

# Curriculum Vitae

John D. Carter

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## Academic Positions

- Associate Professor, Mathematics Department, Seattle University, 2007-present
- Visiting Professor, Departamento de Ingeniería Hidráulica y Ambiental, Pontificia Universidad Católica de Chile, August-December 2008
- Assistant Professor, Mathematics Department, Seattle University, 2001-2007

## Education

- PhD in Applied Mathematics, University of Colorado Boulder, December 2001
- MS in Applied Mathematics, University of Colorado Boulder, August 1997
- Graduate of Semester in the Southwest, National Outdoor Leadership School, 1994
- BS in Mathematics, University of Puget Sound, May 1994

## Teaching Experience

- MATH 118: College Algebra for Business, F'05
- MATH 120: Precalculus: Algebra, F'02, F'03, W'04, W'08
- MATH 130: Elements of Calculus for Business, F'06
- MATH 134: Calculus I, W'03, F'07, F'09, S'10, W'11
- MATH 135: Calculus II, F'01, W'02, F'04, F'10
- MATH 232: Multivariable Calculus, W'11
- MATH 234: Differential Equations, W'02, S'02, F'02, S'03, F'03, S'04, S'05, W'05, F'05, S'06, F'06, W'07, S'07, S'08, W'09, W'10
- MATH 361: Applied Mathematics I, W'04, W'06, W'08, W'10
- MATH 371: Introduction to Numerical Methods, W'05, W'07
- MATH 391: Hamiltonian and Lagrangian Mechanics, W'06
- MATH 391: Asymptotics, S'09
- ICH 3800: Nonlinear Water Waves (at PUCC), 2<sup>nd</sup> '08

## Publications

### I. In Refereed Journals

11. J.D. Carter, "Stability of plane-wave solutions of a dissipative generalization of the vector nonlinear Schrödinger equation," *Mathematics and Computers in Simulation*, to appear, 2011.
10. J.D. Carter and R.E. Cienfuegos, "Kinematics and stability of solitary and cnoidal wave solutions of the Serre equations," *European Journal of Mechanics B: Fluids*, **30**: 259-268, 2011.
9. D.M. Henderson, H. Segur and J.D. Carter. "Experimental evidence of stable wave patterns on deep water," *Journal of Fluid Mechanics*, **658**: 247-278, 2010.
8. J.D. Carter and C.C. Contreras, "Stability of plane-wave solutions of a dissipative generalization of the nonlinear Schrödinger equation," *Physica D*, **237**: 3292-3296, 2008.

7. B. Deconinck, F. Kiyak, J.D. Carter and J.N. Kutz. "SpectrUW: A laboratory for the numerical exploration of spectra of linear operators," *Mathematics and Computers in Simulation*, **74**: 370-378, 2007.
6. N.E. Canney and J.D. Carter, "Stability of plane waves on deep water with dissipation," *Mathematics and Computers in Simulation*, **74**: 159-167, 2007.
5. J.D. Carter and B. Deconinck. "Instabilities of one-dimensional trivial-phase solutions of the two-dimensional cubic nonlinear Schrödinger equation," *Physica D*, **214**: 42-54, 2006.
4. R.J. Thelwell, J.D. Carter and B. Deconinck. "Instabilities of one-dimensional stationary solutions of the cubic nonlinear Schrödinger equation," *Journal of Physics A*, **39**: 73-84, 2006.
3. B. Deconinck, D.E. Pelinovsky and J.D. Carter. "Transverse instabilities of deep-water solitary waves," *Proceedings of the Royal Society A*, **462**: 2039-2061, 2006.
2. H. Segur, D.M. Henderson, J.D. Carter, J. Hammack, C. Li, D. Pheiff and K. Socha, "Stabilizing the Benjamin-Feir instability," *Journal of Fluid Mechanics*, **539**: 229-271, 2005.
1. J.D. Carter and H. Segur, "Instabilities in the two-dimensional cubic nonlinear Schrödinger equation," *Physical Review E*, **68**: 045601(R), 2003.

## II. Book and Technical Reviews

4. J.D. Carter, "A Review of *Mathematica: A Problem-Centered Approach* by R. Hazrat," *SIAM Review*, **53**: 583-585, 2011.
3. J.D. Carter, "A Review of *Mathematica 6*," *SIAM Review*, **50**: 149-152, 2008.
2. J.D. Carter, "A Review of *Maple and Mathematica: A Problem Solving Approach* by I. Shingareva & C. Lizárraga-Celaya," 2007.
1. J.D. Carter, "A Review of *Mathematica 5.0*," *SIAM Review*, **46**: 564-568, 2004.

## Undergraduate Research Students

12. Charles Stoll, "Importance of initial phase in numerical simulations of models of waves on deep water," Spring 2010-present.
11. Hao Nguyen, "High-order, three-way, operator-splitting methods for partial differential equations," Spring 2009-Spring 2010.
10. Natalie Sheils, "Stability of the solitary wave solution of the nonlinear Schrödinger equation with respect to high-frequency perturbations," Summer 2008-Spring 2010.
9. Wilhelmina Chik, "Stability of plane-wave solutions of a dissipative generalization of the vector nonlinear Schrödinger equation," Summer 2007-Spring 2009.
8. Eddie Feeley, "Stability of trivial-phase solutions to a family of nonlinear partial differential equations," Summer 2006-Spring 2008.
7. Leland Jefferis, "Stability of nontrivial-phase solutions of the two-dimensional cubic nonlinear Schrödinger equation," Summer 2006-Spring 2008.
6. Crystal Lee, "Mathematical models of the evolution of surface waves on deep water," Summer 2006-Spring 2007.
5. Cynthia Contreras, "Stability of plane-wave solutions of a dissipative generalization of the nonlinear Schrödinger equation," Summer 2005-Summer 2006.
4. Nathan Canney, "Stability of plane-waves on deep water with dissipation," Fall 2003-Spring 2006.
3. Mona Usmani, "Stability of Jacobi elliptic function solutions to the one-dimensional cubic nonlinear Schrödinger equation," Fall 2005-Spring 2006.

2. William Whitwell, "Stability of solutions to nonlinear partial differential equations," Summer 2004-Spring 2005.
1. Erin Hunt, "Water waves: Comparisons between mathematical predictions and physical experiments," Fall 2002-Spring 2004.

## Presentations

### I. Invited Presentations

14. "Mathematical theory of water waves," Mathematics Seminar, University of Puget Sound, October 2010.
13. "Higher-order symplectic numerical methods for partial differential equations," Mathematics Department Seminar, Pontificia Universidad Católica de Chile, November 2008.
12. "Stability of waves on deep water," Seminario del Departamento de Ingeniería Hidráulica y Ambiental, Pontificia Universidad Católica de Chile, August 2008.
11. "How can mathematics help us understand tsunamis, rogue waves and other wave phenomena?" Big Questions in Science Seminar, Seattle University, October 2007.
10. "What it really takes to get tenure," Collaborative Preparing Future Faculty Network Forum, University of Colorado, March 2007.
9. "Mathematics pedagogy," Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
8. "Communication and mathematics," Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
7. "Computation and technology," Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
6. "Comparisons between physical experiments and dissipative mathematical models of surface waves on deep water," Mining Center Seminar, Pontificia Universidad Católica de Chile, August 2006.
5. "Modeling surface waves in the ocean," Applied and Computational Mathematical Sciences Seminar, University of Washington, January 2003.
4. "Instabilities of traveling-wave solutions of the nonlinear Schrödinger equation," Mathematics Colloquium, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Nacional Autónoma de México, December 2004.
3. "Mathematical models of water waves," Department of Mathematics Noon Seminar, Pennsylvania State University, March 2003.
2. "Instability of bounded solutions of the 2-D nonlinear Schrödinger equation," Applied Mathematics Colloquium, University of Washington, September 2002.
1. "Numerics of the 2-D nonlinear Schrödinger equation and its higher-order generalizations," Nonlinear Waves Seminar, McMasters University, October 2001.

### II. Conference and Workshop Presentations

16. "Kinematics and stability of solutions to the Serre equations," SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010.
15. "Periodic solutions of the Serre equations," AMS Eastern Sectional Meeting, Pennsylvania State University, October 2009.
14. "Stability and shoaling in the Serre equations," IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, March 2009.
13. "Mathematical models of waves including dissipation," Applied Mathematics Workshop, Pontificia Universidad Católica de Chile, August 2008.

12. “Stability of plane-wave solutions to a dissipative generalization of the NLS equation,” SIAM Conference on Nonlinear Waves and Coherent Structures, Università di Roma La Sapienza, Rome, Italy, July 2008.
  11. “Stability of nontrivial-phase solutions to the modified NLS equation,” Nonlinear Waves–Theory and Applications Conference, Tsinghua University, Beijing, China, June 2008.
  10. “Stability of plane-wave solutions to a dissipative generalization of the NLS equation,” Nonlinear Waves–Theory and Applications Conference, Tsinghua University, Beijing, China, June 2008.
  9. “Stability of plane-wave solutions of a dissipative generalization of the NLS equation,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2007.
  8. “Stability of plane waves on deep water with dissipation,” SIAM Conference on Nonlinear Waves and Coherent Structures, University of Washington, September 2006.
  7. “Stability of Stokes’ wave solutions of higher-order generalizations of NLS including dissipation,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2005.
  6. “Instabilities of nontrivial-phase solutions to the cubic nonlinear Schrödinger equation,” SIAM Conference on Nonlinear Waves and Coherent Structures, University of Central Florida, October 2004.
  5. Poster: “Short-wavelength instabilities of solitary wave solutions of the two-dimensional cubic nonlinear Schrödinger equation,” Workshop on Free Surface Water Waves, Field’s Institute, June 2004.
  4. “Preliminary comparisons of physical experiments of waves on deep water with perturbed solutions of NLS,” Workshop on Patterns in Physics, Field’s Institute, November 2003.
  3. “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” AMS Eastern Sectional Meeting, North Eastern University, October 2002.
  2. “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” International Symposium on the Mathematical Theory of Networks and Systems, University of Notre Dame, August 2002.
  1. “Water waves: Comparisons between mathematical predictions and physical experiments,” Fourth Biannual Meeting of the Nonlinear Water Waves Focused Research Group, Pennsylvania State University, April 2002.
- III. Nonlinear Waves Seminar and Seattle University Presentations
15. “The Serre equations,” Nonlinear Waves Seminar, University of Washington, January 2009.
  14. “Stability of plane-wave solutions to a dissipative generalization of the NLS equation,” Nonlinear Waves Seminar, University of Washington, June 2008.
  13. “Higher-order operator splitting techniques,” Nonlinear Waves Seminar, University of Washington, February 2008.
  12. “Stability in fiber-optic communication,” Mathematics Colloquium, Seattle University, March 2008.
  11. Poster: “Waves with dissipation,” Celebration of Faculty Scholarship and Research, Seattle University, April 2007.
  10. Poster: “Waves with dissipation,” Celebration of Faculty Scholarship and Research, Seattle University, April 2006.
  9. “Body Image in Media and Entertainment,” Academic Salon, Seattle University, February 2006.

8. “Nonlinear waves, stability, and instability,” Nonlinear Waves Seminar, University of Washington, January 2006.
7. Poster: “Ocean water waves: A comparison between mathematical predictions and physical experiments,” Celebration of Faculty Scholarship and Research, Seattle University, April 2005.
6. “Nontrivial-phase solutions of the nonlinear Schrödinger equation and their instabilities,” Nonlinear Waves Seminar, University of Washington, October 2004.
5. Poster: “Ocean water waves: A comparison between mathematical predictions and physical experiments,” Celebration of Faculty Scholarship and Research, Seattle University, May 2004.
4. “Higher-order operator splitting as a numerical method for solving ordinary and partial differential equations,” Nonlinear Waves Seminar, Seattle University, June 2004.
3. “Short-wavelength transverse perturbations of elliptic function solutions of NLS,” Nonlinear Waves Group Meeting, Seattle University, October 2003.
2. “Modeling surface waves in the ocean,” School of Science and Engineering Faculty Seminar, Seattle University, November 2002.
1. “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” Nonlinear Waves Group Meeting, University of Washington, June 2002.

### **Grants and External Funding**

6. Conceptual Oral Reviews, September 2011–August 2012. Subcontract award from CU Boulder. SU portion: \$6,557.
5. Collaborative Research in Nonlinear Water Waves, May 2011–June 2014. NSF-DMS 1107476. Total: \$395,000, SU portion: \$134,204.
4. REU Supplemental Award: Comparisons Between Physical Experiments and Mathematical Predictions, September 2003–August 2007. NSF-DMS 0332345. Total: \$33,666, SU portion: \$33,666.
3. Focused Research Group: Fully Nonlinear, Three-Dimensional Surface Water Waves in Arbitrary Depth, August 2002–August 2007. NSF-DMS 0139771. Total: \$770,000, SU portion: \$50,227.
2. SU Summer Faculty Fellowship: 2006, 2010.
1. SU Grant for Student Summer Research: 2005, 2006, 2007 (2), 2008, 2009, 2010.

### **Service and Activities**

#### **I. Professional Service**

21. Member of Organizing Committee for SIAM Workshop on Nonlinear Waves and Coherent Structures, June 2012.
20. Member of Scientific Committee, WAVES 2011, Vancouver, Canada, July 2011.
19. Member of the Scientific Program Committee, IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2011.
18. Co-organized a session entitled “Recent Developments in Mathematical Studies of Water Waves,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2011.
17. Co-organized a minisymposium entitled “Mathematical Models of Water Waves,” SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 2010.
16. Co-founder/organizer of the joint SU/UW Nonlinear Waves Research Group, Fall 2003–Spring 2010.

15. Served on a Project NExT panel on undergraduate research, Pacific Northwest Section Meeting of the MAA, Seattle University, April 2010.
14. Guest editor for an issue of *Mathematics and Computers in Simulation*, 2010.
13. Organized a session entitled “Mathematical Models of Water Waves,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, March 2009.
12. Member of the Scientific Program Committee, IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, March 2009.
11. Organized a session entitled “Patterns in Water Waves,” SIAM Conference on Nonlinear Waves and Coherent Structures, Università di Roma La Sapienza, July 2008.
10. Organized a session entitled “Stability of surface water waves,” IMACS conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2007.
9. Reviewed the engineering mathematics curriculum at the Pontificia Universidad Católica de Chile, August 2006.
8. SIAM Visiting Lecturer, Summer 2006-present.
7. Organized a session entitled “Stability of solutions to nonlinear partial differential equations,” SIAM Conference on Nonlinear Waves and Coherent Structures, University of Washington, September 2006.
6. Organized a session entitled “Recent developments in water waves,” IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2005.
5. Member of Organizing Committee, Workshop on Free Surface Water Waves, Field’s Institute, June 2004.
4. Founding member of SIAM Activity Group on Nonlinear Waves and Coherent Structures, 2004.
3. Hosted Focused Research Group meeting, Seattle University, March 2004.
2. Co-organizer of a session entitled “Nonlinear three-dimensional surface water waves,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2003.
1. Referee for the following journals:
  - *Journal of Fluid Mechanics*
  - *Mathematics and Computers in Simulation*
  - *Natural Hazards and Earth System Sciences*
  - *American Mathematical Monthly*
  - *Applied Mathematics and Physics*

## II. University Service

8. Faculty co-advisor for KSUB (SU student-run radio station), Fall 2001-present.
7. Center for Excellence in Teaching and Learning Peer Consultant, Spring 2009-present.
6. Member of Student Recognition Awards Selection Committee, Spring 2011.
5. Faculty advisor for the SU Ultimate Club Team, Summer 2009-Summer 2010.
4. Member of the Center for Excellence in Teaching and Learning Advisory Board, Fall 2004-Spring 2009.
3. Member of the Center for Excellence in Teaching and Learning Associate Director Hiring Committee, Spring 2006.
2. Judge for the SEAC Battle of the Bands, March 2003.
1. Host for Culture and Language Bridge student interviews, March 2003.

### III. College Service

6. College of Science & Engineering Representative for Prestigious Scholarships, Summer 2010-present.
5. Member of the College of Science and Engineering Academic Grievance Committee, Fall 2004-present.
4. Lead Learning Center discussions on tutoring mathematics, April 2009.
3. Lead Learning Center discussions on tutoring mathematics, April 2008.
2. Directed two classes for the Odyssey Program for Talented Youth, May 2008.
1. Lead a workshop for mathematics and physics faculty entitled "Using *Mathematica 6* in the classroom," April 2008.

### IV. Select Departmental Service

18. Academic advisor for math majors in the class of 2014, Fall 2010-present.
17. Conducted a peer review of a colleague in the Mathematics Department, Winter 2011.
16. Member of the Calculus Textbook Selection Committee, 2011.
15. Chair of the Mathematics Department Committee for the Four-Year Review of Faculty, 2011.
14. Member of the Mathematics Department Committee for the Four-Year Review of Faculty, 2010.
13. Member of the MATH 233/234 Reorganization Committee, 2009-2010.
12. Member of the High-Performance Computer Purchase Committee, 2009-2010.
11. Member of the Mathematics Department Committee for the Tenure and Promotion Review of Faculty, 2009.
10. Proctored and graded math placement exams, 2005, 2006, 2007, 2009.
9. Conducted a peer review of a colleague in the Mathematics Department, Winter 2008.
8. Member of the Mathematics Department Committee for the Four-Year Review of Faculty, 2008.
7. Member of the Technology in the Calculus Sequence Committee, 2007-2008.
6. Member of the Departmental Process Review Committee, 2007.
5. Chair of MATH 118 Curriculum Review Committee, Spring 2007.
4. Chair of MATH 120 textbook review/selection committee, Spring 2004.
3. Member of the Engagement With Our NW Location Committee, Fall 2003.
2. Chair of the MATH 120/121/131 Assessment Subcommittee, Fall 2002.
1. Member of the MATH 120 Textbook Committee, 2002.

### Computer Skills

- Mathematica, Matlab, and Maple
- Fortran, C, and C++ programming languages
- LaTeX and HTML formatting tools
- Unix, Windows, and Macintosh platforms
- Sun Microsystems Certified Java Programmer
- Sun Microsystems Certified Java Academic Instructor

### Select Awards and Fellowships

- Nominated for the College of Arts and Sciences Outstanding Professor Award, 2003
- Nominated for the College of Arts and Sciences Outstanding Professor Award, 2002
- CU Boulder Certified Graduate Teacher
- NSF VIGRE Fellowship, 1999-2001
- CU Boulder Graduate Student Teaching Excellence Award, 1998
- Department of Applied Mathematics Outstanding Teaching Award, 1997,1998