

Jamison T. Moeser

Department of Biomedical Engineering
Tufts University
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Education

- Brown University, Providence, RI, 1997-2002
 - Ph.D. in Applied Mathematics, 2002
 - M.S. in Applied Mathematics, 1998
- University of Massachusetts, Amherst, MA, 1991-1997
 - M.S. in Mathematics, 1997
 - B.S. in Mathematics, 1995
 - Summa cum Laude
 - B.S. in Biochemistry and Molecular Biology, 1995
 - Summa cum Laude

Awards, Honors, and Grants

- Principal investigator, NSF grant DMS-050681, 2005-2008
“Mathematical analysis for problems in nonlinear optics”
- Nominee for R&D Magazine’s “100 Most Promising New Technologies Award,” 2002
Joint nomination with Ildar Gabitov and Michael Chertkov, Los Alamos National Laboratory
- Phi Beta Kappa, 1994
- National Merit Scholar, 1991

Research Interests

- Nonlinear partial differential equations and analysis
- Applied mathematics, including asymptotic and numerical methods
- Wave propagation in inhomogeneous media, including random media
- Applications to problems in nonlinear optics and biology

Research Experience

Postdoctoral:

Department of Biomedical Engineering, Tufts University, present

Advisor : Fiorenzo G. Omenetto

- Development of mathematical theory to complement experimental results for nonlinear optical processes
- Theory-based exploration of novel applications for nonlinear optics in biology and communications

Department of Applied Mathematics, University of Colorado at Boulder, 2002-2006

Advisor : Mark J. Ablowitz

- Modeling, simulation, and mathematical analysis of phenomena from optics and image processing

Doctoral:

Division of Applied Mathematics, Brown University, 1997-2002

Advisor : Christopher K. R. T. Jones

- Existence and stability of special solutions for nonlinear dispersive equations

Mathematical Modeling and Simulation Group (T-7), Los Alamos National Laboratory, 2000-2001

Advisor : Ildar R. Gabitov

- Development and implementation of numerical methods to solve problems arising in optical communications

Undergraduate :

Department of Biochemistry and Molecular Biology, University of Massachusetts at Amherst, 1994-1995

Advisor : David J. Gross

- Mathematical modeling and fluorescence imaging of signaling kinetics in A431 carcinoma cells

Publications

- **J. Moeser**, Diffraction Managed Solitons: asymptotic validity and excitation thresholds, **Nonlinearity**, Volume 18, p. 2275-2297, 2005.
- M. Kunze, **J. Moeser**, V. Zharnitsky, Ground states for the higher order dispersion managed NLS equation in the absence of average dispersion, **Journal of Differential Equations**, Volume 209, Issue 1, p. 77-100, 2005.
- **J. Moeser**, Ground states for Schrödinger-type equations with nonlocal nonlinearity, **Nonlinear Analysis**, Volume 60, Issue 6, p. 1163-1182, 2005.
- M.J. Ablowitz and **J. Moeser**, Dispersion management for randomly varying optical fibers, **Optics Letters**, Volume 29, Issue 8, p. 821-823, 2004.

- **J. Moeser**, C.K.R.T. Jones, V. Zharnitsky, Stable pulse solutions for the nonlinear Schrödinger equation with higher order dispersion management, **SIAM Journal on Mathematical Analysis**, Volume 35, Number 6, p. 1486-1511, 2004.
- **J. Moeser**, I. Gabitov, C.K.R.T. Jones, Pulse stabilization by high order dispersion management, **Optics Letters**, Volume 27, Issue 24, p. 2206-2208, 2002.
- M. Chertkov, I. Gabitov, P. Lushnikov, **J. Moeser**, Z. Toroczkai, Pinning method of pulse confinement in optical fibers with random dispersion, **Journal of the Optical Society of America B (JOSAB)**, Volume 19, Issue 11, p. 2538-2550, 2002.
- M. Chertkov, I. Gabitov, **J. Moeser**, Optical pulse propagation in optical fibers with random dispersion, in **Nonlinearity and Disorder**, Kluwer Academic Press, p. 19-26, 2001.
- M. Chertkov, I. Gabitov, **J. Moeser**, Pulse confinement in optical fibers with random dispersion, **Proceedings of the National Academy of Sciences USA**, Volume 98, Issue 25, p. 14208-14211, 2001.

Manuscripts in Preparation

- **J. Moeser**, C. Ahrens, Delay of collapse for the nonlinear Schrödinger equation in critical dimension.
- **J. Moeser**, Trapping light in two dimensions with dispersion management.
- **J. Moeser**, F.G. Omenetto, N. A. Wolchover, Dynamics of supercontinuum generation in highly nonlinear optical fibers.
- **J. Moeser**, F.G. Omenetto, P. Malave, Averaged equation for supercontinuum generation in highly nonlinear optical materials.

Selected Lectures

- Department of Mathematics Colloquium, Tufts University (October 2006)
- Applied Mathematics and Computation Seminar, University of Massachusetts at Amherst (October 2006)
- Invited talk, SIAM Annual Meeting, Boston (July 2006)
- Invited talk, International Conference on Nonlinear Waves, Integrable Systems and Their Applications, Colorado Springs (June 2005)
- Invited talk, SIAM Conference on Dynamical Systems, Snowbird (May 2005)
- Invited talk, SIAM Conference on Nonlinear Waves and Coherent Structures, University of Central Florida (October 2004)
- Computational and Applied Mathematics Seminar, University of Kansas (February 2004)
- Department of Applied Mathematics Colloquium, University of Colorado at Boulder (February 2004)
- Invited talk, AMS Sectional Meeting, University of North Carolina at Chapel Hill (October 2003)
- Department of Mathematics Colloquium, University of Colorado at Colorado Springs (October 2003)

- Special PDE seminar, Department of Mathematics and Statistics, Boston University (October 2003)
- Invited talk, IMACS conference on nonlinear evolution equations and wave propagation, University of Georgia (April 2003)
- Invited talk, Nonlinear Optics Workshop, Lefschetz Center for Dynamical Systems, Brown University (July 2002)
- Dynamical Systems Seminar, Lefschetz Center for Dynamical Systems, Brown University (March 2002)

Teaching Experience

Tufts University

- Instructor, *Modeling, Simulation, and Analysis of Nonlinear Optical Phenomena*, Fall 2006
Duties included delivering a short course to an experimental group on the use of mathematical techniques in the study of nonlinear optics

University of Colorado

- Instructor, *Matrix Methods*, Spring 2005
Duties included lecturing, designing and grading exams and supervising teaching assistants
- Instructor, *Introduction to Dynamical Systems*, Fall 2003 and 2004
Duties included lecturing, designing and grading exams and homework, and webpage design and maintenance
- Instructor, *Calculus II, III*, Fall 2002 and Spring 2003
Duties included lecturing, designing and grading exams and supervising teaching assistants
- Instructor, *Complex Variables*, Spring 2003
Duties included lecturing, designing and grading exams and homework, and webpage design and maintenance

Brown University

- Instructor, *Methods of Applied Mathematics I*, Spring 2001
Duties included lecturing, designing and grading exams and supervising graders
- Teaching Assistant, *Methods of Applied Mathematics I, II*, Fall 1998 and Spring 1999
Duties included holding office hours and grading exams

University of Massachusetts

- Instructor, *Mathematics for Elementary Education I, II*, Fall 1996 and Spring 1997
Duties included lecturing, designing and grading exams, projects, and homework

Mentoring Experience

- Research mentor for undergraduate students Todd Wieck (Colorado) and Natalie Wolchover (Tufts)
- Reader of M. S. theses of Santhosh Heddese and Moorea Brega (Colorado)
- Research mentor for Ph.D. students Cory Ahrens (Colorado) and Peter Malave (Tufts)

Academic Service

- Colloquium Co-Chair, University of Colorado, Fall 2003 and Spring 2004
Duties included soliciting speakers for the weekly departmental colloquium and coordinating parts of their visit
- Analysis preliminary exam committee, University of Colorado, January 2004, August 2004, January 2005
Duties included writing exam questions for the graduate program's preliminary exams in analysis, grading exams and evaluating graduate degree candidates
- PDE preliminary exam committee, University of Colorado, January 2004 and August 2004
Duties included writing exam questions for the graduate program's preliminary exams in partial differential equations, grading exams and evaluating graduate degree candidates
- Along with M. Stanislavova (Kansas), co-organizer of session entitled *Discrete and Continuous Models in Nonlinear Optics* for the SIAM Dynamical Systems Conference, 2005
- Peer reviewer for *Physica D*, *Studies in Applied Mathematics*, *Mathematical and Computer Modelling*, *Optics Communications*, *Journal of Lightwave Technology*, and *Applied Numerical Mathematics*

References

- Dr. Mark J. Ablowitz
Professor of Applied Mathematics
Department of Applied Mathematics, University of Colorado, Box 526, Boulder, CO 80309-0526
Phone : 303-492-5502, Fax : 303-492-4066, mark.ablowitz@colorado.edu
- Dr. Christopher K. R. T. Jones
Bill Guthridge Distinguished Professor of Mathematics
Department of Mathematics, 303 Phillips Hall, University of North Carolina, Chapel Hill, NC 27599
Phone : 919-962-9607, Fax : 919-962-9345, ckrtj@amath.unc.edu
- Dr. Michael I. Weinstein
Professor of Applied Mathematics
Department of Applied Physics and Applied Mathematics, Columbia University, 200 S.W. Mudd - MC4701, New York, NY 10027
Phone : 212-854-3624, Fax : 212-854-8257, miw2103@columbia.edu
- Dr. Ildar R. Gabitov
Professor of Mathematics
Department of Mathematics, The University of Arizona, Box 210089, 617 N. Santa Rita Avenue, Tucson, AZ 85721-0089
Phone : 520-626-8853, Fax : 520-621-8322, gabitov@math.arizona.edu
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- Dr. Tobias Schäfer
Assistant Professor of Mathematics
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