentially small estimates for separatrix splittings. NATO Advanced Research Workshop on Asymptotics Beyond all Orders, San Diego, CA, January 7-11, 1991. In “Asymptotics Beyond all Orders”, 187-195, ed. H. Segur and S. Tanveer, Plenum, New York.

[2.69] P.J. Holmes and P.J. Swart (1991) Dynamics, energy minimization and phase transformations in nonlinear elasticity. Contemporary Developments in Solid Mechanics, Caltech, Pasadena, Ca. March 15-16, 1991.

[2.70]\* G. Berkooz, J. Elezgaray and P. Holmes (1992) Coherent structures in random media and wavelets. DARPA/ONERA Workshop on Wavelets and Applications, Princeton, June 1991. In *Physica D* 61, 47-58.

[2.71] P. Holmes and G. Berkooz (1991) Intermittent dynamics in the wall layer: A challenge for nonlinear control. In “Abstracts of the AFOSR Workshop on the Theory and Applications of Nonlinear Control”, 52-57, Washington University, St. Louis, MO, August 15-16, 1991.

[2.72] G. Berkooz, P. Holmes and J.L. Lumley (1991) Low dimensional models of the wall region in a turbulent boundary layer: new results. IUTAM Symposium and NATO Advanced Research Workshop on the Interpretation of Times Series from Nonlinear Mechanical Systems, University of Warwick, U.K., August 25-30, 1991.

[2.73] P. Holmes and C.A. Stuart (1992) Homoclinic orbits for eventually autonomous planar systems. Applied Dynamics and Bifurcation, Mathematisches Forschungsinstitut Oberwolfach, Germany, January 12-18, 1992.

[2.74] P. Holmes (1992) Symmetry, global dynamics and intermittency. 34th British Theoretical Mechanics Colloquium, Keele University, U.K., March 30-April 2, 1992

[2.75]\* J. Elezgaray, G. Berkooz and P. Holmes (1993) Wavelet analysis of the motion of coherent structures. In “Progress in Wavelet Analysis and Applications”, 471-476, Ed. Y. Meyer and S. Roques, Editions Frontières, Gif-sur-Yvette, 1993.

[2.76] G. Berkooz, P. Holmes and J.L. Lumley (1993) Dynamics and control of coherent structures in the turbulent wall layer: an overview. AGARD Guidance and Control Panel Workshop on stability in Aerospace Systems, ONERA, Toulouse, France, June 23-25, 1992. In *AGARD Report 789*, pp. 8.1-8.5.

[2.77] P. Holmes (1992) Five lectures on strange attractors and knots. Dynamical Systems Institute, Boston University, July 6-10, 1992

[2.78]\* R. Ghrist and P. Holmes (1993) Knots and orbit genealogies in three dimensional flows. Seminaire de Mathématiques Supérieures, Université de Montréal, July 13-24, 1992. In “Bifurcations and Periodic Orbits of Vector Fields”, 185-239, ed. D. Schlomiuk, NATO ASI Series C-408, Kluwer, Dordrecht, 1993.

[2.79] P. Holmes and P.J. Swart (1992) The dynamics of phase transformation in an anti-plane shear problem, and (with G. Berkooz and J. Elezgaray) The local nature of coherent structure interaction. XVIII International Congress on Theoretical and Applied Mechanics, Haifa, Israel, August 22-28, 1992.

[2.80]\* G. Berkooz, J. Elezgaray, P. Holmes, J. Lumley and A. Poje (1994) The proper orthogonal decomposition, wavelets and modal approaches to the dynamics of coherent structures. IUTAM Symposium on Eddy

Structure Identification in Free Turbulent Shear Flows, Poitiers, France, October 12-14, 1992. *Applied Scientific Research* 53 (3-4), pp 321-338.

[2.81] P. Holmes (1992) Metaphors, models and mathematics, or how strange is turbulence? (plenary lecture) and On wavelet projections of an evolution equation. SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, October 15-19, 1992.

[2.82]\* W. D. Kalies and P. Holmes (1993) On a dynamical model for phase transformation in nonlinear elasticity. Applications of Pattern Formation Workshop, Fields Institute, Waterloo, Ontario, March 23-28, 1993 *Fields Institute Communications* 5, 255-269, 1996

[2.83] J. Elezgaray, G. Berkooz and P. Holmes (1993) Wavelet projections of an evolution equation. AMS Meeting 881, Howard University, Washington D.C., April 17-18th, 1993.

[2.84]\* P. Holmes and R. Ghrist (1993) Knotting within the gluing bifurcation. IUTAM Symposium on Nonlinearity and Chaos in Engineering Dynamics, University College, London, July 19-23, 1993. "Nonlinearity and Chaos in Engineering Mechanics", 299-315, ed. J.M.T. Thompson and S.R. Bishop, Wiley, Chichester, U.K.

[2.85] P. Holmes (1994) Wavelet projections and "local models" for the Kuramoto-Sivashinsky Equation. Workshop on Dynamical Systems Methods for Partial Differential Equations, M.S.R.I., Berkeley, March 14-18, 1993.

[2.86]\* B.D. Collier, P. Holmes and J.L. Lumley (1994) Control of bursting in boundary layer models. 12th U.S. National Congress of Applied Mechanics, Seattle, WA, June 26-July 1, 1994. In "Mechanics USA 1994", ed. A.S. Kobayashi, *Appl. Mech. Rev.* 47 (6), part 2, S139-S143.

[2.87]\* A. Doelman and P. Holmes (1995) On the creation of multi-pulse traveling waves by global bifurcations. IUTAM/ISIMM Symposium on Structure and Dynamics of Nonlinear Waves in Fluids, Hannover, Germany, August 17-20, 1994. In "Proc. IUTAM/ISIMM Symposium on Structure and Dynamics of Nonlinear Waves in Fluids", 201-208, ed. A. Mielke and K. Kirchgässner, Advanced Series in Nonlinear Dynamics, vol. 7, World Scientific, London.

[2.88] P. Holmes (1994) On the dynamics of a phase field model. Society for Natural Philosophy 38th Annual Meeting, Ithaca, NY, September 23-25th, 1994.

[2.89]\* D.A. Taylor, P. Holmes and A.H. Cohen (1997) Excitable oscillators as models of central pattern generators. pp 103-118 in "Nonlinear Dynamics: The Richard Rand 50th Anniversary Volume", ed A. Guran, Series on Stability, Vibration and Control of Systems, Vol 2, World Scientific Publishing Company, Singapore, 1997.

[2.90]\* R. Ghrist and P. Holmes (1996) An ODE whose solutions contain all knots and links. Invited paper for Theme Issue honoring L.P. Shil'nikov, ed. L. Lerman. *Int. J. of Bifurcation and Chaos*, 6(5), 779-800.

[2.91] P. Holmes (1995) Symmetry, heteroclinic cycles, noise and control (invited presentation). Third SIAM Conference on Control and its Applications, St. Louis, MO, April 27-29th, 1995.

[2.92] P. Holmes (1995) Local models of turbulent processes, and On the dynamics of phase transitions in elastic bars (invited presentations). Third SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 21-24th, 1995.

[2.93]\* P. Holmes (1997) Metaphor and Models in Science and Art. In "Advances in the Mathematical Sciences - CRM's 25 Years", ed L. Vinet, 169-182, CRM Proc. and Lecture Notes, vol. 11, Amer. Math. Soc., Providence, RI, 1997.

[2.94]\* P. Holmes, J. Mattingley and R.W. Wittenberg (2001) Low Dimensional Models of Turbulence, or The Dynamics of Coherent Structures. NATO Advanced Study Institute Lectures, Newton Institute, Cambridge, UK, August 21-Sept 1st, 1995. In "From Finite to Infinite Dimensional Dynamical Systems", NATO Science Series II, 19, pp. 177-215, ed. J.C. Robinson and P.A. Glendinning, Kluwer Academic Publishers, Dordrecht, the Netherlands, 2001.

[2.95] P. Holmes (1995) Dynamics of Coherent Structures. Lectures delivered at the Fourth Latin American Workshop on Nonlinear Phenomena, San Carlos de Bariloche, Argentina, Sept 25-29th, 1995.

[2.96] P. Holmes and R.W. Ghrist (1996) Ordinary Differential Equations which Generate all Knots and Links. Plenary lecture, AMS Winter Annual Meeting, Orlando, FL, January 10-13th, 1996.

- [2.97] P. Holmes (1996) Homoclinic Explosions and Implosions. Workshop on Advances in Dynamical Chaos: Self-Similarity, Renormalization, and Multifractality, Courant Institute, NYU, January 18-20, 1996.
- [2.98]\* J. Elezgaray, G. Berkooz, H. Dankowicz, P. Holmes and M. Myers (1996) Local models and large scale statistics of the Kuramoto-Sivashinsky equation. In “Multiscale Wavelet Methods for Partial Differential Equations”, pp. 441-471, ed. W. Dahmen, A. Kurdila, and P. Oswald, Wavelet Analysis and its Applications Vol. 6, Academic Press, London.
- [2.99] P. Holmes (1996) Low Dimensional Models of Turbulence. Dynamical Systems Methods in Fluid Mechanics, Mathematisches Forschungsinstitut Oberwolfach, Germany, June 30-July 6, 1996.
- [2.100] P. Holmes (1997) Knots and Links in Three Dimensional Flows. International Conference on Dynamical Systems, Indian Institute of Science, Bangalore, India, January 10-15, 1997.
- [2.101] P. Holmes, G. Domokos, B.S.H. Royce and J. Schmitt (1997) Constrained Euler Buckling. Conference in Honour of Vladimir Arnol’d, Fields Institute, Toronto, Canada, June 15-21, 1997.
- [2.102] P. Holmes (1997) Dynamics of Coherent Structures. Five lectures in the School on Non-Linear Dynamics, International Center of Condensed Matter Physics, Universidade de Brasília, Brazil, July 14-24, 1997.
- [2.103] P. Holmes (1997) Homoclinic Explosions and Implosions. Invited lecture in Dynamical Systems Session of 21st Brazilian Mathematics Colloquium, IMPA, Rio de Janeiro, July 21-25, 1997.
- [2.104]\* J. Elezgaray, G. Berkooz and P. Holmes (1999) Modelling the coupling between small and large scales in the Kuramoto-Sivashinsky equation. In CRM Proc. and Lecture Notes, vol. 18, pp. 293-301, ed. S. Dubuc. Amer. Math. Soc., Providence, RI, 1999.
- [2.105]\* P. Holmes, J. Schmitt and G. Domokos (1998) Constrained Euler Buckling: line contact solutions. In Proc. IUTAM Symposium on New Applications of Nonlinear and Chaotic Dynamics in Mechanics, Ithaca, NY U.S.A. 27 July -1 August 1997. Solid Mechanics and its Applications, Vol. 63, pp. 149-158, ed. F.C. Moon. Kluwer Academic Publishers, Dordrecht, The Netherlands 1998.
- [2.106] P. Holmes, A. Doelman, G. Hek and E. Lynch (1997) Homoclinic Explosions and Implosions. Invited lecture in Multibump Solutions Workshop, Program on Dynamical Systems and Pattern Formation, Lorentz Center, Leiden, Holland, Oct 6-9, 1997.
- [2.107] R. Wittenberg and P. Holmes (1997) Spatial Localisation in the Kuramoto-Sivashinsky Equation. Cornell Workshop on POD-Galerkin Models for the Dynamics and Control of Complex Flows, Ithaca, NY, Oct 13-14, 1997.
- [2.108] P. Holmes, A. Doelman, G. Hek and E. Lynch (1998) Homoclinic Explosions and Implosions. Invited lecture at Dynamic Days, Chapel Hill, NC, Jan 7-10, 1998.
- [2.109] P. Holmes, D.A. Taylor and A.H. Cohen (1998) Simple models of excitable oscillators and CPGs. IMA Conference on Animal Locomotion and Robotics, Institute for Mathematics and its Applications, Minneapolis, MN, June 1-5, 1998.
- [2.110] P. Holmes, A. Mielke and N. Kutz (1998) Two models from nonlinear optics. IMA Conference on Continuum mechanics and non-linear partial differential equations, Institute for Mathematics and its Applications, Minneapolis, MN, June 8-12, 1998.
- [2.111] P. Holmes and R.W. Wittenberg (1998) Wavelets and local models of the Kuramoto-Sivashinsky equation. Invited lecture in Conference on Mathematical Problems in Meteorology and Oceanography, Indiana University, Bloomington, IN, Nov 9-12, 1998.
- [2.112] P. Holmes and J. Schmitt (1999) Mechanical models for insect locomotion: dynamics and stability in the horizontal plane. Invited lecture in workshop on ‘Biology, Mechanics and Theory of Walking’, IEEE Conference on Robotics and Automation, Detroit, MI, May 10-15, 1999.
- [2.113] P. Holmes (1999) Why Knot? Some Links among Topology, Dynamics, and Bifurcations. Introductory lecture in minisymposium on ‘Applications of Knot Theory in Dynamics and Fluid Mechanics,’ Fourth International Congress on Industrial and Applied Mathematics, Edinburgh, Scotland, July 4-9, 1999.
- [2.114] P. Holmes (1999) The Proper Orthogonal Decomposition and Dimension Reduction. Invited lecture in minisymposium on ‘Methods of Dimension Reduction,’ Fourth International Congress on Industrial and Applied Mathematics, Edinburgh, Scotland, July 4-9, 1999.

[2.115]\* T.R. Smith and P. Holmes (1999) Low dimensional models with varying parameters: a model problem and flow through a diffuser with variable angle. Invited lecture in ‘Fluid Dynamics and the Environment: Dynamical Approaches. A symposium in honor of Sidney Leibovich on his 60th birthday,’ Cornell University, Ithaca, NY, August 23-24, 1999. In “Fluid Mechanics and the Environment: Dynamical Approaches”, pp 315-336, ed J.L. Lumley, Springer Lecture Notes in Physics 566, Springer Verlag, New York.

[2.116]\* P. Holmes (1999) Chaos, Mechanical and Mathematical. Invited lecture in the symposium on ‘Methods of Understanding in Art and Science: The Case of Duchamp and Poincaré,’ Harvard University, Cambridge, MA, Nov 5-7, 1999. (To appear in Conference Proceedings.)

[2.117] P. Holmes (1999) Non-holonomic and piecewise-holonomic mechanical systems. Canadian Mathematical Society Winter Meeting. Invited lecture in the session on ‘Progress in Celestial Mechanics and Hilbert’s Sixteenth Problem,’ Montreal, Canada, Dec 10-12th, 1999.

[2.118] P. Holmes (2000) Non-holonomic and piecewise-holonomic mechanics. Conference in honor of the 60th birthday of Stuart Antman, University of Maryland, May 12-13, 2000.

[2.119] P. Holmes (2000) Mechanical models for insect locomotion. Invited paper in Symposium on Nonlinear Systems, Conference Hotel Drienerburgh, Twente University, The Netherlands, May 25-26th, 2000.

[2.120] P. Holmes (2000) Poincaré’s mistake and the origins of ‘chaos theory.’ Journée Poincaré, Université de Paris VI, P. et M. Curie, June 5th, 2000.

[2.121] P. Holmes (2000) Mechanical models for insect locomotion. Invited paper in European Dynamics Days 2000, University of Surrey, Guildford, UK, June 25-29th, 2000.

[2.122] P. Holmes (2000) Two models from nonlinear optics. Course of three lectures in EVEQ 2000 (Theory of Evolution Equations), Prague, July 3-7th, 2000.

[2.123] P. Holmes (2000) Unconstrained Euler buckling in a potential field. Invited paper in workshop on Symmetry and Stability in Nonlinear Mechanics, Technical University of Budapest, Hungary, July 10-14th, 2000.

[2.124] P. Holmes and J. Schmitt (2000) Mechanical models for insect locomotion: Dynamics and stability in the horizontal plane. Contributed paper at 20th International Congress of Theoretical and Applied Mechanics, Chicago, IL, Aug 27-Sept 2, 2000.

[2.125]\* P. Holmes, A. Doelman, G. Hek and G. Domokos (2000) Homoclinic orbits and chaos in 3 and 4 dimensional flows. Invited paper in Royal Society Discussion Meeting on Topological Methods in the Physical Sciences, London, UK, Nov 15-16th, 2000. *Proc. Roy. Soc. Lond. A* 359, pp 1429-1438, 2001.

[2.126] P. Holmes, T.R. Smith, E. Fiorelli and N.E. Leonard (2001) Flotillas and flocks: Interacting autonomous vehicles. Minisymposium presentation at Sixth SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 20-24th, 2001.

[2.127] P. Holmes, E. Brown, and G. Medvedev (2001) On simple models of groups of spiking neurons. Minisymposium presentation at Sixth SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 20-24th, 2001.

[2.128]\* H. Hanßmann and P. Holmes (2001) On the global dynamics of Kirchhoff’s equations: Rigid body models for underwater vehicles. Invited paper at Workshop in honor of Floris Takens, Lorentz Center of Leiden University, Netherlands, June 24-29, 2001. In “Global Analysis of Dynamical Systems”, pp 353-371, Ed. H.W. Broer, B. Krauskopf and G. Vegter, Institute of Physics Publishing, Bristol, UK, and Philadelphia, PA.

[2.129]\* P. Holmes, R. Goodman and M. Weinstein (2001) Interaction of sine-Gordon kinks with defects: Phase space transport in a two-mode model. Invited paper for Progress in Nonlinear Science: A conference dedicated to the 100-th Anniversary of Alexander A. Andronov, Nizhny Novgorod, Russia, July 2-6, 2001.

[2.130] P. Holmes (2001) Dynamical Systems: Chaos in Poincaré’s wake. Invited address at the opening ceremonies for the Centre for the History of the Mathematical Sciences, Open University, Milton Keynes, UK, July 11th, 2001.

[2.131]\* J. Moehlis, T. Smith and P. Holmes (2001) A model for turbulent plane Couette flow using the proper orthogonal decomposition. Contributed paper at the 12th International Couette-Taylor Workshop, Evanston, IL, Sept 6-8th, 2001.

[2.132] M.S. Gilzenrat, B.D. Holmes, P.J. Holmes, J. Rajkowski and J.D. Cohen (2001) A modified Fitzhugh-Nagumo system simulates locus coeruleus-mediated regulation of cognitive performance. Abstract for poster

presentation at 31st Annual Meeting of the Society for Neuroscience in San Diego, CA, Nov 10-15, 2001.

[2.133]\* P. Holmes, R. Goodman and M.I. Weinstein (2002) Interaction of solitons with defects: Phase space transport in a finite-dimensional model. Invited paper for Mathematics as a Guide to the Understanding of Applied Nonlinear Problems, a conference in honor of Klaus Kirchgässner's 70th birthday, Kloster Irsee, Germany, Jan 6-10, 2002.

[2.134] P. Holmes, E. Brown and J. Moehlis (2002) Globally coupled oscillator networks. Invited paper for Nonlinear Differential Equations, Mechanics and Bifurcation, a conference in honor of David G. Schaeffer. Duke University, Durham, NC, May 20-22, 2002.

[2.135] P. Holmes (2002) How Nonlinear is Science? Reflections on a chaotic, dynamical century. Invited plenary address at the SIAM 50th Anniversary Meeting, Philadelphia, PA, July 8-12, 2002.

[2.136] D. Koditschek, R. Altendorfer, R. Ghigliazza and P. Holmes (2002) Self-stability mechanisms for sensor-cheap legged locomotion. Invited paper for symposium on self-stability at the IVth World Congress of Biomechanics, Calgary, Aug 4-9 2002.

[2.137] P. Holmes, T.R. Smith and J. Moehlis (2002) Low dimensional models of turbulent plane Couette flow. Invited paper for Workshop on Geometry, Dynamics and Mechanics in honor of the 60th birthday of J.E. Marsden. Fields Institute for Research in the Mathematical Sciences, Toronto, Canada, Aug 7-11, 2002

[2.138]\* R. Altendorfer, R. Ghigliazza, P. Holmes and D. Koditschek (2002) Exploiting passive stability for heirarchical control. Clawar, Paris, France, Sept 25-27, 2002.

[2.139] E. Brown, J. Moehlis, P. Holmes, E. Clayton, J. Rajkowski and G. Aston-Jones (2002) The influence of spike rate and stimulus duration on response in *locus coeruleus*. Systems Level Neuroscience Workshop, Mathematical Biosciences Institute, Ohio State University, Columbus. OH, Nov 18-22, 2002.

[2.140]\* R. Altendorfer, D. Koditschek and P. Holmes (2003) Towards a factored analysis of legged locomotion models. IEEE International Conference on Robotics and Automation (ICRA'03), Grand Hotel in Taipei, Taiwan, May 12-17, 2003.

[2.141] P. Holmes (2003) Optimal decisions: From neural oscillations to stochastic differential equations. IAS Program for Women in Mathematics, 10th anniversary reunion, May 16-18, 2003, Princeton, NJ.

[2.142]\* T.R. Smith, J. Moehlis and P. Holmes (2003) Minimal plane Couette flow turbulence: a low-dimensional, uncoupled model. 13th International Couette Taylor Workshop, July 3-5, 2003, Universitat Politècnica de Catalunya, Barcelona, Spain.

[2.143] P. Holmes (2003) Piecewise-holonomic mechanics, hybrid dynamical systems and escaping cockroaches, and Optimal decisions: from neural spikes, through stochastic differential equations, to behavior. London Mathematical Society regional meeting on Nonlinear Dynamics, Southampton University, UK, Oct 24-26, 2003.

[2.144] R. Bogacz, J.M. Moehlis, E.T. Brown, P. Holmes, J.D. Cohen (2003) Neural mechanisms for decision optimization, 2003 Abstract Viewer/Itinerary Planner. Society for Neuroscience, Washington DC, CD-ROM, Program No. 197.6.

[2.145]\* T.R. Smith, J. Moehlis and P. Holmes (2003) Modeling and control of minimal flow unit turbulence in plane Couette flow. 42nd IEEE CDC, Hyatt Regency Maui, Hawaii, Dec 9-12, 2003.

[2.146] P. Holmes, T.R. Smith and J. Moehlis (2003) Dynamics of an 0-1-2  $O(2)$ -equivariant system: Heteroclinic cycles and periodic orbits. Workshop on Bifurcation Theory and Spatio-Temporal Pattern Formation in PDE, Fields Institute for Research in Mathematical Sciences, Toronto, Dec 11-13, 2003.

[2.147] R.J. Full, J. Seipel and P. Holmes (2004). Dynamic stability model predicts constraints in sprawled posture running. Final Program and Abstracts, p. 286, Society of Integrative and Comparative Biology, Annual Meeting and Exhibition, New Orleans, Jan 4-9, 2004.

[2.148] R. Bogacz, E. Brown, J. Moehlis, P. Holmes and J.D. Cohen (2004). Reward optimization in decision making. Workshop on The Neurobiology of Decision-making: Theory and Experiment, Cold Spring Harbor Laboratory, NY, Mar 24, 2004.

[2.149] J. Gao and P. Holmes (2004) Model reduction and optimization in a decision-making task (poster). Computational and Systems Neuroscience 2004, Cold Spring Harbor Laboratory, NY, Mar 24-28, 2004.

[2.150] E. Brown, J. Moehlis, P. Holmes, E. Clayton, J. Rajkowski and G. Aston-Jones (2004). From spikes to speed-accuracy via the locus coeruleus (poster). Computational and Systems Neuroscience 2004, Cold Spring Harbor Laboratory, NY, Mar 24-28, 2004.

- [2.151] P. Holmes (2004). Low-dimensional models of plane Couette flow. Invited lecture for International Workshop on Bifurcation Theory and Applications, Shanghai Jiaotong University, PRC, May 23-26, 2004.
- [2.152] P. Holmes (2004). Applied dynamical systems: From low to high dimensions and back again. International Workshop on Nonlinear Dynamics and Stochastic Partial Differential Equations, Morningside Center of Mathematics, Chinese Academy of Sciences, Beijing, May 27-31, 2004.
- [2.153] R. Bogacz, E. Brown, P. Hu, P. Holmes and J.D. Cohen (2004). Optimization of decision making: speed-accuracy trade-off maximizing reward rate. 4th Forum of European Neuroscience, Lisbon, Spain, July 10-14, 2004.
- [2.154]\* J. Seipel and P. Holmes (2004) Three-dimensional running is unstable but easily stabilized. 7th International Conference on Climbing and Walking Robots, CLAWAR 2004, Madrid, Spain, Sept 22-24, 2004.
- [2.155]\* P. Holmes, E. Brown, J. Moehlis, R. Bogacz, J. Gao, P. Hu, G. Aston-Jones, E. Clayton, J. Rajkowski and J.D. Cohen (2004) Optimal decisions: From neural spikes, through stochastic differential equations, to behavior. Invited plenary lecture, International Symposium on Nonlinear Theory and its Applications. NOLTA2004, Fukuoka, Japan, Nov 29 - Dec 3, 2004.
- [2.156] P. Holmes (2004). Low-dimensional models of plane Couette flow. Invited lecture at International Symposium on Complexity Modelling and its Applications, Faculty of Engineering, University of Tokyo, Japan, Dec 5-8, 2004.
- [2.157] P. Holmes and R. Ghigliazza (2005). A central pattern generator for insect locomotion. Invited lecture at Coupled 60: A Focussed Research Group Workshop on the Dynamics, Classification and Applications of Coupled Systems, University of Houston, TX, Feb 3-6, 2005.
- [2.158] P. Holmes (2005). Poincaré's mistake and the origins of 'Chaos Theory.' Invited talk at the Third Annual Workshop on Applied Mathematics and Computational Physics, Budapest University of Technology and Economics, March 18th, 2005.
- [2.159] P. Holmes (2005). Piecewise-holonomic mechanics, hybrid dynamical systems, and escaping cockroaches. Invited lecture at Mathematical Association of America New Jersey Section Meeting, Middlesex Community College, Edison, NJ, April 2, 2005.
- [2.160] P. Holmes (2005). A central pattern generator for insect locomotion. Minisymposium presentation at the Conference on Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, May 13-15, 2005.
- [2.161] P. Simen, P. Holmes and J.D. Cohen (2005). Performance adaptation by a drift-diffusion-based decision making circuit. Lecture at the 9th International Conference on Cognitive and Neural Systems, Center for Adaptive Systems and Department of Cognitive and Neural Systems, Boston University, May 18-21, 2005.
- [2.162] P. Holmes and T. McMillen (2005). What's optimal about decision-making for two and more choices? Invited presentation at Neurobiology of Decision-Making, Banbury Center, Cold Spring Harbor Laboratory, Long Island, NY, May 22-25, 2005.
- [2.163]\* R. Bogacz, E. Brown, J. Moehlis, P. Holmes and J.D. Cohen (2005) How a biological decision network can implement a statistical test. Presentation at the workshop on Modelling Natural Action Selection, Edinburgh University, UK, July 30-31, 2005.
- [2.164]\* P. Holmes (2005). Ninety plus thirty years of nonlinear dynamics: More is different and less is more. Opening plenary lecture at the Fifth EUROMECH Nonlinear Dynamics Conference (ENOC-05), Eindhoven University of Technology, The Netherlands, Aug 7-12, 2005. Invited paper for special ENOC issue of *Int. J. Bifurcation and Chaos* 15(9), 2703-2716, 2005.
- [2.165] P. Holmes (2005). A swimming rod with a mind of its own (or at least a muscle). Plenary lecture at IMA Conference on Recent Advances in Nonlinear Mechanics (RANM-05), University of Aberdeen, Scotland, Aug 29-Sept 1, 2005.
- [2.166] P. Holmes (2006). Dynamics and control in insect running. Invited lecture at Design Principles in Biological Systems, Banbury conference center, Cold Spring Harbor Laboratory, May 7-10, 2006.
- [2.167]\* P. Holmes, M. Srinivasan, K. Rogale and R. Kukillaya (2006). On spring-mass models for running animals: Approximate solutions, natural frequencies, stability, and double stance phases. Keynote lecture at the James H. Belfer Memorial Symposium on Nonlinear Mechanics, Technion - Israel Institute of Technology, Department of Mechanical Engineering, June 12th, 2006.

- [2.168] T. McMillen and P. Holmes (2006). On the neuromechanics of swimming in lampreys. Invited talk at “From Dust to Planets,” a symposium to honor Joe Burns on his 65th birthday. Cornell University, July 28-29th, 2006.
- [2.169] P. Holmes (2006) On modeling legged locomotion. Invited lecture at Engineering Principles in Biological Systems, Cold Spring Harbor Laboratory, Dec 3-6, 2006.
- [2.170]\* R. Ball and P. Holmes (2007) Dynamical systems, stability and chaos. Expository chapter based on lectures given at COSNet/CSIRO Workshop on Turbulence and Coherent Structures in Fluids, Plasmas and Nonlinear Media, Australian National University, Canberra, Australia Jan 10-13, 2006. In “Frontiers in Turbulence and Coherent Structures,” ed. J.P. Denier and J.S. Frederiksen, pp 1-27, World Scientific Press, Singapore, 2007.
- [2.171] R. Kukillaya and P. Holmes (2007) Realistic hexapedal models of insect locomotion: Jointed legs and Hill-type muscles. Society for Integrative and Comparative Biology Annual Meeting, Phoenix, AZ, Jan 3-7, 2007.
- [2.172] D.M. Dudek, P. Holmes, M. Srinivasan, K. Rogale, R. Kukillaya and R.J. Full (2007) The relevance of resonant frequency in running cockroaches modeled by a spring-loaded, inverted pendulum. Society for Integrative and Comparative Biology Annual Meeting, Phoenix, AZ, Jan 3-7, 2007.
- [2.173] P. Holmes (2007) A central pattern generator for insect locomotion: Phase response curves, averaging and reduction of ionic current models of bursting neurons. Invited lecture at MSRI Introductory Workshop on Dynamical Systems with Emphasis on Extended Systems, Berkeley, CA, Jan 21-26, 2007.
- [2.174] P. Holmes (2007) Do deciders drift and diffuse? On models of decision making. Invited lecture at AFOSR workshop on Robust Decision Making, Alexandria, VA, Feb 27-28, 2007.
- [2.175] P. Holmes (2007) Piecewise-holonomic mechanics, hybrid dynamical systems, and escaping cockroaches. Invited plenary lecture at British Applied Mathematics Colloquium, Bristol University, Bristol, UK, April 16-20, 2007.
- [2.177]\* P. Holmes and E.T. Shea-Brown (2007) Stability. Scholarpedia, p.4208.  
<http://www.scholarpedia.org/article/Stability>
- [2.178]\* P. Holmes (2007) History of Dynamical Systems. Scholarpedia, p.13425.  
[http://www.scholarpedia.org/article/History\\_of\\_Dynamical\\_Systems](http://www.scholarpedia.org/article/History_of_Dynamical_Systems)
- [2.179] P. Holmes (2007) Drift-diffusion models for the dynamics of decision making. Contributed presentation at the SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 28-June 1, 2007.
- [2.180] P. Holmes (2007) Models of legged locomotion, or how cockroaches run stably without thinking about it. Invited presentation at the Danish Symposium on Applied Analysis, University of Copenhagen, Copenhagen, Denmark, Aug 16-18, 2007.
- [2.181] P. Holmes (2007) Oscillatory circuits underlying the retinal detection of temporal patterns. Invited presentation at the Workshop in Mathematical Neuroscience, Centre de Recherches Mathématiques, Université de Montréal, Canada, Sept 16-19, 2007.
- [2.182] P. Holmes (2007) What do poems and differential equations share? Some thoughts on metaphors and models. Mathematical Association of America Eastern Pennsylvania and Delaware Section Meeting, Drexel University, Philadelphia PA, Nov 10th, 2007.
- [2.183] P. Holmes (2007) Anguilliform swimming by muscle activation of an elastic rod. Invited presentation at Fluids Days, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, Dec 31, 2007-Jan 1, 2008.
- [2.184] P. Holmes (2008) Towards an integrated model for insect locomotion. Invited presentation at the Workshop on Neuromechanics of Locomotion, Mathematical Biosciences Institute, Ohio State University, Mar 31-Apr 4, 2008.
- [2.185] P. Holmes (2008) An oscillatory circuit underlying the retinal detection of disruptions in temporally-periodic patterns. Invited presentation at the Workshop on Dynamical Systems in Biology, New York University NYC, Apr 12-13, 2008.
- [2.186] P. Holmes (2008) Stochastic models for individual decisions and social influence in groups. Invited presentation at the Workshop on Systems Biology of Decision Making, Mathematical Biosciences Institute, Ohio State University, June 16-20, 2008.

- [2.187]\* P. Simen, J.D. Cohen and P. Holmes (2009) On the neural implementation of optimal decisions. In “The Oxford Handbook of Human Action,” ed. E. Morsella, J.A. Bargh, and P.M. Gollwitzer, pp 533-548, Oxford University Press, Oxford, UK.
- [2.188]\* P. Holmes (2008) A Short History of Dynamical Systems Theory: 1885-2007. In the “Encyclopedia of Life Support Systems (EOLSS): Mathematical Sciences,” UNESCO-EOLSS Publishers, Oxford, UK. Accessible online at [www.eolss.net](http://www.eolss.net).
- [2.189]\* A. Nedic, D. Tomlin, P. Holmes, D.A. Prentice and J.D. Cohen (2008) A simple decision task in a social context: preliminary experiments and a model. Invited presentation for the special session Mixed Robot/Human Team Decision Dynamics, IEEE CDC, Cancun, Mexico, Dec 9-11th, 2008. *Proc. 47th IEEE Conference on Decision and Control*.
- [2.190] P. Holmes (2008) From spike rates to simple decisions: Stochastic ODEs as models for evidence accumulation in cortical circuits. Invited presentation at “From Nonlinear Dynamics to Systems Biology: a conference in honor of David Rand on his 60th birthday,” Mathematics Institute, University of Warwick, Coventry, U.K., Dec 1-2, 2008.
- [2.191] P. Holmes (2008) Neuromechanical models of animal locomotion. Invited presentation at “Stability and Instability in Dynamical Systems: Applications and Numerical Tools,” University of Barcelona and Centre de Recerca Matemàtica, Bellaterra, Barcelona, Spain, Dec 1-5, 2008.
- [2.192]\* P. Holmes (2009) Neuromechanical models of legged locomotion: How cockroaches run fast and stably without thinking about it. Keynote lecture at the James H. Belfer Memorial Symposium on Neuro-Mechanics, Dynamics and Decision-making, Technion - Israel Institute of Technology, Department of Mechanical Engineering, Feb 15-16th, 2009.
- [2.193] P. Holmes, A. Nedic, D. Tomlin, D. Prentice and J.D. Cohen (2009) A decision task in a social context: Experiments, modeling, and preliminary analyses of behavioral and brain imaging data. SIAM Conference on Control and its Applications, Denver, CO, July 6-8, 2009.
- [2.194] P. Holmes, M. Zacksenhouse and R. Bogacz (2009) Robust versus optimal strategies for two-alternative forced-choice tasks. MathPsych 2009, University of Amsterdam, Aug 1-4, 2009.
- [2.195] P. Simen, D. Contreras, P. Holmes and J.D. Cohen (2009) Adaptive performance in two-alternative decision making. MathPsych 2009, University of Amsterdam, Aug 1-4, 2009.
- [2.196]\* P. Holmes, P. Eckhoff, KF. Wong-Lin, R. Bogacz, M. Zacksenhouse and J.D. Cohen (2010) The physics of decision making: Stochastic differential equations as models for neural dynamics and evidence accumulation in cortical circuits. Plenary lecture at the XVIth International Congress on Mathematical Physics, Prague, Czech Republic, Aug 3-8, 2009; pp 123-142 in Proceedings volume, ed. P. Exner, World Scientific, 2010.
- [2.197] P. Holmes (2009) The dynamical legacy of Lyapunov and Poincaré: Reflections on stability, chaos and randomness. Lyapunov Award Lecture for the Technical Committee on Multibody Systems and Nonlinear Dynamics, ASME Design Engineering Technical Conferences and Computers and Information in Engineering Conference, San Diego, CA, Aug 31-Sept 2, 2009.
- [2.198] J.L. Proctor and P. Holmes (2010) Chasing the Cockroach: How reflexes enhance running. Presentation at Society for Integrative and Comparative Biology Meeting, Seattle, WA, Jan 3-7, 2010. *Integrative and Comparative Biology* 50, E140-E140 Suppl. 1, 2010.
- [2.199] P. Holmes (2010) The neural dynamics of decision making: multiple scales in a single brain. Invited presentation in the Symposium “Moving across scales: Mathematics for investigating biological hierarchies,” AAAS Annual Meeting, San Diego, CA, Feb 18-22, 2010.
- [2.200] P. Holmes (2010) Panel discussions on creativity in the arts and sciences (participant). Banff International Research Station for Mathematical Innovation and Discovery workshop on Creative Writing in Mathematics and Science, The Banff Centre, Alberta, Canada, May 2-7, 2010.
- [2.201] P. Holmes (2010) The neurodynamics of simple decisions: Drift-diffusion equations as models for single brains, and for group behaviors. Invited plenary lecture at SIAM Conference on the Life Sciences, Pittsburgh, PA, July 12-15, 2010.
- [2.202] P. Holmes (2010) How do neurons integrate information? Clues from optimal signal processing theory. Invited lecture in minisymposium on Understanding the Link Between Neuronal Dynamics and Neuronal

Computation, SIAM Conference on the Life Sciences, Pittsburgh, PA, July 12-15, 2010.

[2.203] P. Holmes (2010) From spiking cortical cells to decisions and actions: Two neuroscience problems that I don't really understand. Invited lecture in OCCAM workshop on Future Challenges in Mathematical and Computational Neuroscience, Oxford University, Sept 13-15, 2010.

[2.204]\* P. Holmes (2010) *Caos e dinamica non lineare* (Nonlinear Dynamics and Chaos: A mechanical and mathematical primer), pp 355-394 in *La Matematica Vol 4: Pensare il mondo* (Intertwinements of Mathematics and Science), ed. Claudio Bartocci and Piergiorgio Odifreddi, Einaudi editore, Torino, Italy.

[2.205] J.L. Proctor and P. Holmes (2011) Reflexes and running: Modeling neural feedback in a running cockroach. Presentation at Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT, Jan 3-7, 2011.

[2.206] P. Holmes (2011) Still running! Recent work on the neuromechanics of insect locomotion. Invited lecture at Dynamics Days, University of North Carolina, Jan 5-8, 2011.

[2.207] P. Holmes (2011) The neuromechanics of insect locomotion: How cockroaches run fast and stably without much thought. Invited presentation at ICIAM 2011: 7th International Congress on Industrial and Applied Mathematics, Vancouver, BC, July 18-22, 2011.

[2.208] E. Shlizerman and P. Holmes (2011) Geometry of a hybrid dynamical system modeling cortical neurons. Minisymposium presentation at ICIAM 2011: 7th International Congress on Industrial and Applied Mathematics, Vancouver, BC, July 18-22, 2011.

[2.209] P. Holmes (2011) A short, truncated, and partial history of chaos. Opening lecture, IUTAM Symposium on 50 Years of Chaos: Applied and Theoretical, Kyoto University, Japan, Nov 28-Dec 2, 2011.

[2.210] P. Holmes (2011) The neuromechanics of insect locomotion: How cockroaches run fast and stably without much thought. Workshop on Applied Dynamical Systems, Kyoto University, Japan, Dec 3, 2011.

### (3) Books, included edited volumes

[3.1] B.L. Clarkson, J.K. Hammond, P. Holmes and A. Kistner, editors (1977) "Stochastic Problems in Dynamics." Pitman, London.

[3.2] P. Holmes, editor (1980) "New Approaches to Nonlinear Problems in Dynamics." (Proc. Eng. Fndn. Conf., Asilomar, CA, Dec. 9-14, 1979.) SIAM Publications, Philadelphia.

[3.3] J. Guckenheimer and P. Holmes (1983) "Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields." Applied Mathematical Science No. 42, Springer Verlag, New York, Heidelberg, Berlin. (Second printing 1986, third printing 1990, fourth printing 1993, fifth printing 1997, sixth printing 2002). Chinese paperback reprint, 1999. Russian translation, IKI, Moscow, 2003.

[3.4] P. Holmes, J. L. Lumley and G. Berkooz (1996) "Turbulence, Coherent Structures, Dynamical Systems and Symmetry." Cambridge University Press, Cambridge Monographs on Mechanics. Paperbound edition, 1998; Korean translation, Taehun, Seoul, 1999.

[3.5] F. Diacu and P. Holmes (1996) "Celestial Encounters: The Origins of Chaos and Stability." Princeton University Press, Princeton, NJ. Paperbound edition in Princeton Science Library, 1999. Romanian translation "Întâlniri Cerești" (tr. V. Mioc), Societatea Știință și Tehnică SA, Bucharest, 1996. Chinese translation, Shanghai Science and Technology Publishing House, 2001. Greek translation, Athens, 2001. Hungarian translation, Akkord Kiado, Budapest, 2004. Russian translation, R&C Dynamics, Moscow, 2004. Japanese translation, Springer Mathematics Club, Tokyo, 2004.

[3.6] R.W. Ghrist, P. Holmes and M. Sullivan (1997) "Knots and Links in Three-Dimensional Flows." Springer Lecture Notes in Mathematics Volume 1654, Springer Verlag, Heidelberg.

[3.7] J. Moser (2001) "Stable and Random Motions in Dynamical Systems," with a new introduction by Philip Holmes. Princeton Landmarks in Mathematics Series, Princeton University Press, Princeton, NJ, 2001.

[3.8] P. Newton, P. Holmes and A. Weinstein, editors (2002) "Geometry, Mechanics and Dynamics: Volume in honor of the 60th birthday of J.E. Marsden." Springer Verlag, New York, Heidelberg, Berlin.

[3.9] P. Holmes, J. L. Lumley, G. Berkooz and C.W. Rowley (2012) "Turbulence, Coherent Structures, Dynamical Systems and Symmetry." Second edition of [3.4], revised and expanded, with a new chapter. Cambridge Monographs on Mechanics, Cambridge University Press, UK.

#### (4) Reviews and Non-Technical Articles

[4.1] P.J. Holmes 1976 *J. Sound Vib.* 49 (4), 607-611. Review of “Solutions of Nonlinear Vibration Systems by means of Analogue Computers” by V. Fiala and “On the Interaction between selfexcited and forced vibrators” by A. Tondl.

[4.2] P.J. Holmes 1977 *Bull. Inst. Math. Appl. (Nov./Dec.)*, 289-290. Qualitative Analysis of Partial Differential Equations: a symposium held at Southampton University, May 9-13th, 1977.

[4.3] P.J. Holmes and H. Othmer (1979) *SIAM News* 12 (4) (August), 1 and 6-7. New methods found useful for solving nonlinear applied problems.

[4.4] P.J. Holmes (1980) *SIAM News* 13 (2) (April), 1 and 6. Developments in Qualitative Approaches.

[4.5] P.J. Holmes (1980) *Trans. A.S.M.E. J. Appl. Mech.*, 47, 692-3. Review of “Nonlinear Oscillations” by A.H. Nayfeh and D.T. Mook.

[4.6] P.J. Holmes (1981) *Shock and Vibration Digest* 14 (9). Review of “The Stability of Dynamical Systems” by J.P. LaSalle.

[4.7] P.J. Holmes (1983) *Trans. A.S.M.E. J. Appl. Mech.* 50, 912-913. Review of “Nonlinear Problems: Present and Future”, ed. A. Bishop, D. Campbell and B. Nicolaenko.

[4.8] P.J. Holmes (1984) *American Scientist* (November). Review of “Advanced Dynamics: Modeling and Analysis” by A.F. D’Souza and V.K. Garg.

[4.9] P.J. Holmes (1985) *SIAM Review* 27, 106-110. Review of “The Lorenz Equations: Bifurcations, Chaos, and Strange Attractors” by C. Sparrow.

[4.10] P.J. Holmes (1985) *Forefronts* 1, 3, July 1985, 3-4. (Newsletter of The Center for Theory and Simulation in Science and Engineering, Cornell University). Chaotic dynamics.

[4.11] P.J. Holmes (1986) *SIAM Review* 28, 106-109. Review of “Chaos”, ed. Hao Bai-Lin.

[4.12] P.J. Holmes (1986) *Cornell Engineering Quarterly* 20 (3), 12-19. Chaotic Dynamics.

[4.13] P.J. Holmes (1987) *SIAM Review* 29, 654-658. Review of “Nonlinear Dynamics and Chaos” by J. M. T. Thompson and H. B. Stewart and “An Introduction to Chaotic Dynamical Systems,” by R. L. Devaney.

[4.14] P.J. Holmes (1987) *American Scientist* (April). Review of “Geometric Perturbation Theory in Physics” by S. Omohundro.

[4.15] P.J. Holmes (1987) *IMA Journal* 39, 91-98. Dynamical Systems in Chaos: Some recent books.

[4.16] P.J. Holmes (1989) *American Scientist* (November). Review of “Cell-to-Cell Mapping” by C. S. Hsu.

[4.17] P.J. Holmes (1989) *Bull. A.M.S.* 21, (1) 101-105. Review of “Multiphase averaging for classical systems with applications to adiabatic theorems” by P. Lochak and C. Meunier.

[4.18] P.J. Holmes (1989) *Cornell Engineering Quarterly* 24 (1), 19-20. Commentary.

[4.19] P.J. Holmes (1990) *Bull. A.M.S.* 22 (2), 339-343. Review of “Local Methods in Nonlinear Differential Equations” by A. D. Bruno.

[4.20] P.J. Holmes (1990) *Applied Mechanics Reviews* 43(6), B130-B131. Review of “Instabilities and Nonequilibrium Structures II”, eds E. Tirapegui and D. Villarroel.

[4.21] P.J. Holmes (1991) *Physics Today* 44 (8:1), (August) 59. Review of “Lectures in Complex Systems”, ed. E. Jen.

[4.22] P.J. Holmes (1992) *Physics World* 5(4), (April) 29-30. Sleeping Tops Awake!

[4.23] P.J. Holmes (1992) *Applied Mechanics Reviews* 45 (6), B80-81. Review of “Nonlinear Stability and Bifurcation Theory” by H. Troger and A. Steindl.

[4.24] P.J. Holmes (1994) *SIAM Review* 37, 129-131. Review of “The Essence of Chaos” by E. N. Lorenz.

[4.25] P.J. Holmes (1998) *Math. Reviews MR 98e:76002*. Review of “Turbulence: The Legacy of A.N. Kolmogorov” by U. Frisch.

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