

John D. Carter

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Current Position:

- Associate Professor, Mathematics Department, Seattle University
 - Teaching interests: calculus, differential equations, applied mathematics and numerical analysis
 - General research interests: applied mathematics, mathematical physics, partial differential equations, numerical analysis
 - Current research emphasis: nonlinear waves, fluid mechanics, stability, fast algorithms for partial differential equations

Education:

- PhD Applied Mathematics, University of Colorado, December 2001
 - Thesis Title: Stability and Existence of Traveling Wave Solutions of the 2-D Nonlinear Schrödinger Equation and its Higher-Order Generalizations
 - Thesis Advisor: Harvey Segur
- MS Applied Mathematics, University of Colorado, August 1997
- Semester in the Southwest graduate, National Outdoor Leadership School, 1994
- BS Mathematics, University of Puget Sound, May 1994

Teaching Experience:

- MATH 118: Business Algebra, F'05
- MATH 120: Precalculus, F'02, F'03, W'04, W'08
- MATH 130: Business Calculus, F'06
- MATH 134: Calculus I, W'03, F'07, F'09
- MATH 135: Calculus II, F'01, W'02, F'04
- 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
- MATH 361: Applied Mathematics I, W'04, W'06, W'08
- MATH 371: Numerical Methods, W'05, W'07
- MATH 391: Hamiltonian and Lagrangian Mechanics, W'06
- ICH 3800: Nonlinear Water Waves (at Universidad Católica de Chile), 2nd '08

Research Students:

- Hao Nguyen, “High-order three-way operator-splitting numerical methods for partial differential equations,” April 2009-present.
- Natalie Sheils, “Stability of the solitary wave solution of the nonlinear Schrödinger equation with respect to high-frequency perturbations,” May 2008-present.
- Wilhelmina Chik, “Stability of plane-wave solutions of a dissipative generalization of the vector nonlinear Schrödinger equation,” Summer 2007-Spring 2009.

- Eddie Feeley, “Stability of trivial-phase solutions to a family of nonlinear partial differential equations,” Summer 2006-Spring 2008.
- Leland Jefferis, “Stability of nontrivial-phase solutions of the two-dimensional cubic nonlinear Schrödinger equation,” Summer 2006-Spring 2008.
- Crystal Lee, “Mathematical models of the evolution of surface waves on deep water,” Summer 2006-Spring 2007.
- Cynthia Contreras, “Stability of plane-wave solutions of a dissipative generalization of the nonlinear Schrödinger equation,” Summer 2005-Summer 2006.
- Nathan Canney, “Stability of plane-waves on deep water with dissipation,” Fall 2003-Spring 2006.
- Mona Usmani, “Stability of Jacobi elliptic function solutions to the one-dimensional cubic nonlinear Schrödinger equation,” Fall 2005-Spring 2006.
- William Whitwell, “Stability of solutions to nonlinear partial differential equations,” Summer 2004-Spring 2005.
- Erin Hunt, “Water waves: comparisons between mathematical predictions and physical experiments,” Fall 2002-Spring 2004.

Publications:

- J.D. Carter, “Stability of plane-wave solutions of a dissipative generalization of the vector nonlinear Schrödinger equation,” *Submitted to Mathematics and Computers in Simulation*, 2009.
- J.D. Carter and R.E. Cienfuegos, “Periodic solutions of the Serre equations,” *Submitted to Physics of Fluids*, 2009.
- 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.
- J.D. Carter, “A Review of *Mathematica 6*,” *SIAM Review*, **50**: 149-152, 2008.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- J.D. Carter, “A Review of *Mathematica 5.0*,” *SIAM Review*, **46**: 564-568, 2004.
- J.D. Carter and H. Segur, “Instabilities in the two-dimensional cubic nonlinear Schrödinger equation,” *Physical Review E*, **68**: 045601(R), 2003.

Invited Presentations:

- “Higher-order symplectic numerical methods for PDEs,” Mathematics Department Seminar, Pontificia Universidad Católica de Chile, November 2008.
- “Stability of waves on deep water,” Department of Hydraulic Engineering Seminar, Pontificia Universidad Católica de Chile, August 2008.
- “How can mathematics help us understand tsunamis, rogue waves and other wave phenomena?,” Big Questions in Science Seminar, Seattle University, October 2007.
- “What it really takes to get tenure,” Collaborative Preparing Future Faculty Network Forum, University of Colorado, March 2007.
- “Mathematics Pedagogy,” Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
- “Communication and Mathematics,” Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
- “Computation and Technology,” Special Joint Engineering and Mathematics Seminar, Pontificia Universidad Católica de Chile, August 2006.
- “Comparisons between physical experiments and dissipative mathematical models of surface waves on deep water,” Mining Center Seminar, Pontificia Universidad Católica de Chile, August 2006.
- “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.
- “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” Applied Mathematics Colloquium, University of Washington, September 2002.
- “Numerics of the 2-D nonlinear Schrödinger equation and its higher-order generalizations,” Nonlinear Waves Seminar, McMaster University, October 2001.

Presentations:

- “Periodic solutions of the Serre equations,” AMS Meeting, Pennsylvania State University, October 2009.
- “Stability and shoaling in the Serre equations,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, March 2009.
- “The Serre equations,” Nonlinear Waves Seminar, University of Washington, January 2009.
- “Mathematical models of waves including dissipation,” Applied Mathematics Workshop, Pontificia Universidad Católica de Chile, August 2008.
- “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.
- “Stability of nontrivial-phase solutions to the modified NLS equation,” Nonlinear Waves–Theory and Applications Conference, Tsinghua University, Beijing, China, June 2008.
- “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.
- “Stability of plane-wave solutions to a dissipative generalization of the NLS equation,” Nonlinear Waves Seminar, University of Washington, June 2008.
- “Stability in Fiber-Optic Communication,” Mathematics Colloquium, Seattle University, March 2008.

- “Higher-order operator splitting techniques,” Nonlinear Waves Seminar, University of Washington, February 2008.
- “Stability of plane-wave solutions of a dissipative generalization of NLS,” IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2007.
- Poster: “Waves with dissipation,” Celebration of Faculty Scholarship and Research, Seattle University, April 2007.
- “Stability of plane waves on deep water with dissipation,” SIAM Conference on Nonlinear Waves and Coherent Structures, University of Washington, September 2006.
- Poster: “Waves with dissipation,” Celebration of Faculty Scholarship and Research, Seattle University, April 2006.
- “Body Image in Media and Entertainment,” Academic Salon, Seattle University, February 2006.
- “Nonlinear waves, stability and instability,” Nonlinear Waves Seminar, University of Washington, January 2006.
- “Stability of Stokes’ wave solutions of higher-order generalizations of NLS including dissipation,” IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2005.
- Poster: “Ocean water waves: A comparison between mathematical predictions and physical experiments,” Celebration of Faculty Scholarship and Research, Seattle University, April 2005.
- “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.
- “Nontrivial-phase solutions of the nonlinear Schrödinger equation and their instabilities,” Nonlinear Waves Seminar, University of Washington, October 2004.
- 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.
- “Higher-order operator splitting as a numerical method for solving ordinary and partial differential equations,” Nonlinear Waves Seminar, Seattle University, June 2004.
- Poster: “Ocean water waves: A comparison between mathematical predictions and physical experiments,” Celebration of Faculty Scholarship and Research, Seattle University, May 2004.
- “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.
- “Short-wavelength transverse perturbations of elliptic function solutions of NLS,” Nonlinear Waves Group Meeting, Seattle University, October 2003.
- “Mathematical models of water waves,” Department of Mathematics Noon Seminar, Pennsylvania State University, March 2003.
- “Modeling surface waves in the ocean,” Applied and Computational Mathematical Sciences Seminar, University of Washington, January 2003.
- “Modeling surface waves in the ocean,” School of Science and Engineering Faculty Seminar, Seattle University, November 2002.

- “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” North Eastern AMS Meetings, North Eastern University, October 2002.
- “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” The 15th International Symposium on the Mathematical Theory of Networks and Systems, University of Notre Dame, August 2002.
- “Instability of bounded solutions of the 2-D nonlinear Schrödinger equation,” Nonlinear Waves Research Group, University of Washington, June 2002.
- “Water waves: comparisons between mathematical predictions and physical experiments,” Fourth Biannual Meeting of the Nonlinear Water Waves FRG, Pennsylvania State University, April 2002.

Grants and External Funding:

- Summer Research Stipend for Natalie Sheils, Summer 2009.
- Summer Research Stipend for Natalie Sheils, Summer 2008.
- Summer Research Stipend for Eddie Feeley, Summer 2007.
- Summer Research Stipend for Leland Jefferis, Summer 2007.
- Seattle University Summer Faculty Fellowship, Summer 2006.
- Summer Research Stipend for Cynthia Contreras, Summer 2005.
- NSF-DMS: REU Supplemental Award: Comparisons Between Physical Experiments and Mathematical Predictions. September 2003-August 31, 2007. Amount: \$33,666.
- NSF-DMS: Focused Research Group: Fully Nonlinear, Three-Dimensional Surface Water Waves in Arbitrary Depth. August 15, 2002-August 31, 2007. Amount: \$50,227.

Service:

- Proctored and graded mathematics placement exam, September 2009.
- Faculty Advisor for the Seattle University Ultimate Club Team, July 2009-present.
- Refereed a paper for *Journal of Fluid Mechanics*, July 2009.
- Center for Excellence in Teaching and Learning Peer Consultant, Spring 2009-present.
- Lead a Learning Center discussion on tutoring mathematics, April 2009.
- Organized a session entitled “Mathematical Models of Water Waves,” at the IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, March 2009.
- Member of the Scientific Program Committee for the sixth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, March 2009.
- Organized a session entitled “Patterns in Water Waves” at the SIAM Conference on Nonlinear Waves and Coherent Structures, July 2008.
- Refereed a paper for *Journal of Applied Mathematics and Physics*, July 2008.
- Lead two classes for the Odyssey Program for Talented Youth, May 2008.
- Lead a workshop for math and physics faculty entitled “Using *Mathematica 6* in the classroom,” April 2008.
- Lead a Learning Center discussion on tutoring mathematics, April 2008.
- Conducted a peer review for a faculty member in the Mathematics Department, Winter 2008.
- Member of Mathematics Department Committee for the Fourth-Year Review of Faculty, 2008.

- Book reviewer for *SIAM Review*.
- Member of the Technology in the Calculus Sequence Committee, 2007-2008.
- Refereed two papers for *Mathematics and Computers in Simulation*, Fall 2007.
- Proctored and graded mathematics placement exam, September 2007.
- Organized a session entitled “Stability of surface water waves” at the IMACS conference on Nonlinear Evolution Equations and Wave Phenomena, April 2007.
- Member of the Departmental Process Review Committee, 2007.
- Chair of Math 118 Curriculum Review Committee, Spring 2007.
- Proctored and graded mathematics placement exam, September 2006.
- SIAM Visiting Lecturer, Summer 2006-present.
- Organized a session entitled “Stability of solutions to nonlinear partial differential equations” at the SIAM Conference on Nonlinear Waves and Coherent Structures, September 2006.
- Member of the Center for Excellence in Teaching and Learning Associate Director Hiring Committee, Spring 2006.
- Proctored and graded mathematics placement exam, September 2005.
- Organized a session entitled “Recent developments in water waves” at the Fourth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, April 2005.
- Member of the Center for Excellence in Teaching and Learning Advisory Board, Fall 2004-Spring 2009.
- Member of the College of Science and Engineering Academic Grievance Committee, Fall 2004-present.
- Organizing committee member, Workshop on Free Surface Water Waves, Field’s Institute, June 2004.
- Founding member of SIAM Activity Group on Nonlinear Waves and Coherent Structures, 2004.
- Hosted Focused Research Group meeting at Seattle University, March 2004.
- Organized a Math Club talk given by Diane Henderson, “Experiments and models of surface waves on deep water,” March 2004.
- Chair of Math 120 textbook review/selection committee, Spring 2004.
- Co-organizer of a session entitled “Nonlinear three-dimensional surface water waves,” Third IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, April 2003.
- Judge for the SEAC Battle of the Bands, March 2003.
- Host for the KSUB CLB student interviews, March 2003.
- Co-organizer of the joint SU/UW Nonlinear Waves Research Group, Fall 2003-present.
- Member of the “Engagement with our northwest location” departmental committee as part of the program review, Fall 2003.
- Chaired the MATH 120/121/131 Assessment Subcommittee, Fall 2002.
- Reviewed an article for the American Mathematical Monthly, August 2002.
- Member of the MATH 120 textbook committee, 2002.
- Guest lectured on the numbers zero and infinity in Father Foster’s Matteo Ricci class, 2002.
- Consultant for KSUB (SU student-run radio station), Fall 2001-present.

Computer Skills:

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

Selected 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, Fall 1999-2001
- CU Boulder Graduate Student Teaching Excellence Award, 1998
- Department of Applied Mathematics Outstanding Teaching Award, 1998
- Department of Applied Mathematics Outstanding Teaching Award, 1997
- Graduate School University Fellowship, 1996