

# Clarence Eugene Wayne Vita

## EDUCATION:

- Ph.D. 1982, Harvard University, Department of Physics  
M.A. 1980, Harvard University, Department of Physics  
B.S. 1978, (with Highest Distinction) University of Virginia, Department of Physics

## EMPLOYMENT HISTORY:

- 1997- 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 of Mathematics, The Pennsylvania State University  
1983-1986 Assistant Professor of Mathematics, The Pennsylvania State University  
1983-1984 Research Instructor in Mathematics, The University of Virginia (on leave from the Pennsylvania State University)  
1982-1983 Postdoctoral Fellow, Institute for Mathematics and its Applications, The University of Minnesota

## ACADEMIC HONORS:

- 2009 *Deutscher Akademischer Austausch Dienst* visiting Prof. at the Univ. of Stuttgart  
1997 and 2000 Professeur Invité at the University of Paris  
1997 MAA Award for Distinguished University Teaching of Mathematics, Allegheny Mountain Section  
1996 Teresa Cohen Award (Penn State award for service to mathematics undergraduates)  
1992 C.I. Noll Award (Highest teaching award given by the Penn State College of Science)  
1990 Named to “The Incomplete List of Excellent Honors Instructors” (Penn State Teaching Award)  
1978-1982 National Science Foundation Predoctoral Fellow

#### OTHER EDUCATIONAL ACTIVITIES:

Member of the EMAP Steering Committee of the State of Pennsylvania, (1980-1987) (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.

#### EDITORIAL BOARDS

MPEJ, The Mathematical Physics Electronic Journal (1996-2003)

Journal of Statistical Physics (1997-1999)

SIAM J. of Math. Analysis (1997-present)

SIAM J. of Appl. Dyn. Sys. (2003-present)

J. of Math. Analysis and Appl. (2000-present)

Carus Monograph Series of the MAA (1998-2001)

Walter Rudin Series in Advanced Mathematics (2002-present)

#### GRANT SUPPORT:

1984-present      Research continually supported by NSF Grants in mathematical physics, partial differential equations, and dynamical systems.

1989                Pennsylvania Department of Education Partial Differential Equations Instructional Equipment Grant (with Ridgway Scott)

1996                PSU Fund for Distance Education Grant to support a conference on Calculus Reform.

#### Ph. D. STUDENTS SUPERVISED:

Kresemir Josic      Penn State 1998 (currently tenured Associate Prof. at Univ. of Houston.)

Lee DeVille        Boston University 2001 (currently tenure track Asst. Prof at Univ. of Ill, Champaign-Urbana.)

Douglas Wright    Boston University 2003 (currently tenure track Asst. Prof. at Drexel University )

Stephen Krigman   Boston University 2004 (currently employed by Raytheon Corp.)

Margaret Beck     Boston University 2006 (currently an NSF post-doctoral fellow at Brown University; jointly advised with T. Kaper)

Oleg Mikitchenko   Boston University 2007 (currently visiting Asst. Prof at Conn. College; jointly advised with T. Kaper)

*Curriculum Vita of C. E. Wayne*

## 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-propagating 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.
- [43] Guido Schneider and C. Eugene Wayne. Kawahara dynamics in dispersive media. *Phys. D*, 152/153:384–394, 2001. Advances in nonlinear mathematics and science.
- [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.
- [50] Guido Schneider and C. Eugene Wayne. Estimates for the three-wave interaction of surface water waves. *European J. Appl. Math.*, 14(5):547–570, 2003.
- [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 Burgers equation with small viscosity. Preprint; arXiv:0810.0086, 2008.
- [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. Preprint; arXiv:0811.2406, 2008.

The abbreviations for journal titles used in this publication list are those used by the Am. Math. Soc.