

Keri A. Kornelson

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Education

Ph.D., Mathematics, University of Colorado at Boulder, 2001

Dissertation Title: *Local Solvability of Variable Difference Operators Arising from the Discrete Heisenberg Group*

Thesis advisor: Lawrence W. Baggett

M. S., Mathematics, University of Colorado at Boulder, 1997

B. A., History, University of Maryland, European Division, 1995

B. A., Mathematics *with distinction*, University of Colorado at Boulder, 1989

Academic Positions

Assistant Professor, Grinnell College, 2004–present

Courses Taught: Calculus I, II Linear Algebra, Fourier Analysis/Wavelets, Foundations of Analysis, Topology, Special Topics: Advanced Linear Algebra and Frames.

Visiting Researcher, University of Oklahoma, Fall 2007 - Spring 2008 - research leave funded in part by Grinnell College and in part by a Career Enhancement Fellowship awarded by the Woodrow Wilson Fellowship Foundation.

Selected as a participant in IMMERSE (Intensive Mathematics: a Mentoring, Education, and Research Summer Experience), University of Nebraska, Lincoln, Summer 2005

Position funded by an NSF grant (MCTP), teaching analysis course to students in transition from undergraduate to graduate school.

VIGRE Postdoctoral Fellow, Texas A&M University, 2001–2004

Courses Taught: Honors Calculus I, Calculus I and III, Discrete Mathematics, Advanced Calculus

Visiting Scholar, Georgia Institute of Technology, Spring 2003

Graduate Student Instructor, University of Colorado at Boulder, 1995–2001

Courses Taught: College Algebra, Trigonometry, Spirit and Uses of Mathematics (for Education majors), Quantitative Reasoning and Mathematical Skills (for non-math majors), Calculus I, Calculus II, Calculus with Computer Applications

Publications

Orthogonal Exponentials for Bernoulli Iterated Function Systems, with P. Jorgensen and K. Shuman, to appear in Proceedings for Current Trends in Harmonic Analysis and Its Applications: Wavelets and Frames Workshop in Honor of Larry Baggett, Birkhauser.

Affine Systems: Asymptotics at Infinity for Fractal Measures, with P. Jorgensen and K. Shuman, *Acta Applicandae Mathematicae*, vol. 98, no.3, Sept.(II) 2007, 181–222.

Harmonic Analysis of Iterated Function Systems with Overlap, with P. Jorgensen and K. Shuman, *J. Math. Physics*, vol. 48, 2007, 083511: 35 pages.

Convolutional Frames and the Frame Potential, with M. Fickus, B. Johnson, and K. Okoudjou, *Appl. Comput. Harmon. Anal.*, vol. 19 (1), 2005, 77–91.

Local Solvability of Laplacian Difference Operators Arising from the Discrete Heisenberg Group, *Canadian J. Math.*, vol. 57 (3), 2005, 598–615.

Ellipsoidal Tight Frames and Projection Decomposition of Operators, with K. Dykema, D. Freeman, D. Larson, M. Ordower, and E. Weber, *Illinois J. Math.*, vol. 48 (2), 2004, 477–489.

Rank-One Decomposition of Operators and Construction of Frames, with D. Larson, “Wavelets, Frames, and Operator Theory”, *Contemp. Math.*, vol. 345, American Mathematical Society, Providence, RI, 2004, 203–214.

Scholarly Work in Progress

Frames for Undergraduates, with D. Han, D. Larson, and E. Weber, submitted. This is a manuscript under contract for publication in the Student Mathematical Library book series published by the American Mathematical Society. Expected publication: Dec. 2007.

Non-integer translation invariant systems, with A. Aldroubi, C. Cabrelli, C. Heil, and U. Molter.

Iterated Function Systems, Moments, and Transformations of Infinite Matrices, with P. Jorgensen and K. Shuman.

Grants and Awards

PI (jointly with K. Shuman) for grant DMS-0701164 awarded by the National Science Foundation, *Orthonormal Fourier Bases and Iterated Function Systems*, 8/15/2007 - 7/31/2010.

Selected as one of twenty nationwide recipients of a Career Enhancement Fellowship which, in combination with Grinnell College, supports a one-year research leave. This fellowship is funded by the Andrew W. Mellon Foundation and administered by the Woodrow Wilson Fellowship Foundation. February, 2007

Selected to present one of eight talks in the Recent Ph.D. Recipient session as part of the Association for Women in Mathematics Workshop, Baltimore, MD. January, 2003

Graduate Part Time Instructor Teaching Excellence Award, University of Colorado, 2001

Francis P. Stribic Graduate Fellowship, University of Colorado, 2000 – 2001

Burton W. Jones Teaching Excellence Award, University of Colorado Mathematics Department, 2000

Conference and Colloquium Presentations**Topic:** *Iterated Function Systems and Bernoulli Convolution Measures*

2/2007 Colloquium, University of Oklahoma, Norman, OK.

1/2007 *Workshop in Harmonic Analysis and Applications*, Louisiana State University, Baton Rouge, LA.**Topic:** *Non-Integer Translation Invariant Systems*

5/2006 Current Trends in Harmonic Analysis and Its Applications: Wavelets and Frames, University of Colorado, Boulder, CO.

Topic: *Tight Frames and Rank-One Decomposition of Operators*

5/2004 Great Plains Operator Theory Symposium (GPOTS-2004), College Station, TX.

5/2004 International Conference on Computational Harmonic Analysis (CHA-2004), Vanderbilt University, Nashville, TN.

5/2004 Special Session *Designing Frames and Wavelets: From Theory to Digitization*, Joint Meeting of the AMS and the Sociedad Matematica Mexicana (SMM), Houston TX.

3/2004 Analysis Seminar, St. Louis University, St. Louis, MO.

1/2004 Grinnell College, Grinnell, IA.

1/2004 Invited colloquium talk, Clemson University, Clemson, SC.

1/2004 Contributed talk at the Joint Meetings of the American Mathematical Society and the Mathematical Association of America, Phoenix, AZ.

10/2003 Linear Analysis Seminar, Texas A&M University, College Station, TX.

08/2003 Linear Analysis and Probability Workshop (LAP-2003), Texas A&M University, College Station, TX.

Topic: *Ellipsoidal Tight Frames*03/2003 Special Session *Wavelets, Frames, and Tomography*, American Mathematical Society Southeastern Section Spring Meeting, Louisiana State University, Baton Rouge, LA.

02/2003 Analysis Seminar, Georgia Institute of Technology, Atlanta, GA.

01/2003 Special Session *Wavelets, Frames, and Operator Theory*, Joint Meetings of the American Mathematical Society and the Mathematical Association of America, Baltimore, MD.

01/2003 Association for Women in Mathematics Workshop, Recent Ph.D. Recipient Presentations, Baltimore, MD.

11/2002 Special Session *Functional and Harmonic Analysis of Wavelets, Frames, and their Applications* American Mathematical Society Southeastern Section Fall Meeting, University of Central Florida, Orlando, FL.

10/2002 Conference in Applied Mathematics (CAM-2002), University of Central Oklahoma, Edmond, OK.

Conference and Colloquium Presentations, cont.

- 09/2002 Karcher Colloquium, University of Oklahoma Department of Mathematics, Norman, OK.
- 08/2002 International Workshop on Operator Theory and Applications (IWOTA-2002), Virginia Polytechnic Institute and State University, Blacksburg, VA.
- 07/2002 Concentration Week on Wavelets and Frames, Texas A&M University, College Station, TX.
- Topic:** *Operators Arising from the Discrete Heisenberg Group*
- 05/2002 Great Plains Operator Theory Symposium (GPOTS-2002), University of North Carolina, Charlotte, NC.
- 03/2002 Southeastern Analysis Meeting (SEAM-2002), University of North Carolina, Chapel Hill, NC.
- 10/2001 Linear Analysis Seminar, Texas A&M University, College Station, TX.
- 03/2001 Contributed talk at the New Mexico Analysis Seminar (NMAS-2001), University of New Mexico, Albuquerque, NM.
- 02/2001 Colloquium, Emporia State College, Emporia, KS.
- 10/2000 Contributed talk at the American Mathematical Society Western Section Fall Meeting, San Francisco State University, San Francisco, CA.

Professional Service

Referee for articles submitted to the following mathematical journals: Applied and Computational Harmonic Analysis, Constructive Approximation, Contemporary Mathematics, Linear Algebra and its Applications, and Proceedings of the American Mathematical Society.

Author of article summaries for the Mathematical Reviews database.

Pedagogy and Other Presentations

The Haar Wavelet. Guest lecture, Loyola Marymount University, Los Angeles, CA. February, 2004.

Math and Basketball: A skill-building paradigm, Joint Meetings of the AMS and MAA, Phoenix, AZ. January, 2004.

Mathematics Exam Preparation Techniques. Guest lecture, Emporia State College, Emporia, KS. February 2001.

Fundamental Skills for Success in a Mathematics Course. Guest lecture, University of Denver, Denver, CO. January 2001.

Afternoon Workshops in Math Study Skills: Giving students strategies to succeed in their math courses. Joint Meetings of the AMS-MAA, New Orleans, LA. January 2001.

Skills for Success in a Mathematics Course, Problem Solving Skills, and Exam Preparation and Test-Taking Skills. Seminars presented in the Wednesday Workshops at the University of Colorado, 1999–2001.

Teaching Workshops Attended and Professional Development Activities

Wavelets and Applications: A Multidisciplinary Undergraduate Course with an Emphasis on Scientific Computing, a Professional Enhancement Program (PrEP) workshop sponsored by the Mathematics Association of America, University of St. Thomas, St. Paul, MN. June 7–10, 2006.

Women in Science Networking Seminar sponsored by the Associated Colleges of the Midwest Faculty Career Enhancement (FaCE) Project, Coe College, Cedar Rapids, IA. March 3–5, 2006.

Advising and Mentoring: Vocation and the Liberal Arts, Grinnell College summer workshop, May 24–27, 2005.

Mellon Workshop on Mathematical Modeling, Pomona College, Claremont, CA. November 5–7, 2004.

PEW Midstates Science and Mathematics Consortium: New Faculty Workshop, Hope College, Holland, MI. July 9–11, 2004.

Making Liberal Arts Mathematics the Most Important Course Students Take to Learn Effective Thinking. MAA Minicourse, Joint Meetings of the American Mathematical Society and the Mathematics Association of America, New Orleans, LA, January, 2001.

Departmental and Institutional Service

Co-director of the Grinnell Science Project, Summer 2006. This is a one-week orientation program for incoming first-year students who are interested in majoring in science, and are either from a group which is underrepresented in the sciences or are first generation college attendees.

Guided two student Mentored Advanced Projects (MAPs) at Grinnell College, Summer 2006. These are undergraduate mathematical research projects over a 10-week period.

Member of the Grinnell Instructional Support Committee during the academic year 2006-2007.

Member of the Gender and Women's Studies Committee during the academic year 2006-2007.

Team-teacher and mentor for Research Experience for Undergraduates / VIGRE seminar course at Texas A&M University entitled *Matrix Analysis and Wavelets*, Summers 2002, 2003, 2004.

Co-founder and faculty sponsor for the student chapter of the Association for Women in Mathematics, Texas A&M University. September, 2003.

Developed a series of mathematics skill-enhancement seminars called *The Wednesday Workshops* for undergraduates at the University of Colorado, 1999-2001. Presented the seminars several times each semester to over 200 students per year. Wrote proposals and received grants from the Mathematics Department and the Student Academic Services Center to support the program, which has continued to be offered.

Professional Affiliations

American Mathematical Society

Association for Women in Mathematics

Mathematical Association of America