Curriculum Vitae

Anastassiya Semenova

Postdoctoral Fellow,
Institute for Computational and
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EDUCATION

Ph.D Applied Mathematics, Department of Mathematics and Statistics, University of New Mexico, Fall 2020
"*Numerical Simulations of Nonlinear Waves and Their Stability: Stokes Waves and Nonlinear Schrödinger Equation*", Advisors: A. O. Korotkevich (alexkor@math.unm.edu) and P. M. Lushnikov (plushnik@unm.edu)

M.S. Applied Mathematics, Department of Mathematics and Statistics, University of New Mexico, December 2016, Advisors: A. O. Korotkevich and P. M. Lushnikov

B.S. Mathematics with Summa Cum Laude, Department Honors, Summa Cum Laude per the faculty, University of New Mexico, Department of Mathematics and Statistics, May 2013
"*Visualization and Algorithm for simulations of electro-magnetic field in an elementary cell of a layer of metamaterial*", Advisor: A. O. Korotkevich

EMPLOYMENT

Fall 2021–Spring 2022 Postdoctoral Fellow at the Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University

Fall 2013–Spring 2020 Teaching/Research Assistant, Department of Mathematics and Statistics, University of New Mexico

AWARDS

May 2020 Outstanding Graduate Student in Research, Award in Applied Mathematics as voted by the faculty, University of New Mexico

June 2018 SIAM Student Travel Award: 2018 SIAM Conference on Nonlinear Waves and Coherent Structures

May 2018 SIAM Student Chapter Certificate of Recognition for Outstanding Efforts and Accomplishments (Chapter at the University of New Mexico)

April 2017 Travel Support Award: Water Waves Workshop At The Institute for Computational and Experimental Research (ICERM) at Brown University

March 2017 Best Student Paper Award: The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory

March 2017 Travel Support Award: The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory

May 2013 Outstanding Undergraduate Student Award in Applied Mathematics as voted by the faculty, University of New Mexico

March 2012, 2013 Travel Support Award: MCTP Grant for SUnMaRC conference

Fall 2011, Fall 2012, Spring 2012 College of Arts and Sciences Dean's List

LIST OF SCIENTIFIC PUBLICATIONS

1. A. Semenova, S. A. Dyachenko, A. O. Korotkevich, P. M. Lushnikov, *Comparison of Split-Step and Hamiltonian Integration Methods for Simulation of the Nonlinear Schrödinger Type Equations*, Journal of Computational Physics (2020), 110061, https://doi.org/10.1016/j.jcp.2020.110061
2. A. O. Korotkevich, P. M. Lushnikov, A. Semenova, S. A. Dyachenko, *Superharmonic Instability of Stokes Waves*, 2021, submitted to Journal of Fluid Mechanics
3. A. Semenova, *Steady Water Waves in Finite Depth Ideal Fluid*, 2021, in preparation
4. D. Appelö, T. Hagstrom, A. Semenova, *Energy based discontinuous Galerkin method for Hamiltonian systems*, 2021, in preparation
5. Ph.D Dissertation: *Numerical Simulations of Nonlinear Waves and Their Stability: Stokes Waves and Nonlinear Schrödinger Equation*, under the guidance of Alexander O. Korotkevich and Pavel M. Lushnikov, https://digitalrepository.unm.edu/math_etds/158/
6. B.S. Honors Thesis: *Visualization and Algorithm for simulations of electro-magnetic field in an elementary cell of a layer of metamaterial*, written under guidance of Alexander O. Korotkevich, https://math.unm.edu/~nitsche/mctp/reus/theses/2013May_Semenova.pdf

CONFERENCES AND INVITED TALKS

April 2022 The Twelfth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, March 30-April 1, invited talk

November 2021 ICERM Post Doc/Graduate Student Seminar At The Institute for Computational and Experimental Research (ICERM), Brown University, Providence, RI, November 10, invited talk

October 2021 AMS Fall Western Sectional Meeting, Albuquerque, NM, October 23-24, invited talk

October 2021 Seminar At Hamiltonian Methods in Dispersive and Wave Evolution Equations Program At The Institute for Computational and Experimental Research (ICERM), Brown University, Providence, RI, October 12, invited talk

September 2021 Numerics, Modeling, and Experiments in Wave Phenomena Workshop At The Institute for Computational and Experimental Research (ICERM), Brown University, Providence, RI, September 20-24, lightning talk

July 2021 SIAM Annual Meeting (AN21), Spokane, WA, July 19 - 23, invited talk

June 2021 New Horizons in Dispersive Hydrodynamics Workshop, Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom, June 21 - July 2, participant

May 2021 SIAM Conference on Applications of Dynamical Systems (DS21), Portland, OR, May 23 - 27, invited talk

November 2020 Nonlinear Waves 2020/2021 Scientific School, participant

April 2019 The Eleventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, April 17-19, invited talk

June 2018 SIAM Conference on Nonlinear Waves and Coherent Structures, Orange, CA, June 11-14, invited talk

November 2017 Shared Knowledge Conference, Albuquerque, NM, November 8, poster presentation

April 2017 Water Waves Workshop At The Institute for Computational and Experimental Research (ICERM) at Brown University, Providence, RI, April 24-28, participant

March 2017 The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, March 29-April 1, invited talk

2015 The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, April 1-4, participant

2013 SUnMaRC 2013 Southwest Undergraduate Mathematics Research Conference, Albuquerque, NM, March 1-3, 2013, invited talk

2012 SUnMaRC 2012 Southwest Undergraduate Mathematics Research Conference, Tucson, AZ, March 30-April 1, participant

SERVICES AND ORGANIZATIONS

2017-2018 Society for Industrial and Applied Mathematics chapter at the University of New Mexico, president

2017-2018 Co-organizing two seminar talks at the University of New Mexico (as part of SIAM student chapter)

2017 Co-organizing applied mathematics social event for graduate and undergraduate students (as part of SIAM student chapter)

SUPPORT FOR RESEARCH ASSISTANTSHIP FROM GRANTS

2014-2017 Spontaneous Formation of Singularities Through Critical Collapse. PI: P.M. Lushnikov

2015-2018 Problems in Operator Theory. PI: A. Skripka

2010-2013 Collaborative Research: Deterministic and Statistics Theory of Wind Driven Sea of Finite Depth. PI: A. O. Korotkevich

2008-2016 Sustainable Energy Pathways Through Education and Technology. PI: O. Lavrova

TEACHING/GRADING

Teaching Recitations: undergraduate courses in Calculus I, II, and III

Teaching: undergraduate course Calculus III and Elements of Calculus I; substitute in graduate courses Ordinary Differential Equations and Functions of a Complex Variable I; substitute in undergraduate courses Partial Differential Equations for Engineering and Complex Variables

Grading: graduate courses in Functions of a Complex Variable I and II, Numerical Ordinary Differential Equations, Introduction to Ordinary Differential Equations, Applied Matrix Theory, Intro to Scientific Computing; undergraduate courses in Partial Differential Equations for Engineering, Complex Variables, Intro to Scientific Computing

RESEARCH INTERESTS – APPLIED MATHEMATICS AND NONLINEAR SCIENCE

- Free surface dynamics. Formation of rogue waves. Properties of Stokes and traveling-standing waves. Superharmonic instabilities of Stokes waves.
- Turbulence in nonlinear systems. Stochastic description of ocean states.
- Numerical methods for nonlinear Schrödinger equation. Hamiltonian preserving and operator splitting methods.
- Soliton like solutions, singularities and nonlinear phenomena in integrable systems.
- Behavior of electro-magnetic fields in metamaterials.
- Discontinuous Galerkin methods. Scientific computing.

RELEVANT SKILLS

- Programming: C, Python, Matlab, Fortran, Latex, and C++. MPI and parallel computing. Linux Shell programming.
- Machine learning, Deep learning, Data Science.