Curriculum Vitae

Mathew A. Johnson

June 2009

Professional Education:

University of Illinois at Urbana-Champaign, Urbana, IL

Ph.D., Mathematics, 2009

Thesis Advisor: Jared C. Bronski

Thesis Title: On the Stability of Periodic Solutions to Nonlinear Dispersive Equations

Ball State University, Muncie, IN

B.S. in Mathematics with Minor in Physics, 2005, *Magna Cum Laude*

Research Interests:

I am interested in stability theory for non-linear partial and ordinary differential equations, spectral theory, and scattering problems related certain non-linear evolutionary equations via the inverse scattering transform. Lately, my research has centered around finding stability indices for periodic traveling wave solutions to certain classes of non-linear partial differential equations and developing a rigorous connection to Whitham modulation theory.

Publications:

7. Mathew A. Johnson, *The Transverse Instability of Periodic Waves in the Generalized Zakharov-Kuznetsov and Generalized Kadomtsev-Petviashvili Equations*, submitted to Studies in Applied Mathematics, 2009, 18 pages.
6. Mathew A. Johnson, *Nonlinear Stability of Periodic Traveling Wave Solutions of the Generalized Korteweg-de Vries Equation*, submitted to SIAM Journal on Mathematical Analysiis, 2009, 24 pages.
5. Jared C. Bronski and Mathew A. Johnson, *The Modulational Instability for a Generalized Korteweg-DeVries Equation*, submitted to Arch. Rational Mech. Anal., 2008, 32 pages.
4. Jared C. Bronski and Mathew A. Johnson, *Krein Signatures for the Faddeev-Tahktajan Eigenvalue Problem*, Communications in Mathematical Physics, **288** no. 3: 821-846, 2009.
3. Nicholas Christian and Mathew A. Johnson, *Non-Destructive Testing of Thermal Resistances for a Single Inclusion in a 2-Dimensional Domain*, Rose-Hulman Institute of Technology Undergraduate Math Journal, Vol. 6, Issue 1, 2005, 31 pages.
2. Nicholas Christian and Mathew A. Johnson, *Non-Destructive Testing of Thermal Resistances for a Single Inclusion in a 2-Dimensional Domain* (Shortened version of the full technical report), Ball State University Undergraduate Mathematics Exchange, Vol. 2, No. 2, Fall 2004, 9 pages.
1. Mathew A. Johnson, *Quantum Mechanics in Quantum Computing*, Ball State University Undergraduate Mathematics Exchange, Vol. 1, No. 1, Fall 2003, 8 pages.

Working Papers:

3. Jared C. Bronski, Mathew A. Johnson, and Todd Kapitula, *An Index Theorem for the Stability of Periodic KdV Waves*, in preparation.
2. Mathew A. Johnson, *On the Stability of Periodic Solutions of the Generalized Benjamin-Bona-Mahony and Camassa-Holm Equations*, in preparation.
1. Mathew A. Johnson, *Modulational Instabilities of Quasi-Periodic Traveling Wave Solutions of the Nonlinear Schrödinger Equation*.

Appointments:

To begin 8/2009	Zorn Postdoctoral Fellow, Indiana University.
6/2009 - Present	NSF Postdoctoral Fellow, Sponsoring Scientist: Kevin Zumbrun (Indiana University).
1/2009 - 5/2009	Research Assistant, University of Illinois at Urbana-Champaign, Advisor: Jared C. Bronski (J.C.B.)
8/2008-12/2008	Teaching Assistant, University of Illinois at Urbana-Champaign.
5/2008-8/2008	Graduate Research Assistant, University of Illinois at Urbana-Champaign, Advisor: J.C.B.
1/2008-5/2008	Research Assistant, University of Illinois at Urbana-Champaign, Advisor: J.C.B.
8/2007-12/2007	Teaching Assistant, University of Illinois at Urbana-Champaign.
1/2007-8/2007	Research Assistant, University of Illinois at Urbana-Champaign, Advisor: J.C.B.
8/2006-12/2006	Teaching Assistant, University of Illinois at Urbana-Champaign.
1/2005-5/2005	Mathematics Mentor, Ball State University.
1/2004-12/2005	Grader, Ball State University Department of Mathematics.
5/2004-8/2004	REU Internship, Rose-Hulman Institute of Technology, Advisor: Kurt Bryan.
5/2003-8/2003	ERULF Internship through D.O.E., Argonne National Labs, Advisor: Dmitry Karpeev.
8/2002-12/2004	Mathematics & Physics Tutor, Ball State University Learning Center.

Awards:

- NSF Mathematical Sciences Postdoctoral Fellowship: 2009.
- University of Illinois "Incomplete List of Teachers Rated Excellent By Their Students": Fall 2008, Fall 2007 (Rated Exceptional), Fall 2006.

Teaching Experience:

- Calculus 3 (Fall 2008 - University of Illinois at Urbana-Champaign), Merit Workshop Teaching Assistant.
- Business Calculus (Fall 2007 - University of Illinois at Urbana-Champaign), Teaching Assistant.
- Calculus 1 (Fall 2006 - University of Illinois at Urbana-Champaign), Teaching Assistant.

Synergistic Activities:

- Oral Competition Judge for the 2009 Illinois Council of Teachers of Mathematics (ICTM) State Math Contest Finals held on May 2, 2009.
- Member of organizing committee for 2007 and 2008 UIUC Graduate Student Preview Day.

Presentations:

- *Stability Results for Periodic Traveling Waves of the Generalized Korteweg-de Vries Equation*, 2009 AMS Spring Central Sectional Meeting, March 27-29 2009, University of Illinois at Urbana-Champaign.
- *Krein Signatures for Eigenvalue Problems Associated to Integrable Systems*, The XIXth International Workshop on Operator Theory and its Applications, July 22-26 2008, College of William and Mary.

- *Krein Signatures for Eigenvalue Problems Associated to Integrable Systems*, 32nd SIAM Southeastern-Atlantic Section Conference (SIAM-SEAS 2008) March 14-15 2008, University of Central Florida, Orlando.
- *Krein Signatures for Eigenvalue Problems Associated to Integrable Systems*, UIUC Analysis Seminar, March 6, 2008.
- *Spectral Symmetries and Signatures*, UIUC Graduate Student Seminar in Analysis, September 25, 2007.
- *Introduction to the Inverse Scattering Transform*, UIUC Graduate Student Seminar in Analysis, March 3, 2007.