

SARAH G. RAYNOR

Department of Mathematics
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Current Position

Assistant Professor and Dunn-Riley Faculty Fellow, Department of Mathematics, Wake Forest University, 2004–.

Previous Position

Postdoctoral Fellow, The Fields Institute for Research in the Mathematical Sciences and The University of Toronto, Fall 2003–Spring 2004.

Education

1998-2003 Massachusetts Institute of Technology:
Ph.D. June 2003, in Mathematics
Thesis title: Regularity of Neumann Solutions to a Free Boundary Problem
Thesis advisor: David Jerison
1994-1998 Yale University:
B.S. May 1998, *Summa cum laude* with Exceptional Distinction in Mathematics
and Distinction in Physics
Undergraduate thesis title: Modeling Sonoluminescence
Undergraduate thesis advisor: Alan Chodos

Teaching Experience (Past Three Years)

2006-2009 Instructor for Calculus II, Multivariable Calculus, Real Analysis I and II, Topology, Ordinary Differential Equations, Partial Differential Equations, and Problem Solving Seminar at Wake Forest University.

Research Interests

Partial Differential Equations: Semilinear elliptic PDEs. Variational and topological methods for problems with nonlinearities of critical growth.
Semilinear dispersive PDEs, particularly the nonlinear Schrödinger equation and the Korteweg-de Vries equation and questions of well-posedness and qualitative behavior.

Publications

- (1) "Existence of Multiple Positive Solutions to Some Semipositone Systems," with M. Chhetri and S. Robinson, submitted.
- (2) "A system of ODEs for a Perturbation of a Minimal Mass Soliton," with J. Marzuola and G. Simpson, submitted.
- (3) "Neumann Fixed Boundary Regularity for an Elliptic Free Boundary Problem," *Comm. Partial Differential Equations*, **33** (2008), 1975–1995.
- (4) "Nonvariational Problems with Critical Growth," with Maya Chhetri, Pavel Drábek, and Stephen Robinson, *Nonlinear Anal.*, **68** (2008), 2092-2103.
- (5) "Ground State Mass Concentration in the L^2 -critical Nonlinear Schrödinger Equation below H^1 " with Jim Colliander, Catherine Sulem, and Doug Wright, *Math. Res. Lett.*, **12** (2005), 357-375.
- (6) "Low Regularity Stability of Solitons for the KdV Equation," with Gigliola Staffilani, *Comm. Pure Appl. Anal.*, **2** (2003), 277-296.
- (7) "Modeling Sonoluminescence," (under name Sarah Groff) with Alan Chodos, *Phys. Rev. E*, **59** (1999), 3001-3007.

Invited and Contributed Talks (Past Three Years)

July 2009	North Carolina Governor's School guest speaker
June 2009	Wake Forest Math Department Brown Bag Talk Series
Apr 2009	Special Session on Nonlinear Dispersive Equations, AMS Western Section Meeting, San Francisco, CA
Oct 2008	Southeast Atlantic Regional Conference in Diff. Equations (SEARCDE), University of Arkansas, Little Rock
July 2008	World Conference of Nonlinear Analysts, Orlando, FL
Feb 2008	University of North Carolina, Analysis/PDE Seminar
Dec 2007	University of Chicago, Calderón-Zygmund Seminar
Nov 2007	Prairie Analysis Seminar, Kansas State University
Oct 2007	SEARCDE, Murray State University
Oct 2007	Special Session on Harmonic Analysis Applied to Partial Differential Equations, AMS Western Section Meeting, Albuquerque, NM
May 2007	Conference on Variational and Topological Methods, Northern Arizona University
January 2007	Workshop of the AWM, Joint Mathematics Meetings, New Orleans, LA
December 2006	University of Minnesota, PDE Seminar
November 2006	Wake Forest University, Physics Colloquium
November 2006	Kansas State University, Analysis Seminar
November 2006	Kansas State University, Mathematics Colloquium
October 2006	SEARCDE, University of North Carolina Greensboro
September 2006	Wake Forest University, Math Club Talk Series

Fellowships and awards (Past three years)

Dunn-Riley Faculty Fellow, Wake Forest University
 Sterge Faculty Fellow, Wake Forest University Department of Mathematics
 Funded invited participant, Banff International Research Station conference on "Schrödinger Evolution Equations", April 2006
 Wake Forest University Science Research Fund grant recipient, 2006-2007

Memberships

American Mathematical Society
 Association for Women in Mathematics
 Mathematical Association of America
 Pi Mu Epsilon, Wake Forest University Chapter Advisor 2005-
 Phi Beta Kappa. Undergraduate Secretary, Yale University Chapter, 1997-1998.

Other academic functions

One undergraduate summer student project supervised
 Newsletter Editor and Executive Committee member, MAA Southeastern Section
 Panel Participant, Women in Math: A Celebration, MIT, April 2008
 SEARCDE Steering Committee
 Wake Forest University Pi Mu Epsilon Faculty Advisor
 Organizer of the Piedmont Differential Equations Seminar.
 Mathematical Reviews reviewer
 Referee