Curriculum Vitae – Dr. Russell L. Herman

Short CV – March 2022

Mathematics & Statistics/ Physics & Physical Oceanography
University of North Carolina Wilmington
Wilmington, NC 28403

Phone: (910)-962-3722
Email: hermanr@uncw.edu
Web pages: http://people.uncw.edu/hermanr

Education

Ph.D. Physics, Clarkson University – 1988
M.Sc. Mathematics, Clarkson University - 1986.
B.A. Mathematics, Empire State College (SUNY) - 1981
M.A. Physics, Temple University - 1982
Physics/Math Major, Temple University - 1969-1972.

Professional Experience

Assistant Chair/Undergraduate Coordinator, Mathematics and Statistics, UNCW, 2015-2019, 2020-present
Interim Chair, Mathematics and Statistics, UNCW, 2019-2020
Professor, Physics and Physical Oceanography, UNC Wilmington, 2008-present
Professor, Mathematics and Statistics, UNC Wilmington, 2006-present
Asst. Chair, Physics and Physical Oceanography, UNC Wilmington, Spring 2012
Chair, Physics and Physical Oceanography, UNC Wilmington, 2009-2011
Editor-in-Chief, Journal of Teaching Effectiveness, 2006-2017
Faculty Associate for the Center for Teaching Excellence, UNC Wilmington, 1997-2016
Associate Professor in Mathematical Sciences, UNC Wilmington, 1993-2006
Assistant Professor in Mathematical Sciences, UNC Wilmington, 1990-1993
Visiting Assistant Professor in Mathematics, St. Lawrence University, 1988-1990
Instructor in Physics, Clarkson University, Summer 1988

Other Experience

Editor-in-Chief, The Journal of Teaching Excellence, 2006-2017.
Faculty Associate for the Center for Teaching Excellence, 1997-2015.
Faculty Professional Relations Committee Chair, 2013-2015.
Academic Standards Committee Chair, 1999-2009.
Department Webmaster: Math- 1996-2009, Physics- 2009-2012.
Graduate Faculty, 1991-.

Fields of Interest

Mathematical Physics, Nonlinear wave equations, Integrable and Near Integrable Systems, Dynamical Systems and Chaos, General Relativity, Geometric Methods for PDE's, Integral and Discrete Transforms (including Signal and Image Processing, Shannon Sampling Theory), Numerical Analysis and Instructional Technology.

Recent Recognitions

1. **Outstanding APS Referee**, American Physical Society, https://journals.aps.org/OutstandingReferees - 2018
2. Jack Charles Hall Award, Science Olympiad Wilmington Region 2010 Award Recipient, March 2010
3. Discere Aude Award, Dec 2009 - Chancellor's award for student mentoring
4. **UNC Board of Governor's Award** for Excellence in Teaching, 2006.
5. Induction into **Million Dollar Club**, Office of Research and Sponsored Programs, UNCW, 2006.
6. Carnegie U.S. Professor of the Year Award Nominee, 2006.
7. **Distinguished Teaching Professorship Award**, UNCW, 2005-2008.
8. **Chancellor's Teaching Excellence Award**, UNCW, 2005.
9. **Research and Innovation Award**, medallion awarded by ITSD for innovative use of technology, 2005.

Select Publications

1) *An Introduction to Fourier Analysis*, CRC Press/Taylor & Francis Group, 2016.
2) *A Course in Mathematical Methods for Physicists*, CRC Press/Taylor & Francis Group, 2013.
3) Other Texts in progress and online:
   a) *Introduction to Partial Differential Equations* - Fall 2014-Spring 2015, 2020
   b) *A First Course in Partial Differential Equations* - 2017-2020
   c) *A First Course in Differential Equations for Scientists and Engineers* - June 2014-2018
   d) *Solving Differential Equations Using Simulink* - 2015-2020

4) "Perturbed soliton solutions for an integral modified KdV equation", Communications in Nonlinear Science and Numerical Simulation. Vol. 91, December 2020, 105437, jointly with M. Saravanan.
5) "Numerical Realizations of Solutions of the Stochastic KdV Equation", Mathematics and Computers in Simulation, Volume 80, Issue 1, September 2009, Pages 164-172, Nonlinear Waves: Computation and Theory VII.
6) "Open Source Resources for Teaching and Research in Mathematics", Proceedings of the Twentieth International Conference on Technology in Collegiate Mathematics. Addison Wesley (NR), 2009, jointly with G. Lugo.
7) Numerous Letters from the Editor, *Journal of Effective Teaching*, 2007-2017.
8) "Recreational boating traffic: A chronic source of anthropogenic noise in the Wilmington North Carolina Intracoastal Waterway", J. Acoust. Soc. Am. 122 (1), July 2007, p.151-160, 2007, jointly with Haviland-Howell, Frankel, Powel, Bocconcelli, Sayigh.
9) "Introducing Michaelis–Menten Kinetics through Simulation", J. Chem. Educ. 2007 84 434-437, jointly with C. J. Halkides.
10) "iPods: Reducing Mathematics to Sound/Video Bites", Proceedings of the Nineteenth International Conference on Technology in Collegiate Mathematics. Addison Wesley (NR), 2008, jointly with G. Lugo
11) "Tablet PC's in Mathematics: The VLC Project", Proceedings of the Eighteenth International Conference on Technology in Collegiate Mathematics. Addison Wesley (NR), 146-150, 2007, jointly with G. Lugo.
12) "Exploring the Connection Between Quasistationary and Squared Eigenfunction Expansion Techniques in Soliton Perturbation Theory", Proceedings of the 2004 World Conference of Nonlinear Analysts, Nonlinear Analysis, 63, e2473-e2482, 2005.
13) "Project Numina: Enhancing Student Learning with Handheld Computers", jointly with Barbara Heath, Gabriel Lugo, James Reeves, Ron Vetter, and Charles R. Ward, IEEE Computer Magazine, June 2005, pp 46-53. *Feature article in a special issue on computers in education.*
14) "Developing a Mobile Learning Environment to Support Virtual Education Communities", jointly with Barbara Heath, Gabriel Lugo, James Reeves, Ron Vetter, and Charles R. Ward, T.H.E. Journal, 32(8), March 2005 pp 33-37.
15) "Quasistationary Perturbations of the KdV Soliton", J. Phys. A., 37 4753-4767, 2004.

Grants (2000-2015)

1. Scientist Contributor on NSF Noyce Capacity Building Grant for STEM Teacher Education Program, 2015, $299,974.
2. CTE Summer Curriculum Initiative, 2013, $3000.
3. "Increasing and Retaining STEM Majors through Virtual Learning Communities", jointly with Ward, C., Reeves, J., Vetter, Reeves, J., Lugo, G., & Cohen, D. National Science Foundation, $124,485, 2005.
4. "Integrating Digital Libraries and Traditional Libraries: A Model for Sustaining NSDL Collections", jointly with Ward, C., Reeves, J., Vetter, R., Cody, S., Pfohl, D., Reeves, J., Dillaman, R., & Lugo, G., NSF, $425,000, 2003.
5. UNCW grants from Provost's Office to the Numina Group, totaling $77,000, 2000, 2002.
6. Supplemental funding for A Digital Library of Reusable Science and Math Resources for Undergraduate Education, jointly with Dr. C. Ward, Dr. G. Lugo, Dr. R. Dillaman, Dr. J. Reeves, NSF, $69,635, 2002.
7. "Integrating Interactive Media in the Chemistry Laboratory with Pocket PCs and Wireless Networking", C. Ward, J. Reeves, R. Vetter, G. Lugo, B. Heath, ITSD 2001-2002 Award for Information Technology Innovation, $14,733, 2002.
8. Project Numina: Innovative Integration of Media into Science and Mathematics Curricula, with Charles R. Ward, David White, Jimmy Reeves, Gabriel Lugo, and Ron Vetter, Funded by UNCW, Pearson Education, and Hypercube; Award for $156,257; Grant period: August 15, 2000 – December 31, 2001."
9. Assessment of Underwater Ambient noise using a novel signal acquisition system linked to the Web: Applications for Teaching and Research", jointly with Laela Sayigh, Genevieve Haviland, and Alessandro Bocconcelli, ITSD 2000-2001 Award for Information Technology Innovation, $15,000, 2000.
10. "A Digital Library of Reusable Science and Math Resources for Undergraduate Education", jointly with Dr. C. Ward, Dr. G. Lugo, Dr. R. Dillaman, Dr. J. Reeves, NSF, $1,143,282, 2000. (3 year grant)

Curriculum Vitae – Dr. Russell L. Herman

Short CV – March 2022

Lectures Presented (2003-2021)

1. “Rainbows and Caustics,” Graduate Seminar, October 25, 2021.
2. “An Intriguing ODE,” Graduate Seminar, March 15, 2021.
3. “Nonlinear Waves in Physics: From Solitary Waves and Solitons to Rogue Waves,” Invited 1hr Webinar, SRM Institute of Science and Technology Ramapuram, May 13, 2020.
4. “When Black Holes Collide,” STEM Society, OLLI (Osher Lifelong Learning Institute), 2hrs, March 5, 2020.
5. “How Many Atoms Does It Take to Show 15 = 3(5)?,” UNCW College Day, November 16, 2019.
6. "Asymptotic Solutions to Hard Problems," Graduate Seminar, Nov 2018.
7. “Introducing Elliptic Functions via Simulations of Nonlinear Differential Equations,” MAA-SE 2018, Clemson, SC, March 2018.
8. Chaos and Stability in the Solar System," UNCW Graduate Seminar, Feb 13, 2018.
9. "Fractals in Nature and Mathematics: From Simplicity to Complexity", STEM Society, OLLI (Osher Lifelong Learning Institute), October 13, 2017.
10. "Sensor Overload for iSTEM Experimental Design, Collection, Graphing, and Analysis of Data," UNCW Integrated STEM conference, May 20, 2017.
11. "Can One Hear the Shape of a Drum?," Student Awards Ceremony Keynote, April 11, 2017.
12. "Is Time Real or an Illusion? The Physics of Time", OLLI (Osher Lifelong Learning Institute), Feb 16, 2017.
13. "From Solitary Waves to Rogue Waves Solutions of Nonlinear Evolution Equations," UNCW Graduate Seminar, Jan 26, 2017.
14. "Listening for Einstein's Ripples in the Fabric of the Universe," UNCW College Day, October 29 2016.
15. "Online Publishing," 21st Century Publishing, panel member, UNCW, Sep 28 2016.
16. “Solving ODEs with Simulink,” ICTCM, Atlanta GA, March 11, 2016.
17. "Cooking with a Pinch of Physics and a Dash of Math," UNCW College Day, Oct 24, 2015.
18. "Open Access in Teaching and Research," Open Access Week panel member, UNCW, Oct 19 2015.
19. "Spherical Turkeys and Vibrating Balloons," MAA-SE 2015, Wilmington, NC, March 2015.
20. "Butterflies, Ferns, and Fractal Landscapes: The Emergence of Complexity from Simple Systems," UNCW College Day, Oct 25, 2014.
21. "The Ends of Time", panel on "Does Anybody Really Know What Time It Is?", UNCW, Feb 20, 2013.
22. “Window to the Dark Side of the Universe”, OLLI (Lifelong Learning Institute), March 2, 2012.
23. “Budget Cuts Threaten Physics Departments. Is Your Department Next?”, SEASAPS Invited Talk and Discussion, Asheville, NC, Fall 2011.
24. “Going Rogue: From 'The Great Wave of Translation' to Rogue Ocean Waves”, UNCW College Day, Nov 12, 2011.
25. “Mathematics and Physics in the Movies”, UNCW College Day, Nov, 2010.
26. “Are Solitary Waves Color Blind to Noise?”, MAA-SE 2008, Charleston, SC, March 2008.
27. “Open Source Resources for Teaching and Research in Mathematics”, Twentieth International Conference on Technology in Collegiate Mathematics, San Antonio, TX, March, 2008, jointly with G. Lugo.
28. “Mobile Learning Environments and Virtual Mathematics Spaces”, MAA-AMS Joint Meetings, San Diego, CA, Jan 2008.
29. “Physics Bytes: Podcasting in the Physics Classroom”, AAPT Summer Meeting, Greensboro, NC, July 2007.
30. “How Small is Small?", UNCW Chapter of the Society for Physics Students, April 2007.
31. “Numerical Realizations of Solutions of the Stochastic KdV Equation”, The Fifth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, April 2007.
32. “iPods: Reducing Mathematics to Sound/Video Bites”, Nineteenth International Conference on Technology in Collegiate Mathematics, Boston, MA, February, 2007, jointly with G. Lugo.
33. “TiddlyWiki Math: Course Pages with Embedded Math”, Nineteenth International Conference on Technology in Collegiate Mathematics, Boston, MA, February, 2007, jointly with G. Lugo.
34. “What Should Undergraduates Know About Gravitation?”, UNCW Physics, November, 2006.
35. “How Does a PDE Chef Bake a Cake?”, 26th Annual Southeastern-Atlantic Regional Conference on Differential Equations, University of North Carolina at Greensboro, Greensboro, NC, October, 2006.
36. “Lessons on Teaching General Relativity and Differential Geometry Courses”, AAPT Workshop Syracuse, NY, July 2006, poster.
37. “Numerical Realizations of the Stochastic KdV Equation With and Without Damping”, SIAM, Boston, MA, July 2006.

38. "Using Math Journal and Other Pen-Driven Software in the Classroom", Eighteenth International Conference on Technology in Collegiate Mathematics, Orlando, FL, March, 2006, given by G. Lugo.
39. "Tablet PC's in Mathematics: The VLC Project", Eighteenth International Conference on Technology in Collegiate Mathematics, Orlando, FL, March, 2006, given by G. Lugo.
40. "Predicting the Future of the Solar System: Nonlinear Dynamics, Chaos and Stability", UNCW Physics, February 2006.
41. "Harmonic Analysis and the Prediction of Tides", Mathematics and Statistics Department Seminar, Fall 2005.
42. "Revisiting Quasistationary Perturbation Theory for Equations in 1+1 Dimensions", SIAM-SEAS 2005 Charleston, SC, March 2005.
43. "Card Shuffling as a Dynamical System", UNCW Mathematics and Statistics Department Seminar, Fall 2004.
44. "Explorations of Signal Processing in High School and Beyond", Seventeenth International Conference on Technology in Collegiate Mathematics, Orlando, FL, Nov. 2004, jointly with G. Lugo.
45. "Review of Mathematics Software for Pocket PCs", Seventeenth International Conference on Technology in Collegiate Mathematics, Orlando, FL, Nov. 2004, jointly with G. Lugo.
46. "Exploring the Connection Between Quasistationary and Squared Eigenfunction Expansion Techniques in Soliton Perturbation Theory", Proceedings of the 2004 World Conference of Nonlinear Analysts, Orlando, FL, July 2004.
47. "Transfer Matrix Approach to Solving Linear Geostrophic Wave Equations" Southeastern Section of the American Physical Society, November 2003.
48. "Maxima, LaTex and Maple in Pocket PC's", Sixteenth ICTCM, Chicago, IL, Nov. 2003, jointly with G. Lugo.
49. "Soliton Propagation in Optical Fibers", March 21, 2003, Physics Department, UNCW.

Graduate Thesis Committees and Projects (2001-present)

1. Kellyann Cook, Quantum FFT, **advisor**, 2022.
2. Sarah Gonka, Knot Theory, **advisor**, 2022.
3. Kevin Cosnahan, "Asymptotic Analysis of 1D Path Integrals via Resurgence," **advisor**, 2021.
4. Rachel Willis, "Hidden Markov Model Application for Unsupervised Machine Learning Clustering of Waveform Data During Induced Seismicity," **advisor**, 2020.
5. Carlos Ramos, "Exploring the Hodgkin-Huxley Action Potential Model," **advisor**, 2019.
6. Michael Byrd, "Using Quantum Algorithms to Solve Linear Systems," **advisor**, 2019.
7. Trinity White, "Lattice Based Cryptanalysis of NTRU and RSA," 2019.
8. Christine Craib, "Disease Transmission Dynamics with a Demographic Allee Effect," 2019.
9. Troy Kling, "The Distance Between c^n and Z," 2018.
10. Greg Johnson, "Geometric Approaches to the Characterization of Qubits and Entanglement," **advisor**, 2017.
11. Samuel T. Pickett, "The Mathematics of Color Sensing," 2017.
12. Nikolai D. Lipscomb, "Semi-Lagrangian Numerical methods for systems of Time-dependent Partial Differential Equations," 2016.
13. Kevin Carlin, project, "The AKNS System, Loop Solitons, and Backlund Transformations.," project, 2015.
14. Cody Ashby, project, "Defining and Applying Fractional Calculus," project, 2015.
15. Sofya Zaytseva, "Periodic Solutions and Turing Patterns in an Autocatalator Model," 2014
16. Daniel Hancock, "Quaternionic Approach to the Spinning Top with Simulations in MATLAB," 2014
17. Caylah Retz, "Symmetries of the *K(m,n)* Dispersion Equation," **advisor**, 2012.
18. Gary Crosby, "Geodesic Solutions of the Morris-Thorne Wormhole", 2012
19. Kara Blalock, "Spiral Waves in Cartesian, Polar, and Spherical Geometries", **advisor**, 2010
20. Larry Tingen, "The Julia and Mandelbrot Sets for the Hurwitz Zeta Function", **advisor**, 2009.
21. Rebecca Wilkinson, "Numerical Explorations of Cake Baking Using the Nonlinear Heat Equation", **advisor**, 2008.
22. David Neal, "Finite Difference Approximations of Advection-Diffusion Equations for Modeling Shark Populations", **advisor**, 2007.
23. Chris Canady, "Examination of Tidal Currents in Onslow Bay Measured by Moored Acoustical Doppler Current Profilers", Marine Science, 2007.
24. Andrew Rose, "Numerical Simulations of the Stochastic KdV Equation", **advisor**, 2006.
25. Ben Speckhart, "Shallow Water Response to Hurricanes in Onslow Bay, N.C", Marine Science, 2004
26. Genevieve Haviland, "Recreational boating traffic and environmental noise in the Wilmington, North Carolina intracoastal waterway: possible implications for bottlenose dolphins", Biology, 2002.

27. Sarah Ives, "Julia and Mandelbrot Sets of Riemann Zeta Function", **advisor** 2001.
28. Curtis Wayne Martin, Synchronization in Communications, **advisor** 2001, not completed.
29. Srinath Vadlamani, "Lie Symmetries of the Vaidya Equations", **advisor** 2001.
30. Michael Key, "Rossby Wave Scattering in the Two-Layer Model", **advisor** 2001.

Honors Thesis

Hayley Urbanek, Hyperbolic Knot Complements, 2022.
Christian Koertje, "Relativistic Dynamics: A Journey to the Center of a Black Hole," Advisor, Spring 2021.
Hassan Mason, "Lattice Boltzmann Method," Advisor, Spring 2019.
Rachel Willis, "Application of Spherical Harmonics to Elasto-gravitational Deformations of the Earth, Advisor," Spring 2019.
Nicholas Sterling, "Symmetries in Relativistic Quantum Mechanics," Physics, Advisor, Spring 2018.
Elizabeth Eakin, "Probing the Mandelbrot Set," Mathematics, Advisor, Spring 2017.
William Fox, "Exposition on Gravitational Wave Theory and Detection," Physics, Advisor, Fall 2016.
Nicolas Corak, "Designing a PER-Based Introductory Physics Lab," Physics, Advisor, Fall 2010.
Erik Minges, "Numerical Simulation of Air Pollution Dynamics Due to Point Source Emissions from an Industrial Stack," Physics, Advisor, 2010.
Lisa Soberano, "The Mathematical Foundation of Image Compression," Mathematics, Advisor, 2000.
Scott Watson, "An Exposition on Inflationary Cosmology," Physics, CoAdvisor, 2000.

Selected Service to Professional Organizations

1. Chair, local organizing committee for MAA-SE Section Meeting, Wilmington, NC, March 12-14, 2015.
2. Committee on Technologies in Mathematics Education (CTiME), MAA. Member. 2009-2012, 2012-2015.
3. Web SIGMAA - Attended Annual Meetings 2008-2015.
4. MAA Faculty Liaison, 2004-2016.
5. Partner in Mathematics Gateway/MathDL, Meetings in Washington, DC, 2004-2006, 2008, 2010,2011.
6. Chair -Committee on Mathematics Taxonomy -Authored Core Subject Taxonomy for Mathematics Education - National Group - reported in FOCUS Aug/Sep 2002 and at NSDL web site, May 2002.
7. Mathematical Sciences Conference Group on Digital Educational Resources- Member 2001-? Chair of the Committee on Mathematics Taxonomy; authored Core Subject Taxonomy for Mathematics Education.
8. Chaired Session at Differential Equations and Dynamical Systems Conference, UNCW, May 2002
9. Referee for American Journal of Physics, Physical Review Letters, Physical Review, Physics Letters A and Physical Review E, Journal of Physics A, and Inverse Problems. Others: IEEE Transactions on Plasma Science, Optics Letters, Arabian Journal of Scientific Engineering, Wave Motion, Journal of Mathematical Physics, and Astronomische Nachrichten/ Astronomical Notes, Physica D.
10. Reviewed grant proposals for Cooperative Grants Program U.S. Civilian Research & Development Foundation, 2001, 2003.
11. Member – APS, MAA, AMS, SIAM, AAPT
12. Event Leader for Science Olympiad, 1993-2020.
13. Judge, Southeastern Regional Science Fair, 2014-2022.