# Curriculum Vitae, Brenton John LeMesurier

## Education

- M.S., 1982, Ph.D., 1986, New York University, New York, New York.

  Dissertation: *The focusing singularity of the nonlinear Schrödinger equation*

- B. Sc. (Honours), 1980, Australian National University, Canberra.

- South Australian Public Examinations Board Matriculation Certificate, 1976, Scotch College, Adelaide.

## Employment

- Professor, Department of Mathematics, College of Charleston, Charleston, August 2015–present.

- Associate Professor, Department of Mathematics, College of Charleston, Charleston, August 2004 – August 2015.

- Assistant Professor, Department of Mathematics, College of Charleston, Charleston, January 1999 – August 2004.

- Visiting Assistant Professor, Department of Mathematics, College of Charleston, Charleston, August 1996 – December 1998.

- Visiting Researcher, Department of Mathematics, Case Western Reserve University, Cleveland, Spring 1996.

- Lecturer, Department of Mathematics, Australian National University, Canberra, Australia, 1993–1995.

- Research Fellow, Centre for Mathematics and its Applications, Australian National University, Canberra, Australia, October 1991 – December 1992.

- Assistant Professor, Department of Mathematics, University of Arizona, Tucson, Arizona, 1987–1991.

- Associate Research Scientist, Courant Institute of Mathematical Sciences, New York, New York, June–August 1987.

- Postdoctoral Research Associate, Mathematics, Rensselaer Polytechnic Institute, Troy, New York, September 1985–June 1987.

- Exxon Research and Engineering Company, Clinton, New Jersey, June 1984–May 1985, part time.

## Educational activities at the College of Charleston

- Math 120: Introductory Calculus
- Math 220: Calculus 2
- Math 221: Calculus 3
- Math 245: Elementary Numerical Methods/Numerical Methods and Mathematical Computing.
- Math 246: Mathematical Computing and Programming Laboratory
- Math 323: Differential Equations
- Math 545: Numerical Analysis 1 and Math 445: Numerical Analysis
- Math 645: Numerical Analysis 2

## Grants and awards

1. College of Charleston 4th Century Initiative Faculty-Student Summer Research Grant of $5,000 (estimated) for work with student Barron Whitehead, summer 2003: *Numerical simulation of nonlinear wave focusing in media with random defects.*
2. South Carolina Research Initiative Grant of $24,700 for 2001: *Investigation of the stability of symmetric solutions to models of wave collapse and self-focusing in laser propagation, plasmas, and molecular vibration.*
3. College of Charleston SSM and Department of Mathematics grant of $1000 for curriculum development, summer 2000.
4. College of Charleston Starter Grant of $2,500 for the summer of 1999: *Sustained dissipation from self-focusing waves in plasmas.*
5. Travel grant of $1,000 from the Society for Industrial and Applied Mathematics, funded by the National Science Foundation, towards costs of attending and speaking at ICIAM99, the 1999 International Conference on Industrial and Applied Mathematics in Edinburgh, Scotland.
6. A.N.U. Quality Assurance Grant, $39,000 (with Drs Brian Davies and Steven Roberts): *Teaching of Mathematics Courses Involving Numerical and/or Symbolic Computation.*
7. N.S.F. Grant DMS-8810121, July 1988–December 1990: *Studies of singularities in nonlinear evolution P.D.E's and self-focusing in lasers.*

## Recent invited talks, conference presentations, and conference organizing activities

1. *Approximately Traveling Wave Pulses in Binary Exciton Chain Systems* at the ninth IMACS international conference on nonlinear evolution equations and wave phenomena: computation and theory, April, 2015. `http://waves2015.uga.edu/index.shtml`

2. *Partial continuum approximations for pulses generated by impulsive initial data in binary exciton chain systems* at the SIAM Conference on Nonlinear Waves and Coherent Structures. June 14, 2014, University of Cambridge, UK.
`https://www.siam.org/meetings/nw14/`

3. *Pulse propagation in exciton-phonon (molecular) chains, and conservative numerical methods for quasi-linear Hamiltonian systems* at Frontiers in Applied and Computational Mathematics, June 1, 2013, NJIT. `http://m.njit.edu/Events/FACM13/`

4. *Airy-like pulses in models of large (molecular) chains, and conservative numerical methods for quasi-linear Hamiltonian systems* at the eighth IMACS international conference on nonlinear evolution equations and wave phenomena: computation and theory, March 27, 2013. `http://waves.uga.edu/index.shtml`

5. *Energetic pulses in (molecular) chains, and conservative numerical methods for quasi-linear Hamiltonian systems* at Department of Mathematics Research Colloquium Southern Methodist University, March 20, 2013.

6. *Molecular Chain Modeling and Simulation with Conservative Time-Discretization of Stiff Hamiltonian Systems* in the Applied Mathematics Seminar, Department of Mathematics, Duke University, November 19, 2012.

7. *Conservative time-discretization for stiff Hamiltonian systems, and molecular chain models* at The Center for Scientific Computation and Mathematical Modeling Seminar September 26, 2012 `http://www.cscamm.umd.edu/seminars/fall12/index.htm`

8. *Conservative Time Discretization of Large, Stiff Hamiltonian Systems, and Pulse Propagation in Proteins* at NEEDS 2012 Workshop, July 2012, Orthodox Academy of Crete, Kolimvari, Crete, Greece.
`http://www.needs-conferences.net/ocs/index.php/conf/needs2012/`

9. *Conservative Time Discretization of Large, Stiff Hamiltonian Systems, Applied to Models of Molecular Chains and Nonlinear Optics* at the 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications. July 1, 2012, Orlando, Florida.
`http://aimsciences.org/conferences/2012/`

10. *Stable, Conservative Solution Methods for Large, Stiff Hamiltonian Systems Modeling Coherent Phenomena in Nonlinear Optics and Biophysics* at the SIAM Conference on

Nonlinear Waves and Coherent Structures. June 14, 2012, University of Washington. https://www.siam.org/meetings/nw12/

11. A series of four lectures on *Conservative Discretization Methods for Wave Equations, Lattice Equations, and Conservation Laws* at the summer school on dispersive wave equations at IIMAS, UNAM in Mexico City in June 2012.

12. Assisted with organizing the 2010 Southeastern Atlantic Mathematical Sciences Workshop at the College of Charleston, September 24–26. http://www.chachadays.org/chachadays2010/

13. *Davydov-Scott Models of Wave Motion in $\alpha$-helix Protein and Exactly Energy-Momentum Conserving Discretizations for Hamiltonian Systems* at the SIAM Conference on Nonlinear Waves and Coherent Structures. August 18, 2010. https://www.siam.org/meetings/nw10/

14. *Modeling Exciton Propagation in Molecular Chains, and Conservative Time Discretization of Large, Stiff Hamiltonian Systems*, at the $8^{th}$ AIMS International Conference on Dynamical Systems, Differential Equations and Applications, May 26, 2010, Dresden University of Technology. http://aimsciences.org/AIMS-Conference/2010/

15. Assisted with organizing the 2009 Southeastern Atlantic Mathematical Sciences Workshop at the University of Central Florida, Orlando, Florida, November 6–8. http://www.chachadays.org/chachadays2009/

16. *Conservative Time-Discrete Hamiltonian Systems and Modeling Pulses in Molecular Chains* at the $6^{th}$ IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens Georgia, March 24, 2009. http://www.cs.uga.edu/~thiab/waves2009.html

17. *Conservative Time-Discrete Hamiltonian Systems and Modelling Pulses in Molecular Chains* at the Conference on Coherence and Persistence in Nonlinear Waves: Solitons in Their Roaring Forties, University of Nice, January 8, 2009. http://www.oca.eu/cpnlw09/

18. *Modelling Pulses in Molecular Chains, and Conservative Time-Discrete Hamiltonian Systems* at the workshop Singular phenomena in Nonlinear Optics, Hydrodynamics and Plasmas, at the Banff International Research Station, Banff, Canada, October 25, 2008. http://www.birs.ca/birspages.php?task=displayevent&event_id=08w2133

19. *Conservative Discretizations of Hamiltonian Evolution Equations Modeling Solitary Waves in Proteins* in the minisymposium on Numerical Computation of Nonlinear Waves at the International Conference on Nonlinear Waves – Theory and Applications, Tsinghua University, Beijing, P. R. China, June 9, 2008. http://lsec.cc.ac.cn/~icnwta/

20. *Models and simulation of thermal effects on nonlinear pulse propagation in biopolymers: a discrete nonlinear Schrödinger equation with damping and stochastic driving of phase* at the *Nonlinear Evolution Equations and Dynamic Systems Workshop*, L'Ametlla de Mar, Spain, June 22, 2007. `http://needs-conferences.net/2007/`

21. Minisymposium talk *NLS Related Models of Random and Nonlinear Effects in Wave Motion* at the 2006 SIAM Conference on Nonlinear Waves and Coherent Structures at the University of Washington, Seattle, Washington, September 12, 2006.
`http://www.siam.org/meetings/nw06/`

22. Organized the minisymposium *NLS Related Models of Random and Nonlinear Effects in Wave Motion* at the above conference.

23. *Modeling thermal effects on nonlinear wave motion in biopolymers by a discrete nonlinear Schrödinger equation with damping and stochastic driving* at the AIMS Sixth International Conference on Dynamical Systems, Differential Equations and Applications in Poitiers, France, June 25-28, 2006.
`http://aimsciences.org/AIMS-Conference/2006/`

24. Jointly organized, with Roberto Cammasa of UNC Chapel Hill, the special session *Stochastic evolution equations with spatial structure and applications, from micro to macro scales* at the above conference.

25. *Modeling heat effects on nonlinear wave motion in (stiff, straight, stationary) DNA molecules: discrete nonlinear Schrödinger equations with damping and stochastic driving of the phase* at the conference *Fluids and Waves Recent Trends in Applied Analysis* at The University of Memphis, Memphis, Tennessee, 11–13 May 2006.

26. Colloquium talk *Modeling and simulating self-focussing collapse of waves in thin molecular films: a discrete nonlinear Schrödinger equation with noise and damping in the phase* at the Department of Mathematics and Statistics, University of New Mexico, October 27, 2005.

27. Attended and assisted the organization of the South Eastern Atlantic Mathematical Sciences SEAMS conference (SEAMS 2005, or "Cha-Cha Days") at the University of North Carolina, Chapel Hill, September 23–25, 2005.

28. Contributed talk *Wave collapse inhibition and enhancement by phase noise and damping in 2D nonlinear Schrödinger equations* at the conference *FPU+50: nonlinear waves fifty years after Fermi-Pasta-Ulam*, INSA de Rouen (France) June 21–25, 2005.

29. Co-organized the 29th annual conference of the South Eastern Atlantic Section of the Society for Industrial and Applied Mathematics with Mei Q. Chen of The Citadel and Annalisa Calini, held at the Citadel and The College of Charleston, March 25–26, 2005.

30. Contributed talk with Barron Whitehead, *Control of NLS self-focusing by linear perturbations: potentials and noise* at the SIAM conference on Nonlinear Waves and Coherent Structures, University of Central Florida, October 2004.

### College-wide service since 2006

1. Chair of the Committee on Assessment of Institutional Effectiveness, Spring 2016.
2. Member of the Committee on Assessment of Institutional Effectiveness, Fall 2015–Spring 2016.
3. SSM at-large Faculty Senator, Fall 2013.
4. Chair of the Faculty Committee on Educational Technology, 2011–2012.
5. Co-chair (with Christopher Vinson) of the Faculty Committee on Educational Technology, 2010–2011.
6. Chair of the Faculty Committee on Research and Development, 2008–2009.
7. Member of the Faculty Committee on Research and Development, 2007–2008.
8. Member of the Faculty Committee on Research and Development, 2006–2007.

### Memberships of Professional Societies

The Society for Industrial and Applied Mathematics

## Peer-reviewed publications


[1] Brenton LeMesurier. Pulses in binary wave guide arrays and long wave PDE approximations. *Submittted to Wave Motion*, April 2016.

[2] Brenton LeMesurier. Continuum approximations for pulses generated by impulsive initial data in binary exciton chain systems. *Discrete and Continuous Dynamical Systems B, to appear*, 2016.

[3] Brenton LeMesurier. Energetic pulses in exciton-phonon molecular chains and conservative numerical methods for quasilinear hamiltonian systems. *Phys. Rev. E*, 88(3):032707, 2013.

[4] B. LeMesurier. Conservative unconditionally stable discretization methods for Hamiltonian equations, applied to wave motion in lattice equations modeling protein molecules. *Physica D*, 241(1):1–10, January 2012. (Published online 1 Oct 2011. DOI:10.1016/j.physd.2011.09.012).

[5] Brenton LeMesurier. Studying Davydov's ODE model of wave motion in alpha-helix protein using exactly energy-momentum conserving discretizations for Hamiltonian systems. *Mathematics and Computers in Simulation*, 82(7):1239—1248, March 2012. (Published online 30 December 2010 DOI:10.1016/j.matcom.2010.11.017).

[6] Brenton LeMesurier. Modeling thermal effects on nonlinear wave motion in biopolymers by a stochastic discrete nonlinear Schrödinger equation with phase damping. *Discrete and Continuous Dynamic Systems Series S*, 1(2):317–327, June 2008.

[7] Brenton LeMesurier and Barron Whitehead. Wave energy self-trapping by self-focusing in large molecular structures: a damped stochastic discrete nonlinear Schrödinger equation model. *Physica D*, 225(1):1–12, January 2007.

[8] Brenton John LeMesurier, Peter Leth Christiansen, Yuri B. Gaididei, and Jens Juul Rasmussen. Beam stabilization in the 2D nonlinear Schrödinger equation with attractive potential by beam splitting and radiation. *Phys. Rev. E*, 70, 2004. 046614.

[9] Peter Leth Christiansen, Yuri B. Gaididei, and Brenton John LeMesurier. Collapse control in an inhomogeneous nonlinear Schrödinger equation model. In Luis Vázquez, Robert S. MacKay, and Maria Paz Zorzano, editors, *Proceedings of "Localization and Energy Transfer in Nonlinear Systems"*, pages 28–43. World Scientific, 2003.

[10] Brenton John LeMesurier and Peter Leth Christiansen. Regularisation and control of self-focusing in the 2D cubic Schrödinger equation by linear potentials. *Physica D*, 184:226–236, 2003.

[11] Brenton John LeMesurier. Multi-focusing and sustained dissipation in the dissipative nonlinear Schrödinger equation. *Mathematics and Computers in Simulation*, 55:503–517, 2001.

[12] Brenton John LeMesurier. Dissipation at singularities of the nonlinear Schrödinger equation through limits of regularisations. *Physica D*, 138:334–343, 2000.

[13] Brenton John LeMesurier. Dynamic rescaling methods for simulating wave collapse in plasmas. In R.L. May and A.K. Easton, editors, *Computational Techniques and Applications: CTAC95*, pages 455–462. World Scientific, 1996.

[14] Vadim F. Shvets, N.E. Kosmatov, and Brenton John LeMesurier. On collapsing solutions of the nonlinear Schrödinger equation in supercritical case. In R. Caflisch and George C. Papanicolaou, editors, *Singularities in fluids, plasmas, and optics*, pages 317–321. Kluwer Academic Publishers, 1993.

[15] Vadim F. Shvets, N.E. Kosmatov, and Brenton John LeMesurier. On long-lived singularities in the nonlinear Schrödinger equation. In R. Caflisch and George C. Papanicolaou, editors, *Singularities in Fluids, Plasmas, and Optics*, pages 309–316. Kluwer Academic Publishers, 1993.

[16] Brenton John LeMesurier. Studying singular solutions of a semilinear heat equation by a dilation rescaling numerical method. *Rocky Mountain J. Math.*, 21(2):695–706, 1991.

[17] Michael J. Landman, Brenton John LeMesurier, George C. Papanicolaou, Catherine Sulem, and Pierre-Louis Sulem. Solutions of the cubic Schrödinger equation. In *Integrable systems and applications, Lecture notes in Physics*, pages 210–226. Springer, 1989.

[18] Brenton John LeMesurier, George C. Papanicolaou, Catherine Sulem, and Pierre-Louis Sulem. Local structure of the self-focusing singularity of the nonlinear Schrödinger equation. *Physica D*, 32:210–226, 1988.

[19] Brenton John LeMesurier, George C. Papanicolaou, Catherine Sulem, and Pierre-Louis Sulem. Focusing and multi-focusing solutions of the nonlinear Schrödinger equation. *Physica D*, 31:78–102, 1988.

[20] Brenton John LeMesurier, George C. Papanicolaou, Catherine Sulem, and Pierre-Louis Sulem. The focusing singularity of the nonlinear Schrödinger equation. In *Directions in Partial Differential Equations*, pages 159–201. Academic Press, 1987.

[21] Alvin Bayliss, Kirk E. Jordan, Brenton John LeMesurier, and Eli Turkel. A fourth order accurate finite-difference scheme for the computation of elastic waves. *Bul. Seis. Soc. Am.*, 76(4):1115–1132, 1986.