

Kabe Moen

University of Alabama
Department of Mathematics
Box 870350
345 Gordon Palmer Hall
Tuscaloosa, AL 34587-0350

Phone: (205) 348-1978
Fax: (205) 348-7067
Email: kmoen@as.ua.edu

Positions

Assistant Professor, University of Alabama	2011-present
William Chauvenet Postdoctoral Lecturer, Washington University in Saint Louis Postdoctoral supervisor: Guido Weiss	2009-2011

Education

Ph.D. Mathematics, University of Kansas, Lawrence, KS Dissertation: "Linear and multilinear fractional operators: weighted inequalities, sharp bounds, and other properties" Advisors: Carlos Pérez and Rodolfo Torres	2009
M.A. Mathematics, University of Kansas, Lawrence, KS Thesis: "Radial basis functions and the numerical solution of partial differential equations"	2005
B.A. Mathematics, William Jewell College, Liberty, MO	2002

Research Interest

Harmonic Analysis, wavelets, signal analysis, analysis on metric spaces, and partial differential equations.

Publications

Journal Articles

1. Weighted multilinear Poincaré inequalities for vector fields of Hörmander type, with D. Maldonado and V. Naibo, *Indiana University Mathematics Journal* to appear.
2. Sharp norm inequalities for commutators of classical operators, with D. Cruz-Urbe SFO, *Publicaciones Matemáticas*, **56**, (2012) 147-190.
3. Multiparameter weights with connections to Schauder bases, *Journal of Mathematical Analysis and Applications* **371** (2010) 266–281 .
4. Sharp weighted bounds for fractional integral operators, with M. Lacey, C. Pérez, and R.H. Torres *Journal of Functional Analysis* **259** (2010) 1073–1097.

5. Sharp one-weight and two-weight bounds for maximal operators, *Studia Mathematica* **194** (2009) 163–180.
6. Weighted inequalities for multilinear fractional integral operators, *Collectanea Mathematica* **60** (2009) 213–238.

Preprints

1. New weighted estimates for bilinear fractional integrals, submitted.
2. A panorama of sampling theory, with H. Šikić, G. Weiss, and E.N. Wilson, submitted.
3. Regularity of solutions to degenerate p -Laplacian equations, with D. Cruz-Uribe SFO and V. Naibo, submitted.
4. Bilinear Sobolev-Poincaré inequalities and Leibniz-type rules, with F. Bernicot, D. Maldonado, and V. Naibo, submitted.
5. Higher-order multilinear Poincaré and Sobolev inequalities in Carnot groups, with V. Naibo, submitted.

Expository writings

1. A two weight inequality for the Hilbert transform assuming an energy hypothesis, after M. Lacey, E. Sawyer, and I. Uriarte-Tuero (expository), Summer/Fall school, Lake Arrowhead, California (2010).
2. The Brascamp-Lieb inequalities: finiteness, structure and extremals after J. Bennett, A. Carbury, M. Christ and T. Tao, Summer school on harmonic analysis, Carleson theorems, and multilinear analysis, Snowbird, Utah (2009).

Honors and Awards

- Florence-Blackman Award for excellence in teaching, University of Kansas 2008
- John Bunce Memorial Award for outstanding graduate student, University of Kansas 2008
- Walker-Mitchell Scholarship for summer support, University of Kansas Summers 2006, 2007

Conference Talks

- *Regularity of solutions to degenerate p -Laplacian equations*, AMS spring central sectional meeting, University of Kansas, Lawrence, KS, March 30-April 1, 2012 (upcoming).
- *Sharp norm inequalities for commutators of classical operators*, AMS western sectional meeting fall 2010, University of California Los Angeles, Los Angeles CA, October 9-10. Invited 20 minute talk.
- *A two weight inequality for the Hilbert transform assuming an energy hypothesis* after M. Lacey, E. Sawyer, and I. Uriarte-Tuero, Summer School in Analysis University of California Los Angeles, Lake Arrowhead CA, October 4-9. Two 45 minute talks.
- *Sharp weighted bounds for fractional integral operators and other related inequalities*, International Functional Analysis Meeting in Valencia on the Occasion of the 80th Birthday of Professor Manuel Valdivia, Valencia, Spain, June 7-11, 2010. Invited 50 minute talk.

- *Sharp weighted bounds for fractional integral operators*, AMS Spring Western Section meeting, special session on dyadic and non-dyadic harmonic analysis, University of New Mexico, Albuquerque, NM, April 17-18, 2010. Invited 20 minute talk.
- *Multilinear Poincaré inequalities for vector fields of Hörmander type*, AMS Spring Southeastern Section meeting, special session on function theory, harmonic analysis, and PDE, University of Kentucky, Lexington, KY, March 27-28, 2010. Invited 20 minute talk.
- *Multilinear Poincaré inequalities for vector fields of Hörmander type*, Workshop on Fourier and Harmonic analysis, Wayne State University, Detroit, MI, November 14-15, 2010. 20 minute talk.
- *Multilinear Poincaré inequalities for vector fields of Hörmander type*, Ninth Prairie Analysis Seminar, Kansas State University, Manhattan, KS, October 2010. 20 minute talk.
- *A summary of the Brascamp-Lieb inequalities*, Mathematics Research Communities summer school on Harmonic analysis, Carleson theorems, and multilinear analysis, Snowbird, UT, June/July 2009. Two 50 minute talks.
- *Sharp weighted bounds for fractional integral operators*, Arkansas Spring Lecture Series, University of Arkansas, Fayetteville, AR, April 2009. 20 minute talk.
- *Weighted inequalities for multilinear fractional integral operators*, Twelfth New Mexico Analysis Seminar, University of New Mexico, Albuquerque, NM, April 2009. 20 minute talk.
- *Weighted inequalities for multilinear fractional integral operators*, AMS-MAA Joint Mathematics Meetings Washington, DC, January 2009. Invited 20 minute talk.
- *Sharp one weight and two weight bounds for maximal operators*, Eighth Prairie Analysis Seminar, Lawrence, KS, November 2008. 20 minute talk.
- *Weighted inequalities for multilinear fractional integral operators*, Eighth International Conference on Harmonic Analysis and Partial Differential Equations El Escorial (Madrid), Spain June 16-20 2008. 20 minute talk.

Seminar Talks

- Georgia Institute of Technology, Atlanta, GA, April 2012, upcoming.
- *Weighted inequalities in multilinear harmonic analysis*, Michigan State analysis seminar, East Lansing, MI, March 2011.
- *Recent progress in weighted inequalities for singular integrals*, Washington University analysis seminar, Saint Louis, MO, September 2010.
- *Sharp weighted bounds for classical operators*, Washington University analysis seminar, Saint Louis, MO, April 2010.
- *Rectangular weights on the torus, with connections to Schauder bases for weighted Lebesgue spaces, principle shift invariant spaces, and Gabor systems*, Washington University wavelet seminar, September 2009.
- *Sharp bounds for fractional integral operators*, Kansas State University analysis seminar, Manhattan, KS March 2009.
- *Maximal operators: one weight, two weight, and sharp bounds*, University of Kansas analysis seminar Lawrence, KS September 2008.
- *Weighted inequality for classical operators on mixed Lebesgue spaces*, University of Kansas analysis seminar Lawrence, KS March 2007.

Other Conferences and Workshops Attended

- Mapping theory in metric spaces, American Institute of Mathematics, Palo Alto, CA, January 9-13, 2011.
- Weighted estimates for singular integrals, American Institute of Mathematics, Palo Alto, CA, October 10-14, 2011.
- Harmonic Analysis and Applications - A conference in honor of the 70th birthday of Richard Wheeden, Sevilla, Spain, June 14-18, 2010. Presented the poster, *Higher-order multilinear Poincaré inequalities on Carnot Groups*.
- AMS-MAA Joint Mathematics Meetings, San Francisco, CA, January 2010.
- Workshop on Multilinear Harmonic Analysis and Weights, Centre de Recerca Matemàtica (CRM), Bellaterra, Barcelona, Spain, May 2009.
- Tenth New Mexico Analysis Seminar, New Mexico University, Albuquerque, NM, October 2007.
- Sixth Prairie Analysis Seminar, University of Kansas, Lawrence, KS, October 2006.

Teaching Activities

University of Alabama

- Math 588: Theory of Differential Equations I Spring 2012
- Math 238: Applied Differential Equations Spring 2012
- Math 227: Calculus III Fall 2011

Washington University in Saint Louis

- Introduction to Lebesgue Integration Spring 2011
- Introduction to Analysis Fall 2010
- Differential Equations Fall 2010, Fall 2009
- Matrix Algebra Spring 2010
- Calculus I Spring 2010

University of Kansas

- Vector Calculus Spring 2009, Fall 2008
- Calculus I Fall 2007, Spring 2007, Fall 2006
- Business Calculus II Instructor Spring 2006
- Precalculus Fall 2005, Spring 2004
- Kansas Algebra Program Summers 2004, 2005
- Precalculus Fall 2003
- College Algebra Spring 2003
- Pre-Algebra Fall 2002

Outreach

- Presenter, Math Circle, *Celestial calculations*, 90 minute activity for 6th-8th grade students. Washington University, Saint Louis, MO, October 2010.
- Volunteer, SciFest 2010, International Science Festival at the Saint Louis Science center. Saint Louis, MO, October 2010.
- Presenter, Math Circle, 90 minute activity for 6th-8th grade students. Washington University, Saint Louis, MO, October 2009.
- Coach, MATHCOUNTS, enrichment and competition program for 6th-8th grade students. West Junior High, Lawrence, KS 2008-2009.
- Coach, American Mathematics Competition 10, competitive testing program for 8th-9th grade student. West Junior High, Lawrence, KS 2008.
- Presenter, KU math Awareness Day, 15 minute activity for 4th-5th grade students. University of Kansas, April 2007.

Mentoring, Advising, and Dissertation Committees

- Faculty Mentor, Healthy Living and Recreation BLOC: Mentoring 25 students that share a common interest and live together on the same floor of the student residence. Washington University 2010–2011.
- Major Advisor, Katrina Stumbras, undergraduate mathematics major. Washington University, 2010–present.
- Final Defense Committee Member, Nicholas Sedlock, Ph.D. in Mathematics, Washington University, April 2010.

Professional Activities

- Co-organizer (with Betsy Stoval and Richard Oberlin, UCLA), AMS-MAA Joint Mathematics Meetings, Special Session on Harmonic Analysis, San Francisco, CA January 2010.
- Journal Referee: *Collectanea Mathematica*, *Indiana University Mathematics Journal*, *Journal of Geometric Analysis*, *Journal of Mathematical Analysis and Applications*, *Studia Mathematica*.

References

- Rodolfo Torres, University of Kansas, Lawrence, KS.
- Carlos Pérez, Universidad de Sevilla, Sevilla, Spain.
- Guido Weiss, Washington University, Saint Louis, MO.
- Loukas Grafakos, University of Missouri, Columbia, MO.
- Ed Spitznagel, Washington University, Saint Louis, MO.