

William O. Bray, Ph.D.

Professor of Mathematics & Department Head

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Current Position: Department Head (2012-)

Appointments/Promotions:

- Professor of Mathematics, Missouri State University (2012-)
- Professor of Mathematics, University of Maine (1996-2012)
- Department Chair, University of Maine (1997-2000, 2003-2009)
- Associate Professor, University of Maine (1987-1996)
- Visiting Associate Professor, Oregon State University (1987-1988 & Spring 1989)
- Assistant Professor, University of Maine (1981-1987)
- Graduate TA, University of Missouri-Rolla (1977-1981)

Education:

- Ph.D. in Mathematics, University of Missouri-Rolla (1981)
- BS & MS in Applied Mathematics, University of Missouri-Rolla (1977 & 1980)

Scholarly Interests:

- Analytic & Geometric aspects of Harmonic Analysis
- Partial Differential Equations
- Special Functions
- Graphical User Interfaces for classroom/student use.

1 Scholarly Works

1.1 Journal/Conference Proceedings

- *Inversion formulas in integral geometry in real hyperbolic space*, to appear Contemporary Math (AMS), coauthor: Boris Rubin (2018).
- *Radon transforms over lower dimensional horospheres in real hyperbolic space*, to appear Trans. Amer. Math. Soc., coauthor: Boris Rubin (2018).
- *Growth and integrability of Fourier transforms on Euclidean space*, Jour. Fourier Anal. Appl 20 (2014), p1234-1256.
- *Growth properties of Fourier transforms*, Filomat 26:4 (2012) University of Nis, p755-760, coauthor: M.A. Pinsky
- *Growth properties of Fourier transforms via moduli of continuity*, Jour. Funct. Anal. 255 (2008), p2265-2285, coauthor: M.A. Pinsky.
- *Transplantation formulas & Hadamard's method of descent*, Proc. Edin. Math. Soc. 50 (2007), p277-292.
- *Eigenfunction expansions on geodesic balls and rank one symmetric spaces of compact type*, Annals of Global Geometry and Analysis 18 (2000) p347-369, coauthor: Mark.A. Pinsky.
- *Inversion of the horocycle transform on real hyperbolic spaces via a wavelet-type transform*, Chapter 7 in **Analysis of Divergence: Control and Management of Divergent Processes**, Birkhauser (1998).
- *Pointwise inversion on rank one symmetric spaces and related topics*, Jour. Funct. Anal. 151 (1997) p306-333, coauthor: M.A. Pinsky.
- *Generalized spectral projections on symmetric spaces of non-compact type: Paley-Wiener theorems*, Jour. Funct. Anal. 135 (1996) p202-232.
- *Summability of trigonometric series and Calderon reproducing formulas*, Publ. Inst. Math. (Beograd) 58 (1995) p21-34.
- *Aspects of harmonic analysis on real hyperbolic spaces*, Chapter 5 in **Fourier Analysis: Analytic and Geometric Aspects**, Marcel Dekker (1994).
- *A spectral Paley-Wiener theorem*, Monat. Math. 116 (1993) p1-11.
- *Paley-Wiener theorems on rank one symmetric spaces*, Contemporary Math., Amer. Math. Soc. 113 (1991) p17-29, coauthor: D.C. Solmon.

- *A characterization theorem for the Fourier transform*, Jour. Math. Anal. Appl. 134 (1988) p141-150.
- *Asymptotic properties of the Radon transform*, Publ. Inst. Math. (Beograd) 40 (1986) p87-98.
- *On the weighted integrability of trigonometric series and L^1 convergence of Fourier series*, Proc. Amer. Math. Soc. 96 (1986) p53-61, coauthor: C.V. Stanojević.
- *On the integrability of complex trigonometric series*, Proc. Amer. Math. Soc. 93 (1985) p51-58, coauthor: V.B. Stanojevic.
- *On the Sidon-Telyakovskii integrability class for cosine series*, Jour. Math. Anal. Appl. 108 (1985) p73-78.
- *Tauberian L^1 convergence classes of Fourier series II*, Math. Ann. 269 (1984) p469-486, coauthor: C.V. Stanojevic.
- *On a Tauberian theorem for the L^1 convergence of Fourier sine series*, Proc. Amer. Math. Soc. 88 (1983).
- *Tauberian L^1 convergence classes of Fourier series I*, Trans. Amer. Math. Soc. 275 (1983) p59-69, coauthor: C.V. Stanojevic.
- *On a theorem of Stanojevic*, Proc. Amer. Math. Soc. 83 (1981) p59-62.

1.2 Textbook

- **A Journey into Partial Differential Equations**, Jones & Bartlett Publ (2011).

1.3 Edited Volumes

- **Analysis of Divergence: Control and Management of Divergent Processes**, Birkhauser 1998. Co-editor: C.V. Stanojevic. (Proceedings of the seventh International Workshop in Analysis and its Applications, UMaine 1997)
- **Fourier Analysis: Analytic and Geometric Aspects**, Marcel Dekker 1994. Co-editors: P.S. Milojevic, C.V. Stanojevic. (Proceedings of the fifth International Workshop in Analysis and its Applications, UMaine 1992)

1.4 Interdisciplinary Publications

- *The period gene controls courtship song cycles in *Drosophila melanogaster**, Animal Behavior (1999), Coauthors: H. Dowse, S. Alt, J. Ringo, B. Taylin.
- *Kinetic models for phototransduction and G-protein enzyme cascades: Understanding quantal bumps during CaM-II and PP2B inhibition*, Jour. Photobiology and Photochemistry B: Biology 35 (1996) p105-113, coauthor: L. Kass.

1.5 Other

- *Periodic Heat Kernel*, Wolfram Demonstration Project (2009), <http://demonstrations.wolfram.com/PeriodicHeatKernel/>

2 Lectures 1985-

- *Integrability of Fourier transforms on Euclidean space*, Special Session on Harmonic Analysis and PDE, 11th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, July 1-5, 2016.
- *Growth properties and integrability of Fourier transforms*, Analysis Seminar, Northwestern University, March 2013.
- *Growth properties of Fourier transforms*, Analysis Seminar, Northwestern University, October 5, 2009.
- *Growth properties of Fourier transforms via spherical moduli of continuity*, Special Session on Harmonic Analysis, AMS-MAA-SIAM National Joint Meeting, Washington D.C., January 4-8, 2009.
- *Growth properties of Fourier transforms via moduli of continuity*, Special Session on Radon Transforms and Integral Geometry, AMS sectional meeting, Louisiana State University, March 28-30, 2008.
- *Transplantation formulas in harmonic analysis*, Special Session on Harmonic Analysis and Integral Geometry, AMS section meeting, University of Connecticut, October 28-29, 2006
- *Transplantation formulas and Hadamard's Method of Descent*, Workshop on Harmonic Analysis and Partial Differential Equations, Puerto Vallarta, MX, June 20-25, 2003.
- Colloquium: *A Journey through Partial Differential Equations*, UMaine, October 2002.
- Colloquium: *Transplantation formulas for spherical functions*, University of Missouri-Rolla, December 4, 2001.
- Neurophysiology Seminar: *Lie symmetry analysis and ion channel models*, Brandeis University, June 15, 2001.
- *Geometric transplantation in harmonic analysis*, Conference on Stochastic Analysis and Harmonic Analysis, Northwestern University, June 2000.
- Colloquium: *Hadamard's method of descent: view on the Fourier side*, University of Connecticut, March 1998.

- Colloquium: *Aspects of Jacobi functions in harmonic analysis*, University of Missouri-Rolla, October 1996.
- Colloquium: *Some aspects of Jacobi functions in harmonic analysis* University of Maine, March 1996.
- Colloquium: *Spectral aspects of harmonic analysis on symmetric space*, Northwestern University, January 1996.
- Colloquium Series: *Aspects of Fourier methodology*, University of Missouri-Rolla, March 1995, (three lectures).
- *Calderon reproducing formulas on the circle group*, AMS Regional Meeting, Orlando, Florida, March 1995, .
- Colloquium: *Generating data on a computer*, Department of Zoology, UMaine, March 1995, joint talk with Professor L. Kass.
- Analysis Seminar: *Paley-Wiener theorems and spherical means*, Cornell University, April 1992, .
- Colloquium: *Spectral Paley-Wiener theorems*, University of Connecticut, April 1992.
- Analysis Seminar: *Spectral Paley-Wiener theorems on Euclidean space*, University of Missouri-Rolla, March 1992.
- *The horocycle transform and harmonic analysis on real hyperbolic space*, AMS-SIAM conference on Integral Geometry, Humbolt State University, June 1989, .
- *A characterization theorem for the Fourier transform*, International Workshop in Analysis and its Applications, Kupuri, Yugoslavia, June 1986.
- Colloquium: *Regular variation on Euclidean space*, Mathematical Institute of the Serbian Academy of Sciences, Beograd, Yugoslavia, May 1986.
- Colloquium: *On the notion of regular variation in analysis* Tufts University, February 1986.
- *Asymptotic properties of the Radon transform*, International Workshop in Analysis and its Applications, Kupuri, Yugoslavia, June 1985.
- Colloquium: *On the integrability of complex trigonometric series* University of Titograd, Titograd, Yugoslavia, May 1985.
- Colloquium: *On the weighted integrability of trigonometric series* Mathematical Institute of the Serbian Academy of Sciences, Beograd, Yugoslavia, May 1985.

3 Workshops

- AMS Committee on Education Meeting, October 22-23, 2004, Washington D.C.
- Workshop for Department Chairs, AMS (2004), Phoenix, AZ.
- Workshop on Gender Issues in the Sciences, Colby College, ME, June 2003.
- Annual Chairs Colloquium, Board of the Mathematical Sciences, Washington, DC, November 2000.
- Annual Chairs Colloquium, Board of the Mathematical Sciences, Bethesda, MD, November 1997.
- Chairing the Academic Department, ACE, San Diego, CA, February 1997.
- Comprehensive Faculty Evaluation Systems, CEDA, St. Louis, MO., October 1996.
- Filter Banks, wavelets and signal processing, Wellesley College, June 1994.
- Wavelets, University of Connecticut, May 1991.
- Fourier Analysis, Southern Illinois University, August 1990.
- Computer algebra in teaching calculus, Colby College, November 1989.

4 Grants and Awards

- Exploration of Biological Models via Lie Symmetry Analysis, UM Summer Faculty Grant 2001, \$7500
- Geometric Harmonic Analysis, Maine Science and Technology Commission and the National Science Foundation, Summer 1992, \$7500.
- Integrability of Ultraspherical expansions, UM Summer Faculty Grant 1983, \$4000.

5 Teaching Experience

- Undergraduate: Calculus, Linear Algebra, Differential Equations, Partial Differential Equations, Differential Geometry, Analysis.
- Graduate: Real Variables, Complex Variables, Lie Groups.
- Graduate Students:
 - (a) Trevor Vadas (2012) thesis: Ergodic transformations and measurable sets.
 - (b) Zachary Smith (2007) thesis: Bochner's identity in Harmonic Analysis.
 - (c) Jarod Bryan (1995) non-thesis option.

- (d) Ayesha Ali (1993) thesis: An Overview of Wavelets.
- (e) Leigh Snowden (1993) thesis: Tiling in the Non-Euclidean Plane.
- (f) Marc Goulet (1986) thesis: Regular Variation with Remainder Term.

- PhD Committees
 - (a) Jan Fiala (2004, Physics), Advisor: Peter Kleban
 - (b) Jake Simmons (2007, Physics), Advisor: Peter Kleban

6 Service Activities

Departmental Service

- Committees: Library (1982-84), Graduate Admissions (1982-85), Executive (1985), Professional Review (1982-83), Chairman Search (1985), Curriculum (various years), Graduate Executive (1988-92), Colloquium (1995-96), Policy Advisory (1995-97), Program Review (1996, chair).
- Graduate Coordinator (1988-92).

College of Liberal Arts and Sciences

- College of Liberal Arts and Sciences Promotion and Tenure (2003-2005).
- College Position Advisory Group (2007-2009).

University Service

- Freshman Orientation (Summers 1983, 84, 85).
- Graduate Board (1986-88).
- Council of Colleges (1986-87).
- College of Liberal Arts and Sciences Mission and Bylaws (1996).
- University Research Council (2004-2006).

Professional Service

- Member, Missouri Mathematics Pathways Taskforce, 2014.
- Co-organizer of an AMS Special Session, UCONN, October 28-29, 2006.
- Reviewer for Mathematical Reviews.
- Referee for various Mathematics Journals.

- Secretary for the International Workshop in Analysis and its Applications (IWAA) (1985-88).
- Program Chair, 6th IWAA, June 15-21, 1992, UM.
- Program Chair, 7th IWAA, June 1-6, 1997, UM.
- Associate Chairman, Organization of IWAA, (1992-).