

# Curriculum Vitae

Annalisa Maria Calini

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**Citizenship** Dual: U.S. and Italian

## Education

- University of Arizona, Tucson AZ, U.S.A:  
Ph.D. in Applied Mathematics (December 1994)  
Dissertation: *Integrable Curve Dynamics*. Director: Nicholas Ercolani;  
M.Sc. in Applied Mathematics (December 1992).
- Università degli Studi di Milano, Italy:  
Laurea in Physics (equivalent of an M.Sc.), 110/110 Cum Laude (March 1989)  
Dissertation: *Influence of an External Signal on the Cooperative Dynamics of an Atomic Gas: Analytical Results*. Directors: Vincenzo G. Benza, Luigi Galgani.

## Research Interests

Geometrical aspects of completely integrable PDE. Rogue waves in deep water. Integrable and near-integrable nonlinear wave equations. Mathematical Physics.

## Work Experience

- *Graduate Program co-Director* (with Dr. Martin Jones). Department of Mathematics, College of Charleston (08/2014–Present).
- *Shapiro Visitor*. Department of Mathematics, Penn State University (11-12/2013)
- *Professor*. Department of Mathematics, College of Charleston (08/2008–Present).
- *Program Director*. Division of Mathematical Sciences, National Science Foundation, Arlington, VA (08/2011–08/2013).
- *Associate Professor*. Department of Mathematics, College of Charleston (08/2001–08/2008).
- *Director of Graduate Studies*. Department of Mathematics, College of Charleston (08/2002–07/2005 and 08–12/2006).
- *Assistant Professor*. Department of Mathematics, College of Charleston (08/1996–08/2001).
- *Visiting Assistant Professor*. Department of Mathematics, Case Western Reserve University, Cleveland, OH (01/1995–06/1996).
- *Visiting Fellow*. Special Program in Nonlinear Analysis, Centre for Mathematics and its Application. Australian National University, Canberra, Australia (10–12/1994).

- *Postdoctoral Fellow*. Special Semester in Dynamical Systems and Probabilistic Methods in Partial Differential Equations, Mathematical Sciences Research Institute. Berkeley, CA (01–07/1994).
- *Research Assistant*. University of Arizona (01/1991–12/1993).
- *Research Associate*. Los Alamos National Laboratory (07–08/1990). (Project with J.C. Scovel and J.M. Hyman on symplectic numerical integrators.)
- *Research Assistant*. University of Arizona (08/1989–06/1990). Collaboration with N. Ercolani, D.W. McLaughlin and C.M. Schober on chaos induced by spatial discretizations of nonlinear PDE.
- *Research Assistant*. University of Arizona (06–08/1989). Project with D.W. McLaughlin on analytical methods for detecting homoclinic chaos in a forced and damped NLS equation.

## Teaching Experience

- (August 1996–Present)

*Courses taught:* College Algebra, Contemporary Mathematics (for Liberal Arts majors), Elementary Statistics, Introduction to Abstract Mathematics, Discrete Structures, Advanced Calculus, Advanced Linear Algebra (graduate), Continuous Mathematical Models, Vector and Tensor Analysis, Modern Differential Geometry (senior level/graduate), Partial Differential Equations (senior level/graduate), Capstone in Mathematics, Dynamical Systems (graduate), Appreciation of Mathematics (Honors), Complex Variables (senior level/graduate), Functional Analysis for Mathematical Physics (senior level/graduate).

*Independent Studies and Reading Courses:* Classical Mechanics and Symplectic Geometry, Modern Differential Geometry for Physicists, Representation Theory of Lie Algebras.

- (January 1995–June 1996) Calculus II for Science and Engineering majors, Calculus for Liberal Arts majors.
- (August–December 1993) Teaching assistant for a senior/graduate level geometry class. (Duties: teaching part of the lectures, grading, and supervising individual projects.)
- (August–December 1990) College Algebra.

## Students (College of Charleston)

- Carter Rhea (Math and Physics, BS 2016). Undergraduate research project: *Numerical Investigations of Models of Vortex Filament Flow*. Co-director: Dr. Brenton Lemesurier. January–June 2016. (NSF-supported.)
- Danielle Massé (Math and Physics, BS 2015), Allison Conger (Math, current student). Undergraduate research project: *Almost Parallel and Nearly Circular Vortex Filaments*. Co-director: Dr. Stéphane Lafortune. May–June 2015. (NSF-supported.)
- Phillip Lee Staley (Math, M.Sc. 2015). Master Thesis: *Vortex Dynamics in Any Dimension*. (NSF-supported.)
- Victoria Shuler (Studio Art and Geology, current student). Arts and Science Project: *Art Matters: art installation on Rogue Waves*. Fall 2014.

- Elena Fenici (Math, M.Sc. 2011). Master Thesis: *On the Conserved Quantities of the Vortex Filament Equation*. Co-director: Dr. Stéphane Lafortune. (NSF-supported.)
- J Seymour (Math, BS 2012), Hunter Moss (Physics, BS 2013 ). Undergraduate research project: *Stability of nonlinear waves*. Co-director: Dr. Stéphane Lafortune. (Summer 2011, NSF-supported.)
- Sybil Prince Nelson (Math, M.Sc. 2010). Master Thesis: *Dynamics of Nearly Circular Vortex Filaments*. (NSF-supported.)
- Scott Forbes Keith (Math and Physics, BS 2009). Undergraduate research project and Senior Thesis: *Linear Stability of Solutions of the Vortex Filament Equation*. May 2007-April 2009. (NSF-supported.)
- Kelly Epperson (Math, MS 2008). *The Vortex Filament Equation and its Solutions and Energies*. Master Thesis. (NSF-funded.)
- Kelly Epperson (Math, BS 2007). *A Model of Vortex Filament Motion*. Summer research project and Bachelor's Essay. May, 2005–December 2006. (NSF-supported.)
- Cassel Sloan (Physics, BS 2005). *Periodic Orbits in Triangular Biliards*. Senior Thesis. (Spring 2005.)
- Evguenia (Jane) Ilina (Math, BS 2006). *Integrable Dynamics in Knotted Vortex Filaments*. Summer research project. Summer 2003. (NSF-supported.)
- Kevin Young (Physics, BS 2005). *Integrable Dynamics in Knotted Vortex Filaments*. Summer research project. Summer 2003. (NSF-supported.)
- Kelly Sweetingham (Math and Psychology, BS 2002). *Topics in Dynamical Systems*. Senior Thesis. (Spring 2002.)
- Dimitre T. Milkov (Math and Economics, BS 2000). *Chaos in a Continuous-Time Model of Inventory Business Cycle*. Summer research project and Applied Mathematics Practicum. (06/1998–01/1999.)

### Students (Other)

- Maria Strawn (Ph.D. 2016). Thesis co-advisor (Major Advisor: Constance Schober): *Modeling rogue waves in deep water*. Department of Mathematics, University of Central Florida.

### Publications in Refereed Journals

22. (with C.M. Schober) *Characterizing JONSWAP Rogue Waves and their Statistics via Inverse Spectral Data*. In Press, Wave Motion, 2016.
21. (with C.M. Schober) *Numerical investigation of stability of breather-type solutions of the nonlinear Schrödinger equation*. Nat. Hazards Earth Syst. Sci., 14, 2014.
20. (with C.M. Schober) *Observable and reproducible rogue waves*. J. Opt. **15**, no. 10, 105201 (2013).
19. (with T. Ivey and G. Mari-Beffa) *An integrable flow for starlike curves in centroaffine space*. SIGMA **9**, (2013), 022, 21 pp.

18. (with C.M. Schober) *Dynamical Criteria for Rogue Waves in NLS Models*. Nonlinearity **25** (2012), 19 pp.
17. (with S.F. Keith and S. Laforune) *Squared Eigenfunctions and Linear Stability Properties of Closed Vortex Filaments*. Nonlinearity **24**, no. 12 (2011), 33555-3583.
16. (with T. Ivey) *Stability of Small-Amplitude Torus Knot Solutions of the Localized Induction Approximation*. J. Phys. A: Math. Theor. **44**, no. 33 (2011), 335204.
15. (with T. Ivey and G. Mari-Beffa) *Remarks on KdV-type Flows on Star-Shaped Curves*. Physica D Vol. 238, no. 8 (2009), 788–797.
14. (with J. Langer) *Schwarzian Reflection Geometry II: Local and Global Behavior of the Exponential Map*. Experimental Mathematics, Vol. 16, no. 1 (2007), 321–346.
13. (with T. Ivey) *Finite-gap Solutions of the Vortex Filament Equation II: Isoperiodic Deformations*. J. Nonlinear Sci., Vol. 17, no. 6 (2007), 527–567.
12. (with T. Ivey) *Finite-gap Solutions of the Vortex Filament Equation: Genus One Solutions and Symmetric Solutions*. J. Nonlinear Sci., Vol. 15, no. 5 (2005), 321–361.
11. (with J. Langer) *Schwarzian Reflection Geometry I: Continuous Iteration of Reflection*. Mathematische Zeitschrift Vol. 244, No. 4 (2003), 775–804.
10. (with C.M. Schober) *Homoclinic chaos increases the likelihood of rogue wave formation*. Physics Letters A, Vol. 298, No. 5–6 (2002), 335–349.
9. (with T. Ivey) *Connecting geometry, topology and spectra for finite-gap NLS potentials*. Physica D 152–153 (2001), 9–19.
8. (with T. Ivey) *Knot types, Floquet spectra, and finite-gap solutions of the Vortex Filament Equation*. Journal of Mathematics and Computers in Simulation. Vol. 55, No. 4–6 (2001), 341–350.
7. (with C.M. Schober) *Chaotic dynamics for a symmetry breaking perturbation of the NLS equation*. Journal of Mathematics and Computers in Simulation. Vol. 55, No. 4–6 (2001), 351–364.
6. *Recent developments in integrable curve dynamics*. In *Geometric Approaches to Differential Equations*, Ed. P. Vassiliou, I. Lisle. Australian Mathematical Society Lecture Series Vol. 15, Cambridge University Press (2000), 57–99.
5. (with T. Ivey) *Topology and sine-Gordon evolution of constant torsion curves*. Physics Letters A 254/3-4 (1999), 170–178.
4. (with C.M. Schober) *Mel'nikov analysis of a Hamiltonian perturbation of the Nonlinear Schrödinger Equation*. NATO Science Series C, Math. and Phys. Sci., Vol 533. Kluwer Academic Press (1999), 558–562.
3. (with T. Ivey) *Bäcklund transformations and knots of constant torsion*. Journal of Knot Theory and its Ramifications. Vol. 7, No. 6 (1998), 719–746.
2. (with N. Ercolani, D.W. McLaughlin, C.M. Schober) *Mel'nikov analysis of numerically induced chaos in the Nonlinear Schrödinger Equation*. Physica D 89 (1996), 227–260.
1. *A note on a Bäcklund transformation for the Continuous Heisenberg Model*. Physics Letters A 203 (1995), 333–344.

## Theses

1. *Integrable Curve Dynamics*. Ph.D. Thesis. University of Arizona, December 1994.
2. *Influenza di un Segnale Esterno sulla Dinamica Cooperativa di un Gas Atomico: Risultati Analitici*. Tesi di Laurea. Dipartimento di Fisica, Università degli Studi di Milano, March 1989.

## Refereed Book Chapters

1. (with C.M. Schober) *Rogue Waves in High-Order Nonlinear Schrödinger Models*. In *Extreme Ocean Waves*, Pelinovsky, E.; Kharif, C. Editors, Springer-Verlag (2008), 31–52.

## Conference Proceedings

1. *Integrable Dynamics of Knotted Vortex Filaments*. Four invited lectures in Proceedings of the Fifth International Conference on Geometry, Integrability and Quantization, I.M. Mladenov and G.L. Naber Editors (2004), 11–50.

## Encyclopedia Articles

1. *The Mel'nikov Method*. In *Encyclopedia of Nonlinear Science*. Ed. Alwyn Scott. New York: Routledge, 2005.
2. *Elliptic Functions*. In *Encyclopedia of Nonlinear Science*. Ed. Alwyn Scott. New York: Routledge, 2005.

## Work in Preparation

1. (with T. Ivey) *Integrable flows for curves in the pseudoconformal 3-sphere*.
2. (with S. Lafortune) *A Lyapunov functional for the one-soliton solution of the vortex filament equation*.
3. (with G. Mari-Beffa) *Integrable evolutions of twisted polygons in centro-affine  $\mathbb{R}^m$* .
4. (with S. Nelson) *Nearly circular interacting vortex filaments*.
5. (with N. Ercolani) *Completeness of the squared eigenfunctions family for finite-gap solutions of the NLS equation*.

## Other Works

- (with G. Kovacic and C.M. Schober) *Multiphase Solutions of the Maxwell-Bloch Equation*. Unpublished (2000).
- (with C.M. Schober) *Chaotic Dynamics for Symmetry-Breaking Perturbations of Integrable Equations*. Contributed Abstract for the XXIII European Geophysical Society General Assembly, Nice, France, 20-24 April 1998. *Annales Geophysical Supplement*, Vol. 16, 1998.
- (with P. D. Miller) *Modulational stability in the focusing Ablowitz-Ladik equations*. Unpublished (1996).

## Invited Presentations

69. *A Lyapunov functional for the Hasimoto filament.* Special Session on *Geometric Flows, Integrable Systems and Moving Frames.* AMS Fall Central Sectional Meeting, University of St. Thomas, Minneapolis, MN. October 28–30, 2016.
68. *A Lyapunov functional for the Hasimoto filament.* Special Session on *Novel Challenges in NLS Equations: Integrability, PT-Symmetry and Beyond.* SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA. August 8–11, 2016.
67. *Stability of Vortex Filaments.* Applied and Computational Mathematics Seminar. University of Wisconsin-Madison, Madison, WI. May , 2016.
66. *Stability of Vortex Filaments.* Mathematics Department Colloquium. University of Central Florida, Orlando, FL. September 24, 2015.
65. *Stability of Vortex Filaments.* Plenary talk at the International Conference of Mathematics of Non-linearity in Neural and Physical Sciences, New York University Shanghai, Shanghai, China. June 8-11, 2015.
64. *On generalisations of the integrable vortex filament evolution.* (Speaker and Co-Organizer.) Special Session on *Applications of Continuous and Discrete Integrable Systems.* The 9th IMACS International Conference on Nonlinear evolution equations and wave phenomena: computation and theory. Athens, GA. April 1–4, 2015.
63. *Integrable Curve Flows: the solitary travels of a vortex filament.* Mathematics Colloquium. University of Colorado at Colorado Springs, October 2, 2014.
62. *Methods of integrable systems for vortex filament flows.* Plenary talk at Geometrical Aspects of Hydrodynamics Workshop. Simons Center for Geometry and Physics, May 19-23, 2014.
61. *Integrable Curve Flows in Centroaffine Geometry.* WAAM (Women Advancing Arizona Mathematics) Colloquium. University of Arizona. April 28, 2014.
60. *Soliton equations that come from geometry.* Talk in Specialty Session III: Analysis and Its Applications. Program in Applied Mathematics 35th Anniversary Meeting. University of Arizona. April 25-26, 2014.
59. *Integrable Curve Flows in Centroaffine Geometry.* GAP Seminar, Pennsylvania State University. November 5, 2013.
58. *Curve Flows and Soliton Equations: the case of the vortex filament.* Conference on Integrable Systems, Random Matrices, and Combinatorics. University of Arizona. October 23-26, 2013.
57. *The Formation of Rogue Waves in Nonlinear Schrödinger Models.* Joint Math/Physics colloquium, Department of Physics, Wake Forest University. October 9, 2013.
56. *Integrable Flows for Starlike Curves in Centroaffine Space.* Nonlinear Evolution Equations and Linear Algebra. Cagliari, Sardinia, Italy. September 2-5, 2013.
55. *Linear Stability of Closed Vortex Filaments.* Special Session on *Nonlinear Water Waves and Patterns.* AMS Fall Central Sectional Meeting. Akron, OH. October 20-21, 2012.

54. *Knotted solutions of the vortex filament equation and their stability.* Nonlinear Evolution Equations and Dynamical Systems, NEEDS 2012, Conference. Orthodox Academy of Crete, Kolymbari, Greece. July 8-15, 2012.
53. *On the stability of closed vortex filaments.* Special Session on *Applied Analysis and Dynamical in Engineering and Sciences*; the 9th AIMS Conference on Dynamical Systems, Differential Equations, and Applications. Orlando, FL. July 1-5, 2012.
52. *Four Lectures on an integrable equation describing the motion of vortex filaments: knotted solutions and their stability.* Escuela de Verano, Ecuaciones de Ondas Dispersivas, National University of Mexico (UNAM), Mexico City. June 4-8, 2012.
51. *Integrable evolution of closed vortex filaments: finite-gap solutions and their linear stability.* ESF-ERCOM International Conference: *Knots and Links: From Form to Function.* Mathematical Research Center (CRM) Ennio De Giorgi Pisa, Italy. July 2-8, 2011.
50. *Linear stability of closed finite-gap solutions of the Vortex Filament Equation.* Special Session on *Geometry of Drops, Membranes and Filaments.* The 7th IMACS International Conference on Nonlinear evolution equations and wave phenomena: computation and theory. Athens, GA. April 4–7, 2011.
49. *Integrable evolution of closed vortex filaments: finite-gap solutions and their linear stability.* (Plenary Speaker.) The 45th Texas Geometry and Topology Conference, Texas Tech University, February 18-20, 2011.
48. *A Study of Stability of Rogue Wave Solutions of the Nonlinear Schrödinger Equation.* Special Session on *Applied Analysis and Dynamics in Engineering and Sciences.* The 8th AIMS Conference on Dynamical Systems, Differential Equations and Applications. Dresden University of Technology. Dresden, Germany. May 25–28, 2010.
47. *Linear stability of small-amplitude torus knot solutions of the Vortex Filament Equation.* Applied Mathematics Seminar. University of South Carolina, SC. April 21, 2010.
46. *Linear stability of small-amplitude torus knot solutions of the Vortex Filament Equation.* Special Session on *Geometric Flows, Moving Frames and Integrable Systems.* AMS Central Spring Section Meeting, St. Paul, MN. April 10–11, 2010.
45. *From circles to cables: closed finite-gap solutions of the Vortex Filament Flow.* Special Session on *Integrable Systems and Related Areas.* AMS Fall Eastern Sectional Meeting, State College, PA, October 24-25, 2009.
44. *Remarks on KdV-type Flows on Star-Shaped Curves.* *Solitons in the Roaring Forties*, CPNLW09 (Coherence and Persistence in Nonlinear Waves) Conference, Nice University, Campus Valrose. France. January 6–9, 2009.
43. *The Formation of Rogue Waves in Nonlinear Schroedinger Models.* Physics Department Colloquium. College of Charleston. October 30, 2008.
42. *Finite-Gap Solutions of the Vortex Filament Flow: Isoperiodic Deformations.* Special Session on *Periodic Problems in Soliton Equations.* International Conference on Nonlinear Waves–Theory and Applications. Beijing, China. June 9–12, 2008.

41. *Cable Formation for Finite-Gap Solutions of the Vortex Filament Flow*. Special Session on *New trends in Spectral Analysis and PDEs*. First Joint Meeting of the AMS-NZMS. Victoria University of Wellington, New Zealand. December 12–15, 2007.
40. *Investigating knot types of finite-gap solutions of the Vortex Filament Equation*. NEEDS 2007 Workshop on Nonlinear Evolution Equations and Dynamical Systems. L’Ametlla de Mar (Spain). June 15–24, 2007.
39. *The Localized Induction Equation for Vortex Filament Motion: Families of Closed Solutions and their Properties*. Special Session on *Solitons and Nonlinear Patterns on Closed Surfaces/Curves*. The 5th IMACS International Conference on Nonlinear evolution equations and wave phenomena: computation and theory. Athens, GA. April 16–19, 2007.
38. *Investigating knot types of finite-gap solutions of the Vortex Filament Equation*. Differential Equations Seminar. North Carolina State University. March 23, 2007.
37. *Closed solutions of the vortex filament flow I*. Applied Mathematics Seminar. University of Wisconsin, Madison. March 7, 2007.
36. *Finite-gap Solutions of the Localized Induction Equation for Vortex Filaments: Their Geometry and Topology*. (Speaker and Co-Organizer.) Minisymposium on *Generation and Dynamics of Vortex Filaments: Geometrical, Topological, Analytical, and Experimental Approaches*. SIAM Conference on Nonlinear Waves and Coherent Structures. University of Washington, Seattle, WA. September 9–12, 2006.
35. *The formation of rogue waves in NLS models: persistence of homoclinic orbits*. (Speaker and Co-Organizer.) Special session on *Nonlinear water waves: phenomena and modeling*. The 6th AIMS International Conference on Dynamical Systems, Differential Equations and Applications. University of Poitiers, Poitiers, France. June 25–28, 2006.
34. *Families of closed solutions of the integrable Vortex Filament Flow*. Conference on *Fluids and Waves—Recent Trends in Applied Analysis*. University of Memphis, Memphis, TN. May 11–13, 2006.
33. *Finite-gap solutions of the Vortex Filament Equation*. Analysis Seminar. University of New Mexico, Albuquerque, NM. October 26, 2005.
32. *Investigating knot types of algebro-geometric solutions of the Vortex Filament Equation*. Analysis and its Applications Seminar. University of Arizona, Tucson, AZ. October 11, 2005.
31. *Finite-gap solutions of the Vortex Filament Equation*. Applied Mathematics Colloquium. University of Arizona, Tucson, AZ. October 7, 2005.
30. *Finite-gap solutions of the Vortex Filament Equation*. (Contributed talk.) FPU+50. Nonlinear waves 50 years after Fermi-Pasta-Ulam Conference. INSA de Rouen, France. June 21–25, 2005.
29. *Knotted vortex filaments: finding connections between topology and spectra*. (Invited poster presentation.) DMac Fest. Conference in honor of Dave McLaughlin’s 60th birthday. Chapel Hill, NC. October 23–24, 2004.
28. *Knotted vortex filaments: finding connections between topology and spectra*. (Contributed talk.) SIAM Conference on Nonlinear Waves and Coherent Structures, Orlando, FL. October 2–5, 2004.



27. *Chaotic direction reversing waves in a perturbed nonlinear Schrödinger equation.* MIDIT Seminar. Danish Technical University. Lyngby, Denmark. May 25, 2004.
26. *Knotted vortex filaments: finding connections between topology and spectra.* Applied Mathematics Colloquium. University of North Carolina, Chapel Hill, NC. April 16, 2004.
25. *Knotted vortex filaments: finding connections between topology and spectra.* MIDIT Seminar. Institute for Mathematical Modelling (IMM), Danish Technical University. Lyngby, Denmark. June 24, 2003.
24. *Four Lectures on Curve Geometry and Soliton Theory.* (Principal speaker.) *The Fifth International Conference on Geometry, Integrability and Quantization.* Varna, Bulgaria, June 6–15, 2003.
23. *Integrable Dynamics of Knotted Vortex Filaments.* PDE Seminar. University of Missouri. Columbia, MO. October 10, 2002.
22. *A Continuous Analogue of Iteration of Schwarz Reflection.* Mathematics Department Colloquium. University of Missouri. Columbia, MO. October 10, 2002.
21. *Homoclinic Chaos Increases the Likelihood of Rogue Wave Formation.* MIDIT Seminar. Institute for Mathematical Modelling (IMM), Danish Technical University. Lyngby, Denmark. May 30, 2002.
20. *Curve Geometry and Soliton Theory.* MIDIT Seminar. Institute for Mathematical Modelling (IMM), Danish Technical University. Lyngby, Denmark. July 3, 2001.
19. *Mel'nikov analysis of a symmetry-breaking perturbation of the NLS equation.* (Invited poster presentation.) Nonlinear Science Festival III. Technical University of Denmark. Lyngby, Denmark, June 12–15, 2001.
18. *Curve Geometry and Soliton Theory.* Mathematics Department Colloquium. Old Dominion University. Norfolk, VA. April 13, 2001.
17. *Curve Geometry and Soliton Theory.* Mathematics Research Seminar. Saint Mary's College of Maryland. Saint Mary's City, MD. April 12, 2001.
16. *Connecting geometry, topology and spectra for finite-gap NLS potentials.* (Invited poster presentation.) Nonlinear Analysis 2000. Courant Institute of Mathematical Sciences. New York, NY. May 28–June 2, 2000.
15. *Curve Geometry and Soliton Theory.* Integrating Integrability into Mathematics and Science. Conference in honor of Vladimir Zacharov's 60th birthday. Tucson, AZ. October 29–31, 1999.
14. *Topological changes near homoclinic solutions of an integrable model of vortex filament evolution.* (Speaker and Co-Organizer.) Minisymposium on *Near-singular Phenomena in Conservative Wave Equations and their Perturbations.* ICIAM99, International Congress on Industrial and Applied Mathematics, Edinburgh, Scotland. July 5–9, 1999.
13. *Topology and Sine-Gordon Evolution of Constant Torsion Curves.* Special Session on *Theoretical Aspects of Solitons and Integrability.* The 1999 IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory. Athens, GA. April 12–19, 1999.
12. *Integrable Systems Methods in the Geometry and Topology of Evolving Curves.* Southeastern Geometry Conference, University of Georgia, Athens, GA. April 10–11, 1999.

11. *Topology and Sine-Gordon Evolution of Constant Torsion Curves*. Special Session on *Filaments, Interfaces and Patterns*. 1998 Fall Western Section Meeting, Tucson, AZ, November 13–15, 1998.
10. *Integrable Systems Methods in Curve Evolution*. Mathematical Sciences Department Seminar, Montana State University. Bozeman, MT. April 3, 1998.
9. *Mel'nikov Analysis for the NLS equation*. Mathematics Department Colloquium. Ball State University, IN. March 5, 1998.
8. *Bäcklund Transformations of Knots of Constant Torsion*. Mathematics Department Colloquium. Rensselaer Polytechnic Institute, Troy, NY. July 14, 1997.
7. *Bäcklund Transformations of Knots of Constant Torsion*. Applied Mathematics and PDE Seminar. University of Notre Dame, IN. June 3, 1997.
6. *Bäcklund Transformations of Knots of Constant Torsion*. (Speaker and Co-Organizer.) Minisymposium on *Integrable Systems Methods for Curve Evolution*. SIAM Conference on Applications of Dynamical Systems, Snowbird, UT. May 18–22, 1997.
5. *Soliton Equations and Evolution of Space Curves*. (Speaker and Co-Organizer.) Minisymposium on *Nonlinear Dynamics and Geometry in Integrable and Near-Integrable partial Differential Equations*. SIAM Annual Meeting, Kansas City, MO. July 22–26, 1996.
4. *Mel'nikov Analysis for the NLS equation*. The University of Notre Dame Symposium on *Current and Future Directions in Applied Mathematics*, University of Notre Dame, IN. April 18–21, 1996.
3. *Dynamics of Curves and Integrable Equations*. (Principal Speaker.) Miniworkshop on *Geometry and Differential Equations*. University of Canberra, Australia. May 15–16, 1995.
2. *Bäcklund Transformations and Immersed Knots. Integrable evolution of spherical curves and the Nonlinear Schrödinger Equation: a geometrical point of view*. Geometry and Topology Seminar. University of Maryland at College Park, MD. March 8, 1995.
1. *Dynamics of Curves*. Arizona Days, Los Alamos National Laboratories, Los Alamos, NM. February 5–6, 1994.

### **Educational and Outreach Presentations**

7. Keynote talk on *Modeling and Forecasting Rogue Ocean Waves*. Annual Meeting of the Charleston Chapter of Sigma Xi. The Citadel, April 23, 2015.
6. Faculty Lecture Series: *When Waves Go Rogue*. Honors College and Friends of the Library. College of Charleston, March 27, 2015.
5. Brief TED-style talk on *Rogue Waves*. Art Matters Symposium. College of Charleston, March 13, 2015.
4. Lecture for freshman students: *Lessons from the Mathematical Mechanic: playing squash in an elliptical court; springs, best fit, and the search for Ceres*. College of Charleston, October 11, 2012
3. *DMS funding opportunities*, 9th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Orlando, FL. July 1-5, 2012.

2. *DMS/NSF Outreach Presentation*, Women's Summer Program. Mathematics Department, The George Washington University, July 24, 2012.
1. *DMS funding opportunities*, Federal Agency Briefing of the University of Pittsburgh and Duquesne University. Arlington, VA, March 26, 2012.

## Grants and Awards

### Research

- NSF Award DMS-1109017 (\$174,104) (PI). *Collaborative RUI. Nonlinear Schrödinger Models in Fluid Dynamics: Rogue Waves and Vortex Filaments*. Collaborating PI: C.M. Schober, UCF. 8/1/2011–7/31/2014.
- NSF Award (Supplement) DMS-0853273 (\$8,000). (PI, co-PI: T. Ivey.) *Graduate Research Assistantship Supplement. RUI: Topology and Stability of Integrable Vortex Filament Motion*. 09/01/2008–06/30/2009.
- Faculty Research and Development Grant-in-Time (\$2,700). College of Charleston, Fall 2008.
- NSF Award DMS-0608587 (\$150,000). (PI, co-PI: T. Ivey.) *RUI: Topology and Stability of Integrable Vortex Filament Motion*. 07/01/2006–06/30/2009.
- NSF Award DMS-0204557 (\$148,000). (PI, co-PI: T. Ivey.) *RUI: Integrable Dynamics of Knotted Vortex Filaments*. 07/15/2002–06/30/2005.
- NSF Award DMS-9705005 (\$56,531) (PI). *Integrable Dynamics of Knotted Vortex Filaments*. 07/15/1997–06/30/2001.
- Research and Development Summer Grant (\$2,250). University of Charleston, SC. 05/01–06/30, 1997.
- Mathematics Department Research and Development Summer Grant (\$1,000). University of Charleston, SC. June 1997.

### Conferences and Workshops

- NSF Award DMS-0739409 (\$36,324). (PI, co-PI: C.M. Schober, UCF.) *Collaborative Proposal: Southeastern Atlantic Mathematical Sciences Workshop*. 09/01/2008–08/31/2011.
- NSF Award DMS-0739386 (\$12,108). (PI, co-PI: C.M. Schober, UCF.) *Collaborative Proposal: Southeastern Atlantic Mathematical Sciences Workshop: 2007 Meeting*. 09/01/2007–08/31/2008.
- NSF Award DMS-0407843 (\$29,992). (PI, co-PIs: L-S. Luo, NIA and ODU, and C.M. Schober, UCF.) *Collaborative Proposal: Southeastern Applied Mathematics Days*. 09/01/2004–08/31/2007.

### Miscellaneous Awards

- Invited participant to the workshop: *Women in Geometry*. Banff International Research Station, Banff, Canada. November 1-5, 2015.
- NSF Director's Award for Collaborative Integration: *Education and Human Resources and Mathematical & Physical Sciences Cross-Directorate Team*. (In recognition for exemplary service to promote transformation of the teaching and learning of mathematics.) June, 2012.

- AWM-NFS Travel Grant (\$1,200). *The 4th International Conference on Geometry, Integrability and Quantization* in Varna, Bulgaria, June 2002. (Declined as I received an NSF award.)
- College of Charleston CETL Grant (\$1,000). Course Development Grant: MATH 495, Capstone in Mathematics. Spring Semester 2002.
- College of Charleston *In Praise of Teaching Award* for promoting undergraduate research. 01/2002.
- AWM-ONR award for participating in the AWM Workshop held at the SIAM Annual Meeting, Kansas City, MO. July 22–26, 1996.
- AWM-NFS travel grant (\$1,000) for participating in the Summer School: *The Painlevé Property: One Century Later*, Cargèse, France. June 3–22, 1996.

### Service to the Profession and Conference Organization

- *Program Director* (elected) of the Society for Industrial and Applied Mathematics (SIAM) Activity Group on Nonlinear Waves & Coherent Structures (NWCS). January 2015–December 2016.
- *External Review Committee Member* for the Mathematics Departments at two institutions.
- *Peer Referee* for: SIAM Journal of Applied Mathematics, Journal of Differential Equations, Journal of Discrete and Continuous Dynamical Systems, Journal of Geometry, Journal of Mathematics and Computers in Simulation, Journal of Mathematical Physics, Journal of Nonlinear Science, Nonlinearity, Pacific Journal of Mathematics, Journal of Physics A, Physica D, Physical Review E, Physical Review Letters, Physica Scripta.
- *Reviewer* for European Science Foundation (Expert Reviewer, 2009, 2010, 10/2016–10/2019); Math-Reviews (1996–2002, 2007); National Science Foundation (Panelist, DMS-Applied Mathematics, 2006, 2007, 2008, 2009, 2010, 2015, 2016).
- *Organizing Committee Co-Chair* with D. Ambrose (Drexel U), of the 2016 SIAM Conference on Nonlinear Waves and Coherent Structures (NW16). Philadelphia, PA. August 8–11, 2016.
- *Co-Organizer*, with B. Khesin (U Toronto), G. Marí-Beffa (U Wisconsin), and V. Zharnitsky (U Illinois, Urbana-Champaign) of the *Workshop on Integrability in Mechanics and Geometry: Theory and Computations*. Institute for Computational and Experimental Research in Mathematics (ICERM), June 1–5, 2015.
- *Co-Organizer*, with F. Demontis (U Cagliari, Italy) and G. Ortenzi (U Milano Bicocca, Italy) of the special session on *Connections Between Nonlinear Wave Equations and Geometry*. SIAM Conference on Nonlinear Waves and Coherent Structures (NW14), University of Cambridge, Cambridge, UK. August 11–14, 2014.
- *Co-Organizer* with Roberto Camassa (UNC) of the series (nicknamed *Cha-Cha Days*):
  - SEAMS Workshop 2010*, College of Charleston, September 24–26, 2010.
  - SEAMS Workshop 2009*, University of Central Florida, November 6–8, 2009.
  - SEAMS Workshop 2008*, University of North Carolina, Chapel Hill, October 31–November 2, 2008.
  - SEAMS Workshop 2007*, National Institute of Aerospace, October 19–21, 2007.
  - SEAMS Workshop 2006*, College of Charleston, September 29–October 1, 2006.
  - SEAMS Workshop 2005*, University of North Carolina, Chapel Hill, September 23–25, 2005.
  - SEAMS Workshop 2004*, College of Charleston, September 17–19, 2004.

- *Co-Organizer* with M.Q. Chen (The Citadel) and B. LeMesurier (CofC) of the *SIAM-SEAS Annual Meeting*, the Citadel and the College of Charleston, March 25–26, 2005.
- *Advisory Board Member* (2003–2007) for the *International Conference on Geometry, Integrability and Quantization*. Varna, Bulgaria.
- *Co-Organizer* with Alex Kasman and Thomas Ivey (both at CofC) of the *Fourteenth Southeastern Geometry Conference*, College of Charleston, March 28–30, 2003.
- *Co-Organizer* with Alex Kasman (CofC) of the *Eleventh Southeastern Geometry Conference*, College of Charleston, March 24–6, 2000.