Clarence Eugene Wayne

Contact Information

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Education

Harvard University, Ph.D. in Physics, 1982

Harvard University, A.M. in Physics, 1980

University of Virginia, B.S. in Physics with Highest Distinction, 1978

Employment History

1997-present	Professor of Mathematics, Boston University
1991-1997	Professor of Mathematics, The Pennsylvania State University
1991-1994	Associate Chairman, Department of Mathematics, The Pennsylvania State University
1986-1991	Associate Professor, The Pennsylvania State University
1983-1986	Assistant Professor, The Pennsylvania State University
1983-1984	Research Instructor, The University of Virginia (on leave from Penn State)
1982-1983	Postdoctoral Fellow, Institute for Mathematics and its Applications (IMA), University of Minnesota

Honors and Awards

- Fellow of the Society for Industrial and Applied Mathematics, 2015.
- Fellow of the American Mathematical Society, 2015.
- Distinguished Lecturer in Applied Mathematics, University of Massachusetts, Amherst, October 2010.
- DAAD Visiting Professor at the University of Stuttgart, Germany, July 2009.
- Professeur Invité at the University Paul Sabatier, Toulouse, France, January 2009.

- My research on the stability of vortices in fluids was one of ten topics featured in the 2006 edition of the AMS publication " What's Happening in the Mathematical Sciences".
- Distinguished Lecturer on Theoretical Aspects of Pattern Formation at the Institute of Advanced Study, University of Surrey, England, September 2005.
- My research on invariant manifolds and two-dimensional fluid flows was selected by Math Reviews as the subject of a "Featured Review". Such reviews are "especially commissioned for some of the books and papers that are considered particularly important in the areas that they cover." 2003.
- Professeur Invité at the Université de Paris-Sud, France, July 2000.
- MAA Award for Distinguished University Teaching of Mathematics, Allegheny Mountain Section, 1997.
- Professeur Invité at the Université de Paris VII, France, June 1997.
- Provost's Collaborative and Curricular Innovation Special Recognition Program (awarded for the development of a course on the application of computer algebra systems for scientists and engineers), 1996.
- Teresa Cohen Award (Penn State award for service to mathematics undergraduates), 1996.
- C.I. Noll Award (Highest teaching award given by the Penn State College of Science), 1992.
- Named to the "Incomplete List of Excellent Honors Instructors" (Penn State Teaching Award), 1990.
- NSF Predoctoral Fellow, 1978-1982.
- Rotary International Foundation Undergraduate Scholar at the University of London, 1978-1979.

Grant Support

1984-PRESENT	PI on NSF Grants to support research in mathematical physics, partial differential equations and dynamical systems.
2006-2011	Co-PI on the NSF Grant "Biodynamics at Boston University" a training grant to support post-docs and graduate students at BU.
2008	PI on an NSF grant to fund US participants in a special semester on Dynamical Systems and Evolution Equations at the Centre de Recherches Mathematiques, University of Montreal.
2005	Co-PI on an NSF grant to fund a US participants for a conference on Mathematical Hydrodynamics at the Steklov Institute, Moscow, Russia.
1996	PSU Fund for Distance Education Grant to support a conference on Calculus Reform.
1989	Co-PI on Pennsylvania Department of Education, Partial Differential Equations Instructional Equipment Grant.

Editorial Boards

MPEJ, The Mathematical Physics Electronic Journal (1996-present)

Journal of Statistical Physics (1997-1999)

SIAM J. of Mathematical Analysis (1997-present)

Carus Monograph Series of the MAA (1998-2001)

J. Math. Analysis and Applications (2000-present)

SIAM J. of Applied Dynamical Systems (2004-2019)

J. Diff. Equations (2011-2018)

Nonlinearity (2016-present)

Other Educational Activities

Member of the EMAP Steering Committee of the State of Pennslvania (1990-1997) (Early Mathematics Advising Program).

Member of the Steering Committee of the Penn State MASS Program (1996-1997) (Mathematics Advanced Study Semesters).

Organizer of "Calculus in a Real and Complex World", Calculus Reform Conference held at Penn State, July 1996.

Other Professional Activities

- Vice-Chair, SIAM Activity Group on Dynamical Systems (1992-1995)
- Founding Editor of Dynamics Notes, The SIAM electronic newsletter on dynamical systems (1993-1995)
- Member of the organizing committee for the 1994 program on Coherent Structures in Partial Differential Equations at the Mathematical Sciences Research Institute, Berkeley
- Chairman of the organizing committee for the "IMA at 20", a conference to mark the 20th anniversary of the Institute for Mathematics and its Applications at the University of Minnesota, 2002.
- Member of the scientific committee for the Thematic Program on Partial Differential Equations at the Fields Institute, Toronto (2003-2004)
- Chair of the organizing committee for the joint workshop on Hamiltonian Dynamical Systems at the Centre de Recherches Mathematiques, University of Montreal, 2004
- Member and Chair of the SIAM Committee on the Joint Mathematics Meetings (2004-2006)
- Member of the organizing committee on the workshop on Mathematical Hydrodynamics, Steklov Institute, Moscow, 2006

- Member of the NSF Committee of Visitors, 2007
- Organizer of special sessions for both the AMS and MAA at the JMM, Boston, Jan. 2012
- Member of the organizing committee of the IMA workshop in Dynamical Systems in Studies of PDE's, 2012
- Member of the scientific committee for the Karlsruhe Institute of Technology, Conference on Mathematics of Wave Phenomena, 2018.

Visiting Positions (one month or more)

IMA, Minnesota (2016)

University of Stuttgart (2009)

University Paul Sabatier, Toulouse (2009)

Brown University (2001, 1993)

University of Paris 7 (1997)

University of Paris-Sud (1992, 2000)

University of Geneva (1987, 1988, 1990, 1991, 1993, 1996, 2016)

Mathematical Sciences Research Institute (1991, 1994)

Mittag-Leffler Institute, Djürsholm (1994)

Institute for Advanced Study, Princeton (1992)

Institut des Hautes Études Scientifiques, Bures-sur-Yvette (1989)

Center for Theoretical Studies, ETH-Zurich (1985, 1987)

Ph.D. Students Supervised

- Kresemir Josic, Penn State 1998 (currently Prof. at Univ. of Houston)
- R. E. Lee DeVille, Boston University 2001 (currently Prof. at Univ. of Illinois, Champaign-Urbana)
- J. Douglas Wright, Boston University 2003 (currently Prof. at Drexel University)
- Stephen Krigman, Boston University 2004 (currently Principal Systems Engineer, Raytheon Corp.)
- Margaret Beck, Boston University 2006 (currently Assoc. Prof. at Boston University; jointly advised with T. Kaper)
- Oleg Mikitchenko, Boston University 2007 (currently a financial analyst at Bloomberg Financial; jointly advised with T. Kaper)
- David Uminsky, Boston University 2009 (currently Assoc. Prof. at Univ. of San Francisco)
- Anna Barry, Boston University 2012 (currently Lecturer at Univ. of Auckland)

- G. Nick Benes, Boston University 2014 (currently Senior Researcher, Image Insight, Inc.)
- Laura Rocio Gonzalez-Ramirez, Boston University 2014 (currently Prof. at National Polytechnical Inst. of Mexico, Hidalgo, Mexico; jointly advised with Mark Kramer)
- Osman Chaudhary, Boston University 2017 (currently teaching in the Baltimore County Schools)
- Patrick Cummings, Boston University 2017 (currently Associate Research Engineer, Aptima)

Selected Invited Talks (last 10 years)

- "Asymptotic stability of the Toda n-soliton", Equadiff 2019, Leiden, July 2019.
- "Modulation Equations", Workshop on Hamiltonian PDE's, Casa Mathemática Oaxaca, June 2019.
- "Breathers as metastable states for weakly damped lattices of Hamiltonian oscillators", School on non-equilibrium statistical mechanics, Centre de Recherches Mathématiques, Montreal, October 2018.
- "Dynamical Systems and the Two-Dimensional Navier-Stokes Equations", Departmental Colloquium, NJIT, April 2918.
- "Energy dissipation in Hamiltonian chains of rotators", LlaveFest, A broad perspective on finite and infinite dimensional dynamical systems (FIDDS-17), CRM, Barcelona, June 2017.
- "Vortrices in rapidly rotating Boussinesq convection", ICERM, May 2017.
- "The nonlinear Schroedinger equation and the evolution of wave packets in nonlinear dispersive equations", Dynamical Systems Seminar, Georgia Tech, November 2016.
- "Taylor Dispersion and Invariant Manifolds", American Institute of Mathematics workshop in Mixing and Nonlinear Statiblity, April 2016.
- "Normal forms for partial differential equations", a mini-course of two lectures at the winter school on Dynamical Systems, St. Etienne de Tinée, January 2016.
- "'Vortex solutions in two-dimensional fluid flows", a course of three lectures at the summer school on "Geometric methods for PDEs and dynamical systems", Porquerolles, France, June 2015.
- "Vortex solutions in two-dimensional fluid flows", a course of three lectures at the "School around Vortices", IMPA, Rio de Janeiro, Brazil, March 2014.
- "Existence and stability of nonlinear waves in dispersive systems", a course of four lectures in the Karlsruhe PDE Seminar, University of Karlsruhe, February 2014.
- "Traveling waves in the Fermi-Pasta-Ulam model" at the "HANDDY 2013 Conference on Hamiltonian and Dispersive Equations", Luminy, France, June 2013.
- "Metastable States and the Navier-Stokes Equations" at Workshop on "Ocean Turbulence", Fields Institute, May 2013.

- "Inverse Spectral Theory for Weight-Type Sturm-Liouville Operators" at the "Recent Mathematical Advances in Classical, Quantum and Statistical Mechanics" Conference, University of Virginia, March 2013.
- "A Dynamical Systems Approach to Metastiblity", Workshop "From Chaos to Complexity", Mathematics Institute, University of Warwick, July 2011.
- "Asymptotic Stability of the Toda m-soliton", Fields Institute Workshop on the Short Pulse Equation, May 2011.
- "Dynamical Systems and Metastable States", Distinguished Lecture in Applied Mathematics, University of Massachusetts, Amherst, October 2010.
- "Dynamical System Theory and the Two-Dimensional Navier-Stokes Equations", Plenary Lecture at the international conference on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, Spain, June 2010.
- "Dynamical System Theory and the Two-Dimensional Navier-Stokes Equations", CAMS Colloquium, USC, April 2010.
- "Counterprogagating two-soliton solutions in the FPU lattice," SIAM Conference on Analysis of Partial Differential Equations, Miami, December 2009.
- "Interactions of Solitary Waves in Dispersive, Infinite Dimensional Hamiltonian Systems," Nonlinear PDE Days, University of Karlsruhe, Germany: June 2009.
- Gave a mini-course of six hours of lectures at international symposium on Hamiltonian Partial Differential equations at the University of Nantes, France, June 2008.
- Gave a mini-course of six hours of lectures on my research on the Navier-Stokes equations at the University of Rome, III, October 2008.
- Gave a series of four lectures at the NATO Advanced Studies Institute at the Centre de Recherches Mathematiques, Montreal on "Dynamical Systems and Partial Differential Equations with Applications to the Navier-Stokes Equations" in June 2007.
- Gave a series of five lectures at the 2nd National Summer School on Dynamical Systems, Jilin University, Chongchun, China in August 2007.
- Plenary Lecturer at the "Symposium on Dynamical Systems" at the Chinese Academy of Sciences, Beijing, where I spoke on "Invariant manifolds for partial differential equations on unbounded domains", August 2007.
- Plenary Lecturer at "Dynamics Days, Europe" July 2007, Loughborough University.
- "Two-dimensional Navier-Stokes Flows", Steklov Institute of Mathematical Sciences, Moscow, July 2006.
- Gave a series of five lectures on dynamical systems and partial differential equations at the "European Summer School on Dynamical Systems" at the University of Barcelona, July 2006.

Publications

[1] Boris Shraiman, C. Eugene Wayne, and Paul C. Martin. Scaling theory for noisy period-doubling transitions to chaos. *Phys. Rev. Lett.*, 46(14):935–939, 1981.

[2] C. Eugene Wayne. *The Roughening Transition in Surface Models with Nonlocal Potentials*. PhD thesis, Harvard University, 1982.

[3] R. Brandenberger and C. E. Wayne. Decay of correlations in surface models. *J. Statist. Phys.*, 27(3):425–440, 1982.

[4] C. Eugene Wayne. Surface models with nonlocal potentials: upper bounds. *Comm. Math. Phys.*, 90(2):293–315, 1983.

[5] C. Eugene Wayne. The KAM theory of systems with short range interactions. I. *Comm. Math. Phys.*, 96(3):311–329,, 1984.

[6] C. Eugene Wayne. The KAM theory of systems with short range interactions. II. *Comm. Math. Phys.*, 96(3):331–344, 1984.

[7] James H. Curry and C. Eugene Wayne. On the nonpathological behavior of Newton's method. In *Fluids and plasmas: geometry and dynamics (Boulder, Colo., 1983)*, pages 407–418. Amer. Math. Soc., Providence, RI, 1984.

[8] C. Eugene Wayne. Bounds on the trajectories of a system of weakly coupled rotators. *Comm. Math. Phys.*, 104(1):21–36, 1986.

[9] Jürg Fröhlich, Thomas Spencer, and C. Eugene Wayne. An invariant torus for nearly integrable Hamiltonian systems with infinitely many degrees of freedom. In *Stochastic processes in classical and quantum systems (Ascona, 1985)*, pages 256–268. Springer, Berlin, 1986.

[10] C. Eugene Wayne. On the elimination of nonresonance harmonics. *Comm. Math. Phys.*, 103(3):351–386, 1986.

[11] Jürg Fröhlich, Thomas Spencer, and C. Eugene Wayne. Localization in disordered, nonlinear dynamical systems. *J. Statist. Phys.*, 42(3-4):247–274, 1986.

[12] Lawrence E. Thomas and C. Eugene Wayne. On the stability of dense point spectrum for selfadjoint operators. *J. Math. Phys.*, 27(1):71–75, 1986.

[13] G. Chen, S. G. Krantz, D. W. Ma, C. E. Wayne, and H. H. West. The Euler-Bernoulli beam equation with boundary energy dissipation. In *Operator methods for optimal control problems (New Orleans, La., 1986)*, pages 67–96. Dekker, New York, 1987.

[14] Jean-Pierre Eckmann and C. Eugene Wayne. Liapunov spectra for infinite chains of nonlinear oscillators. *J. Statist. Phys.*, 50(5-6):853–878, 1988.

[15] Goong Chen, Steven G. Krantz, David L. Russell, C. Eugene Wayne, Harry H. West, and Jianxin Zhou. Modelling, analysis and testing of dissipative beam joints—experiments and data smoothing.

Math. Comput. Modelling, 11:1011–1016, 1988. Mathematical modelling in science and technology (St. Louis, MO, 1987).

[16] G. Chen, S. G. Krantz, D. L. Russell, C. E. Wayne, H. H. West, and M. P. Coleman. Analysis, designs, and behavior of dissipative joints for coupled beams. *SIAM J. Appl. Math.*, 49(6):1665–1693, 1989.

[17] J.-P. Eckmann and C. E. Wayne. The largest Liapunov exponent for random matrices and directed polymers in a random environment. *Comm. Math. Phys.*, 121(1):147–175, 1989.

[18] Augustin Banyaga, Rafael de la Llave, and C. Eugene Wayne. Cohomology equations and commutators of germs of contact diffeomorphisms. *Trans. Amer. Math. Soc.*, 312(2):755–778, 1989.

[19] C. Eugene Wayne. Periodic and quasi-periodic solutions of nonlinear wave equations via KAM theory. *Comm. Math. Phys.*, 127(3):479–528, 1990.

[20] Walter Craig and C. E. Wayne. Nonlinear waves and the KAM theorem: nonlinear degeneracies. In *Large scale structures in nonlinear physics (Villefranche-sur-Mer, 1991)*, pages 37–49. Springer, Berlin, 1991.

[21] J.-P. Eckmann and C. E. Wayne. Propagating fronts and the center manifold theorem. *Comm. Math. Phys.*, 136(2):285–307, 1991.

[22] Walter Craig and C. Eugene Wayne. Solutions of nonlinear wave equations and localization theory. In *Mathematical physics, X (Leipzig, 1991)*, pages 256–261. Springer, Berlin, 1992.

[23] Walter Craig and C. Eugene Wayne. Newton's method and periodic solutions of nonlinear wave equations. *Comm. Pure Appl. Math.*, 46(11):1409–1498, 1993.

[24] J.-P. Eckmann, H. Epstein, and C. E. Wayne. Normal forms for parabolic partial differential equations. *Ann. Inst. H. Poincaré Phys. Théor.*, 58(3):287–308, 1993.

[25] Walter Craig and C. Eugene Wayne. Periodic solutions of nonlinear Schrödinger equations and the Nash-Moser method. In *Hamiltonian mechanics (Toruń, 1993)*, pages 103–122. Plenum, New York, 1994.

[26] Walter Craig and C. Eugene Wayne. Nonlinear waves and the $1:1:2$ resonance. In *Singular limits of dispersive waves (Lyon, 1991)*, pages 297–313. Plenum, New York, 1994.

[27] Jean-Pierre Eckmann and C. Eugene Wayne. The nonlinear stability of front solutions for parabolic partial differential equations. *Comm. Math. Phys.*, 161(2):323–334, 1994.

[28] J. L. Bona, K. S. Promislow, and C. E. Wayne. Higher-order asymptotics of decaying solutions of some nonlinear, dispersive, dissipative wave equations. *Nonlinearity*, 8(6):1179–1206, 1995.

[29] J.-P. Eckmann, Th. Gallay, and C. E. Wayne. Phase slips and the Eckhaus instability. *Nonlinearity*, 8(6):943–961, 1995.

[30] Rafael de la Llave and C. Eugene Wayne. On Irwin's proof of the pseudostable manifold theorem. *Math. Z.*, 219(2):301–321, 1995.

[31] R. D. Pierce and C. E. Wayne. On the validity of mean-field amplitude equations for counterpropagating wavetrains. *Nonlinearity*, 8(5):769–779, 1995.

[32] A. Banyaga, R. de la Llave, and C. E. Wayne. Cohomology equations near hyperbolic points and geometric versions of Sternberg linearization theorem. *J. Geom. Anal.*, 6(4):613–649 (1997), 1996.

[33] C. Eugene Wayne. An introduction to KAM theory. In *Dynamical systems and probabilistic methods in partial differential equations (Berkeley, CA, 1994)*, pages 3–29. Amer. Math. Soc., Providence, RI, 1996.

[34] Percy Deift, C. David Levermore, and C. Eugene Wayne, editors. *Dynamical systems and probabilistic methods in partial differential equations*, Providence, RI, 1996. American Mathematical Society.

[35] C. Eugene Wayne. Invariant manifolds and the asymptotics of parabolic equations in cylindrical domains. In *Differential equations and applications (Hangzhou, 1996)*, pages 314–325. Internat. Press, Cambridge, MA, 1997.

[36] Claude-Alain Pillet and C. Eugene Wayne. Invariant manifolds for a class of dispersive, Hamiltonian, partial differential equations. *J. Differential Equations*, 141(2):310–326, 1997.

[37] Jean-Pierre Eckmann, C. Eugene Wayne, and Peter Wittwer. Geometric stability analysis for periodic solutions of the Swift-Hohenberg equation. *Comm. Math. Phys.*, 190(1):173–211, 1997.

[38] C. Eugene Wayne. Invariant manifolds for parabolic partial differential equations on unbounded domains. *Arch. Rational Mech. Anal.*, 138(3):279–306, 1997.

[39] C. Eugene Wayne. Periodic solutions of nonlinear partial differential equations. *Notices Amer. Math. Soc.*, 44(8):895–902, 1997.

[40] J.-P. Eckmann and C. E. Wayne. Non-linear stability analysis of higher-order dissipative partial differential equations. *Math. Phys. Electron. J.*, 4:Paper 3, 20 pp. (electronic), 1998.

[41] G. Schneider and C. Eugene Wayne. The long-wave limit for the water wave problem, I. The case of zero surface tension. *Comm. Pure Appl. Math.*, 53(12):1475–1535, 2000.

[42] G. Schneider and C. Eugene Wayne. Counter-progagating waves on fluid surfaces and the continuum limit of the Fermi-Pasta-Ulam model. In K. Fiedler, B. Gröger and J. Sprekels, editors, *EQUADIFF'99; Proceedings of the International Conference on Differential Equations*. World Scientific, 2000.

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[44] Krešimir Josić and C. Eugene Wayne. Dynamics of a ring of diffusively coupled Lorenz oscillators. *J. Statist. Phys.*, 98(1-2):1–30, 2000.

[45] Thierry Gallay and C. Eugene Wayne. Invariant manifolds and the long-time asymptotics of the Navier-Stokes and vorticity equations on $\mathbf{R}^2$. *Arch. Ration. Mech. Anal.*, 163(3):209–258, 2002.

[46] R. E. Lee DeVille and C. Eugene Wayne. Reduced equations for models of laminated materials in thin domains. I. *Asymptot. Anal.*, 42(3-4):263–309, 2005.

[47] V. Rottschäfer and C. E. Wayne. Existence and stability of traveling fronts in the extended Fisher-Kolmogorov equation. *J. Differential Equations*, 176(2):532–560, 2001.

[48] Guido Schneider and C. Eugene Wayne. The rigorous approximation of long-wavelength capillary-gravity waves. *Arch. Ration. Mech. Anal.*, 162(3):247–285, 2002.

[49] Thierry Gallay and C. Eugene Wayne. Long-time asymptotics of the Navier-Stokes and vorticity equations on $\mathbf{R}^3$. *Phil. Trans. R. Soc. Lond. A*, 360:2155–2188, 2002.

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[51] C. Eugene Wayne and J. Douglas Wright. Higher order corrections to the KdV approximation for a Boussinesq equation. *SIAM J. Applied Dynamical Systems*, 1(2):271–302, 2002.

[52] Guido Schneider and C. Eugene Wayne. On the validity of 2D-surface water wave models. *GAMM Mitt. Ges. Angew. Math. Mech.*, 25(1-2):127–151, 2002.

[53] T. Schäfer and C. E. Wayne. Propagation of ultra-short optical pulses in cubic nonlinear media. *Phys. D*, 196(1-2):90–105, 2004.

[54] Thierry Gallay and C. Eugene Wayne. Global stability of vortex solutions of the two-dimensional Navier-Stokes equation. *Comm. Math. Phys.*, 255(1):97–129, 2005.

[55] Y. Chung, C. K. R. T. Jones, T. Schäfer, and C. E. Wayne. Ultra-short pulses in linear and nonlinear media. *Nonlinearity*, 18(3):1351–1374, 2005.

[56] David J. Pinto, Russell K. Jackson, and C. Eugene Wayne. Existence and stability of traveling pulses in a continuous neuronal network. *SIAM J. Appl. Dyn. Syst.*, 4(4):954–984 (electronic), 2005.

[57] R. de la Llave and C. E. Wayne. Whiskered and low dimensional tori in nearly integrable Hamiltonian systems. *Math. Phys. Electron. J.*, 10:Paper 5, 45 pp. (electronic), 2004.

[58] Thierry Gallay and C. Eugene Wayne. Existence and stability of asymmetric Burgers vortices. *J. Math. Fluid Mech.*, 9(2):243–261, 2007.

[59] Thierry Gallay and C. Eugene Wayne. Three-dimensional stability of Burgers vortices: the low Reynolds number case. *Phys. D*, 213(2):164–180, 2006.

[60] Thierry Gallay and C. Eugene Wayne. Long-time asymptotics of the Navier-Stokes equation in $\mathbb{R}^2$ and $\mathbb{R}^3$ [Plenary lecture presented at the 76th Annual GAMM Conference, Luxembourg, 29 March–1 April 2005]. *ZAMM Z. Angew. Math. Mech.*, 86(4):256–267, 2006.

[61] Karsten Matthies and C. E. Wayne. Wave pinning in strips. *Proc. Roy. Soc. Edinburgh Sect. A*, 136(5):971–995, 2006.

[62] Margaret Beck and C. Eugene Wayne. Invariant manifolds and the stability of traveling waves in scalar viscous conservation laws. *J. Differential Equations*, 244(1):87–116, 2008.

[63] S.S. Krigman and C. E. Wayne. Boundary controllability of Maxwell's equations with nonzero conductivity inside a cube, I: Spectral controllability. *J. Math. Anal. Appl.*, 329(2):1375–1396, 2007.

[64] S.S. Krigman and C. E. Wayne. Boundary controllability of Maxwell's equations with nonzero conductivity inside a cube, II: Lack of exact controllability. *J. Math. Anal. Appl.*, 329(2):1355–1374, 2007.

[65] Guillaume van Baalen, Nikola Popović, and C. Eugene Wayne. Long tails in the long-time asymptotics of quasi-linear hyperbolic-parabolic systems of conservation laws. *SIAM J. Math. Anal.*, 39(6):1951–1977, 2008.

[66] C. Eugene Wayne. Lectures on dynamical systems and partial differential equations with applications to the Navier-Stokes equations. In Walter Craig, editor, *Hamiltonian Dynamical Systems and Applications*. Springer Verlag, 2008.

[67] Walter Craig and C. Eugene Wayne. Mathematical aspects of surface water waves. *Russian Math. Surveys*, 62(2):453–473, 2007.

[68] A. Hoffman and C. E. Wayne. Counter-propagating two-soliton solutions in the Fermi-Pasta-Ulam lattice. *Nonlinearity*, 21(12):2911–2947, 2008.

[69] Ray Nagem, Guido Sandri, David Uminsky, and C. Eugene Wayne. Generalized Helmholtz-Kirchhoff model for two dimensional distributed vortex motion. *SIAM J. Appl. Dyn. Sys.*, 8, 2009.

[70] Aaron Hoffman and C. Eugene Wayne. Asymptotic two-soliton solutions in the Fermi-Pasta-Ulam model. *J. Dyn. Diff. Eqns.*, 21:343, 2009.

[71] Margaret Beck and C. Eugene Wayne. Using global invariant manifolds to understand metastability in the Burgers equation with small viscosity. *SIAM J. Appl. Dyn. Syst.*, 8(3):1043–1065, 2009.

[72] Aaron Hoffman and C. Eugene Wayne. A simple proof of the stability of solitary waves in the Fermi-Pasta-Ulam model near the KdV limit. in **Infinite Dimensional Dynamical Systems; Fields Institute Comunications**, 64:185-192, 2013.

[73] G. N. Benes, A. Hoffman, and C. Eugene Wayne. Asymptotic stability of the Toda m-soliton. *J. Math. Anal. Appl.*, 386(1):445–460, 2012.

[74] Anna Barry, R. Hall, Glen, and C. Eugene Wayne. Relative equilibria of the $(1+n)$-vortex problem. *Nonlinear Science*, DOI: 10.1007/s00332-011-9108-z; 22:63-83 (2012).

[75] C. Eugene Wayne. Vorticity and two-dimensional fluid motion. *Notices of the AMS*, 58(1):10-19, 2011.

[76] Margaret Beck and C. Eugene Wayne. Using global invariant manifolds to understand metastability in the Burgers equation with small viscosity. *SIAM Review*, 53(1):129-153, 2011. (Republication of an expanded version of [71] as part of the SIAM SIGEST series, which "highlights an exceptional paper, chosen for its readability and wide appeal to the SIAM community.")

[77] G. Schneider and C. Eugene Wayne. Justification of the NLS approximation for a quasi-linear water wave model. J. Differential Equations , 251(2):238-269, 2011.

[78] David Uminsky, C. Eugene Wayne, and A. Barbaro. A multi-moment vortex method for 2d viscous fluids. *J. Comput. Phys.*, 231:1705-1727, 2012.

[79] M. Beck and C. Eugene Wayne Metastability and rapid convergence to quasi-stationary bar states in the 2D Navier-Stokes equations. *Proc. Royal Soc. Edin.* 143:905-927, 2013.

[80] A. Hoffman and C. Eugene Wayne Orbital stability of localized structures via Bäcklund transformations. *Differential Integral Equations*, 26:303-320, 2013.

[81] W.-P. Düll, G. Schneider and C. Eugene Wayne Justification of the nonlinear Schrödinger equation for the evolution of gravity driven 2D surface water waves in a canal of finite depth. *Arch. Rat. Mech. Anal.*, 220:543-602, 2016.

[82] C. Eugene Wayne Dynamical Systems and the two-dimensional Navier-Stokes equations. *Frontiers in Applied Dynamical Systems*, 3 2016.

[83] L. R. González-Ramírez, O. J. Ahmed, S. S. Cash, C. E. Wayne, and M. A. Kramer A Biologically Constrained, Mathematical Model of Cortical Wave Propagation Preceding Seizure Termination. *PLoS Comput Biol*, 11(2): e1004065, doi:10.1371/journal.pcbi.1004065 (2015).

[84] M. Chirilus-Bruckner and C. Eugene Wayne Inverse spectral theory for uniformly open gaps in a weighted Sturm-Liouville problem. *J. Math. Anal. Appl.*, 427:1168-1189, 2015.

[85] M. Beck, O. Chaudhary, and C. Eugene Wayne Analysis of enhanced diffusion in Taylor dispersion via a model problem *Comm. Fields Inst.*, 75:31-71, 2015.

[86] K. McQuighan and C. Eugene Wayne An explanation of metastability in the viscous Burgers equation with periodic boundary conditions via a spectral analysis *SIAM J. Appl. Dyn. Sys.*, 15:1916-1961, 2016.

[87] P. Cummings and C. Eugene Wayne Modified energy functionals and the NLS approximation *Discrete and Continuous Dynamical Systems*, 7(3): 1295-1321, 2017. doi: 10.3934/dcds.2017054

[88] N. Cuneo, J.-P. Eckmann, and C. Eugene Wayne Energy Dissipation in Hamiltonian Chains of Rotators *Nonlinearity*, 30:R81, 2017. https://doi.org/10.1088/1361-6544/aa85d6

[89] J.-P. Eckmann and C. Eugene Wayne Breathers as metastable states for the discrete NLS equation *Discrete & Continuous Dynamical Systems - A*, doi :10.3934/dcds.2018136, 2018.

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[91] M. Beck, O. Chaudhary, C. Eugene Wayne Rigorous justification of Taylor dispersion via center manifolds and hypocoercivity *Arch Rational Mech Anal* (2019), https://doi.org/10.1007/s00205-019-01440-2Analysis")

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