VITA

Mark C. Lammers

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Education: 1997 Ph.D.-Mathematics, University of Missouri.

UNCW Appointments

2013-	Professor and Mathematics Graduate Coordinator.
2012- 2013	Associate Professor and Mathematics Graduate Coordinator.
2006- 2012	Associate Professor.
2003-2006	Assistant Professor.
1997-1999	Visiting Assistant Professor.

Other Positions

2001-2003	Western Washington University: Assistant Professor.
1999-2001	The University of South Carolina: Visiting Assistant Professor.

Research Interests

Time-frequency analysis /computational harmonic analysis. Frame theory, approximation theory, and applications to image and signal processing.

Refereed Articles and Proceedings

17 Mark Lammers *The Finite Fractional Zak Transform* IEEE Signal Processing Letters. Volume 21 (2014) issue 9,1064-1067 (Article featured on journal cover)

16 C.S. Gunturk, M.C. Lammers, A. Powell, S. Y Rayan, and O. Yilmaz, *Sobolev Duals for Random Frames and Sigma-Delta Quantization of Compressed Sensing Measurements* Foundations of Computational Mathematics. Volume 13 (2013) issue 1,1-36.

15 C.S. Gunturk, M.C. Lammers, A. Powell, S. Y Rayan, and O. Yilmaz, *Sobolev Duals for Compressed Sensing*, SampTA 2011, May 2-6, 2011 Singapore

14 M.C. Lammers, and A. Maeser, *An Uncertainty Principle for Finite Frames.* Journal of Mathematical Analysis and Applications. Volume 373,(2011) no.1, 242-247

13 C.S. Gunturk, M.C. Lammers, A. Powell, S. Y Rayan, and O. Yilmaz, *Sigma Delta Quantization for Compressed Sensing*, Proc. 2010 Conf. on Inform. Sciences and Systems (CISS 2010), Princeton Univ., 17-19 Mar., 2010.

12 C.S. Gunturk, M.C. Lammers, A. Powell, S. Y Rayan, and O. Yilmaz, *S*obolev Duals of Random Frames, Proc. 2010 Conf. on Inform. Sciences and Systems (CISS 2010), Princeton Univ., 17-19 Mar., 2010.

11 J. Blum, M. C. Lammers, A. Powell, O. Yilmaz, *S*obolev duals in frame theory and Sigma-Delta quantization. J. Fourier Anal. Appl. . Volume 16, (2010) no. 3,365-381.

10 M.C. Lammers, Alex Powell O. Yilmaz, *Alternative dual frames for digital-to-analog conversion in Sigma−Delta quantization.* Advances in Computational Mathematics. Volume 32, (2010) no. 1,73-102.

9 M. C. Lammers, Alexander M. Powell, and O. Yilmaz *On quantization of finite frame expansions: sigma-delta schemes of arbitrary order.* SPIE Proceedings Vol. 6701 Wavelets XII, Dimitri Van De Ville; Vivek K. Goyal; Manos Papadakis, Editors, 670108 Date: 20 September 2007

8 P.G. Casazza, G. Kutyniok, and M.C. Lammers. *Duality principles, localization of frames, and Gabor theory.*SPIE Proceedings Vol. 5914 Wavelets XI, Manos Papadakis; Andrew F. Laine; Michael A. Unser, Editors, 591418 Date: 17 September 2005

7 M.C. Lammers, *Convolution for Gabor systems and Newton's method.*, Contemp. Math., 345,237–251, Amer. Math. Soc., Providence, RI, (2004).

6 P.G. Casazza, Gitta Kutyniok and M.C. Lammers, *Duality principles in frame theory*, J. Fourier Anal. Appl., 10, (2004), no. 4, 383-408.

5 P.G. Casazza and M.C. Lammers, *Bracket products for Weyl-Heisenberg Frames.* In H.G. Feichtinger and T.Strohmer, eds, *Advances in Gabor Analysis.* Birkhauser, Boston (2003).

4 P.G. Casazza, O. Christensen and M.C. Lammers, *Perturbations of Weyl-Heisenberg frames*, Hokkaido Math. J., Volume 31, (2002) no. 3, 539-553 .

3 P.G. Casazza and M.C. Lammers, *Analyzing the Weyl-Heisenberg frame identity*, Appl. Comput. Harmon. Anal. 12 (2002), no. 2, 171-178.

2 P.G. Casazza and M.C. Lammers, *Classifying characteristic functions giving Weyl-Heisenberg frames.* SPIE Proceedings Vol. 4119 Wavelet Applications in Signal and Image Processing VIII, Akram Aldroubi; Andrew F. Laine; Michael A. Unser, Editors, pp.142-152 Date: 4 December 2000

1 P.G. Casazza and M.C. Lammers, *Genus n Banach Spaces*, Illinois J. Math, **43**(1999), 307-323.

Research Presentations

- 42 May 2014, 5th International Conference on Computational Harmonic Analysis. Diagonalizing the finite Zak Transform and the finite Balian-Low Theorem
- 41 February 2013, The Department of Mathematics and Statistics Colloquium. American University. Localized Dual Frames and Applications to Sigma Delta Quantization

- 40 January 2013, UNCW Colloquium. Title: A Time Frequency Localization measure for and Finite frames.

39 April 2012, University of Missouri Analysis Seminar. Title: Sigma-Delta Quantization for Compressed Sensing

38 April 2012, University of Missouri Frame Seminar. Title: A Time Frequency Localization measure for and Finite frames

37 March 2012,SIAM-SEAS 2012, University of Alabama Huntsville. Title: A Time Frequency Localization measure for and Finite frames.

36 May 2010, Norbert Wiener Center at the University of Maryland, College Park: From Banach Spaces to Frame Theory and Applications In Honor of Professor Pete Casazza's 65th Birthday. Title: Localization and Finite frames.

35 March 2009, Banff International Research Station: Error Correction, Symmetry Goals and Numerical Efficiency. Title: Uncertainty in Finite Frames with application to Quantization.

34 May 2007, The 31st SIAM-SEAS conference Special Session "Wavelets and Frames", University of Memphis. Sigma Delta and Alternate duals.

33 April 2007, University of Utah: Applied Math Seminar Sigma Delta and Alternate Dual Frames for Reconstruction.

32 March 2006, Banff International Research Station: Coarsely Quantized Redundant Representations of Signals, Title: Alternate dual frames for Sigma Delta Quantization.

31 October 2005, University of South Carolina, Analysis Seminar, Title: Frames and Alternate Duals.

30 September 2005, UNCW Mathematics and Statistics Seminar, Title: Analog to Digital conversion: Alternate Duals for reconstruction.

29 June 2005 Universit de Franche-Comt. Besancon France, Functional Analysis Seminar Title: Frames and Applications.

28 May 2005 International Conference "Modern Methods of Time-Frequency Analysis", Strobl Austria Title: Alternate Duals For Sigma Delta Quantization.

27 December 2004, University of Maryland. Harmonic Analysis Seminar. Title: Norm Bounded Canonical Duals.

26 May 2004, Second International Conference on Computational Harmonic Analysis, Vanderbilt University. Title: Duality Principles in Frame Theory.

25 February 2004, UNCW Mathematics and Statistics Seminar, Title: Uncertainty principles and Time-Frequency Analysis.

24 March 2003, Frames, Wavelets and Tomography Special Session at the AMS Sectional Meeting, Baton Rouge, Title: Bracket Products for Weyl-Heisenberg (Gabor) Frames.

23 January 2003, Wavelets, Frames and Operator Workshop University of Maryland, Title: Computing the Canonical dual with Newton's Method.

22 January 2003, Wavelets, Frames and Operator Theory Special Session at the AMS National Meeting, Baltimore, Title: Wilson Bases and Convolution.

21 October 2002, Colloquium, Western Washington University, Title: Non-orthogonal expansions and Time-Frequency analysis.

20 July 2002, Concentration Week on Wavelets, Frames and Operator Theory, Texas A&M University, Title: Modular Convolutions.

19 March 2002, Banach Space Applications Special Session at the AMS Sectional, Georgia Tech University, Title: Banach Algebras and Gabor Frames.

18 February 2002, New Mexico State Analysis Seminar, Title: Gabor Frames and Hilbert C^*-Modules.

17 January 2002, Colloquium, Western Washington University, Title: A Newton's Method for Frames.

16 April 2001, Industrial Mathematics Institute Seminar, University of South Carolina, Title: Gabor Algebras and Dual Frames.

15 March 2001, Banach Space Theory Special Session at the AMS Sectional, University of South Carolina, Title: Gabor Systems and Function-Valued Inner Products.

14 February 2001, Colloquium, University of Western Washington, Title: Frames, Hilbert C^*-Modules and an Application to Wireless Communications.

13 April 2000, Frame Seminar, University of South Carolina, Title: A Hilbert C^*-Module for Gabor Systems and Wavelets.

12 March 2000, Colloquium, University of St. Louis, Title: Oversampled Gabor systems.

11 February 2000, Frame Seminar, University of South Carolina, Title: Generalized Zak Transforms and Oversampled Gabor Systems.

10 October 1999, Frame Seminar, University of South Carolina, Title: Weyl-Heisenberg Frames IV: Compressing the Frame Operator.

9 October 1999, Frame Seminar, University of South Carolina, Title: Weyl-Heisenberg Frames III: Riesz Representation for Bracket Products.

8 September 1999, Frame Seminar, University of South Carolina, Title: Weyl-Heisenberg Frames II: The Bracket Product.

7 September 1999, Frame Seminar, University of South Carolina, Title: Weyl-Heisenberg Frames I: Introduction.

6 May 1999, Graduate Student Seminar, University of North Carolina - Wilmington, Title: Bases and Frames.

5 April 1999, Applied Analysis Seminar, University of North Carolina - Wilmington, Title: Weyl-Heisenberg Frames and Operators.

4 March 1998, Banach Space Theory Special Session at the AMS Sectional, Louisville, Kentucky, Title: Genus n Banach Spaces.

3 January 1998, Applied Analysis Seminar, University of North Carolina - Wilmington, Title: Combinatorial Applications to Banach Spaces.

2 October 1997, Applied Analysis Seminar, University of North Carolina - Wilmington, Title: Banach Spaces and Permutatively Equivalent Bases.

1 May 1997, Banach Space Seminar Talk, University of Missouri, Title: Unique Unconditional Bases.

Other Professional Meetings Attended

13 February 2013, February Fourier Talks February 15 - 16, Norbert Wiener Center

12 February 2010, February Fourier Talks February 18 - 19, Norbert Wiener Center

11 May 2005, Erwin Schrdinger Institute : Modern Methods of Time-Frequency Analysis, Vienna Austria.

10 April 2005, The Center for Scientific Computation and Mathematical Modeling (CSCAMM), Oversampling and Coarse Quantization for Signals, University of Maryland College Park.

9 October, 2003, Workshop of the NSF Focused Research Group: Wavelets, Frames and operator Theory, Georgia Institute of Technology.

8 May, 2000, CBMS-NSF Regional Conference in Applied Mathematics, University of Missouri-St. Louis.

7 October 1999, AMS Sectional Meeting, University of North Carolina-Charlotte.

6 January 1999, AMS-MAA Joint Meeting, San Antonio, Texas.

5 October 1997, AMS Sectional Meeting, Georgia Institute of Technology, Atlanta, Georgia.

4 December 1996, Conference on Modern Banach Space Theory, Kent State University, Kent, Ohio.

3 February 1996, Concentration in Infinite Dimensional Convex Geometry, MSRI, Berkeley, California.

2 October 1996, AMS Sectional Meeting, University of Missouri, Columbia, Missouri.

1 May 1994, Interaction Between Functional Analysis, Harmonic Analysis, and Probability, University of Missouri, Columbia, Missouri.

Honors, Grants and Travel Awards

- 2011 Exemplary Post Tenure Review
- 2010 Faculty Research Reassignment Award.
- 2010 IMA Participating Institution Conference: From Banach Spaces to Frames and Applications: A Conference in Honor of the 65th Birthday of Peter G. Casazza $5,000.00, Funded
- 2009, Invitation only. Banff International Research Station.Error Correction, Symmetry Goals and Numerical Efficiency. Title: Uncertainty in Finite Frames with application to Quantization. Travel support. One week lodging and meals.

- 2006 Invitation only. Banff International Research Station: Coarsely Quantized Redundant Representations of Signals, Title: Alternate dual frames for Sigma Delta Quantization. Travel support. One week lodging and meals.
- 2005 Cahill Grant: Modern Methods of Time-Frequency Analysis, University of North Carolina at Wilmington. Award Amount: $2,500.
- 2005 International Conference "Modern Methods of Time-Frequency Analysis", Strobl Austria Travel support 900 EURO from the Erwin Schrödinger Institute.
- 2004 Summer Research Grant, University of North Carolina at Wilmington: Duality Principles in Frame Theory, June-August. Award Amount: $3,000.
- 2002 Summer Research Grant, Bureau of Faculty Research, Western Washington University: Wavelet Frames, June-August. Award Amount: $5,000.
- 1998 Recognized as one of Graham/Hewlett Halls' " Favorite Faculty" (UNCW)

Theses, Honors Projects and Undergraduate Research Directed

- Zac Carnevale, Masters Project UNCW 2010-2011: Fractional Transforms
- Zac Carnevale, Honors Project UNCW 2010-2011: The Zak Transform
- Simon Stampe, Masters Thesis Mathematics UNCW 2011: A finite Heisenberg sum.
- Anna Maeser, Masters Thesis Mathematics UNCW 2009: Optimal duals for the time frequency noise shaper.
- Will Morgan, Masters Project UNCW 2008, Frames of Translates.
- Anna Maeser, Undergraduate research UNCW 2008: Day trading with Fourier. Presented: The 6^{th} Annual Colonial Academic Alliance (CAA) Undergraduate Research Symposium. April 2008, Boston.
- Michael Zichy, Masters Thesis Mathematics UNCW 2006: Complex scheme for Sigma-Delta Quantization .
- Adam Key, Masters Thesis Mathematics UNCW 2006: Finite Frames and the Heisenberg Uncertainty Principle.
- Seth Rittenhouses, Masters Project Mathematics WWU 2003: Self-Adjoint Operators and Applications to Quantum Transport Theory.(WWU)

Computer Skills

- Matlab, SAS, Maple

Professional Membership and Service

- Faculty Senate
- Member of NC Coast Clinical Research Initiative Statistics Team
- Member of IEEE
- Member of AMS

- Member of SIAM
- Referee for:
  - Advances in Computational Mathematics
  - Applied and Computational Harmonic Analysis
  - Complex Analysis and Operator Theory
  - Contemporary Mathematics
  - EURASIP Journal on Applied Signal Processing Math
  - IEEE Signal Processing Letters
  - IEEE Transactions on Information Theory
  - Journal of Fourier Analysis and Applications
  - Journal of Mathematical Analysis and Applications
  - Studia Mathematica
- Reviewer for the American Mathematical Society