

# Curriculum Vitae

## Jens Gerlach Christensen

### Research Interests

Abstract and Applied Harmonic Analysis, Time-Frequency Analysis, Representation Theory, Wavelets, Frames, Sampling theory

### Education

- 2004–2009      PhD studies in Mathematics at Louisiana State University, USA (Ph.D. received August 2009)
- 1994–2003      Bachelor's Degree in Mathematics and Computer Science and Master's Degree in Mathematics from the University of Copenhagen, Denmark  
Remark: I studied 1 year of chemistry and 2 years of physics before studying computer science.

### Professional Experience

- Fall 11 – present    Norbert Wiener Assistant Professor in the Department of Mathematics at Tufts University.
- 2009 – 2011      Post doctoral research associate at the Norbert Wiener Center at University of Maryland, College Park
- Fall 03            Worked as a system administrator on UNIX and Windows platforms in Tellabs Denmark (<http://www.tellabs.dk>)
- 1999 – 2002      Worked as a system administrator on UNIX and Windows platforms in Tellabs Denmark (<http://www.tellabs.dk>)
- 1995 – 1999      Worked as backup operator and in a computer helpdesk function at Brüel & Kjær Denmark (<http://www.bksv.dk>)

### Publications and preprints

1. *The uncertainty principle for operators determined by Lie groups*, J. Fourier Anal. Appl., **10**,(2004), Nr. 5, 541–544
2. (with H. Schlichtkrull) *An uncertainty principle related to the Euclidean motion group*, Math. Proc. R. Ir. Acad., **104A** (2004) Nr. 2, 249–252 (electronic)
3. (with G. Ólafsson) *Examples of Coorbit spaces for dual pairs*, Acta Appl. Math., **107**, (2009), Nr. 1-3, 25–48

4. (with G. Ólafsson) *Coorbit spaces for dual pairs*, Appl. Comp. Harm. Anal., **31**, (2011), Issue 2, 303–324
5. *Sampling in reproducing kernel Banach spaces on Lie groups*, Journal of Approximation Theory, Vol. 164, Issue 1 (2012), 179–203
6. (with G. Ólafsson) *Sampling in Spaces of Bandlimited Functions on Commutative Spaces*, To appear as chapter in book Excursions in Harmonic analysis, Volume 1, in ANHA series, Preprint at <http://arxiv.org/abs/1107.4578>
7. (with R. Balan, I.A. Krishtal, K. Okoudjou and J.L. Romero) *Multi-window Gabor frames in amalgam spaces*, Submitted, Preprint at <http://arxiv.org/abs/1108.6108>
8. (with A. Mayeli and G. Ólafsson) *Coorbit description and atomic decomposition of Besov spaces*, Numerical Functional Analysis and Optimization, Vol. 33, Issue 7-9 (2012), 847–871

## Meetings and conferences co-organized

- Jan 6-7 2012     *AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday)* at AMS National meeting in Boston.
- Jan 8-9 2012     *Workshop on Geometric Analysis on Euclidean and Homogeneous Spaces* at Tufts University. Partially supported by NSF, Department of Mathematics at Tufts, and Tufts University Provost and Dean's Discretionary fund.

## External support

- Co-PI on NSF grant DMS-1200615 for workshop on *Geometric Analysis on Euclidean and Homogeneous Spaces* at Tufts University January 2012

## Talks

- Jul 19 2012     *Reconstruction in reproducing kernel Banach spaces*, Concentration week on Frame Theory and Maps Between Operator Algebras, Texas A&M University
- Mar 17 2012     *Besov spaces on stratified Lie groups and atomic decomposition through representation theory*, AMS Special Session on Analysis of Wavelets, Frames, and Fractals,
- Jan 7 2012     *Decomposition of spaces of distributions using Gårding vectors*, AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday), Boston
- Apr 12 2011     *Sampling of audible signals and generalizations*, Colloquium, American University
- Mar 31 2011     *Sampling related to reproducing kernels*, Workshop on Operator Algebras and Representation Theory: Frames, Wavelets and Fractals, Oberwolfach, Germany
- Feb 18 2011     *Sampling of band limited functions for Gelfand pairs*, February Fourier Talks, University of Maryland, College Park

- Jan 15 2011 *Crash course in coorbit theory*, Harmonic Analysis Student Seminar, Louisiana State University
- Jan 7 2011 *Sampling in reproducing kernel Banach spaces on Lie groups*, AMS Special Session on Wavelets, Tilings, and Iterated Function Systems, AMS National Meeting, New Orleans
- Jan 5 2011 *Sampling of bandlimited functions for Gelfand pairs*, Workshop in Analysis and Geometry, Louisiana State University
- Oct 22 2010 *Smoothness criteria for sampling in reproducing kernel Banach space*, Colloquium talk at Tufts University
- Oct 9 2010 *Sampling in reproducing kernel Banach spaces on Lie groups*, Operator Algebras and Representation Theory: Frames, Wavelets and Fractals, BIRS, Banff, Canada
- Aug 27 2010 *Construction of Banach spaces via representation theory*, Geometri- og analyseseminar, University of Copenhagen
- Jan 18 2010 *Discretization in coorbit spaces for Lie groups*, Workshop on Optimal Frames and Operator Algebras, A satellite conference of the AMS National Meeting, Jan 14-16 2010 (this work is an extension of my dissertation).
- Jan 05 2009 *Uncertainty Principles from Representations of Lie Groups*, 2009 AMS National Meeting, Washington D.C.
- Dec 01 2008 *Wavelets and Besov spaces on the forward light cone*, Linear Analysis Seminar, Texas A&M
- Nov 21 2008 *A Wavelet Decomposition of Besov Spaces on the Forward Light Cone*, Department Colloquium, Georgia Southern University
- Oct 05 2008 *A wavelet decomposition of Besov spaces in  $\mathbb{R}^n$* , 2008 Fall Western Section Meeting, Vancouver, Canada. Special Session: Wavelets, Fractals, Tilings and Spectral Measures, III
- Jun 19 2008 *Atomic Decompositions of Bergman Spaces using Representation Theory*, Analysis Seminar, Saint Louis University, Missouri
- Apr 23 2008 *Coorbit spaces and sampling*, The Tufts Lie Groups and Integral Geometry Seminar, Tufts University, Medford
- Mar 29 2008 *Coorbit spaces and discretizations*, Louisiana State University, AMS Sectional Meeting in Baton Rouge 2008, Special Session on Wavelets, Frames, and Multi-Scale Constructions, II
- Aug 16 2007 *Characterization of function spaces using square integrable representations*, University of Iceland, International Conference on Integral Geometry, Harmonic Analysis and Representation Theory (in honor of Sigurdur Helgason)
- May 20 2007 *Characterization of function spaces using representations*, University of Iowa, 2007 Midwest Geometry Conference

- Jan 08 2007     *Gelfand Triples and Time-Frequency Analysis*, 113th Annual Meeting of the AMS in New Orleans, AMS Special Session on Frames and Wavelets in Harmonic Analysis, Geometry, and Applications
- May 19 2006     *Smooth representations and modulation spaces*, University of Colorado at Boulder, Current Trends in Harmonic Analysis and Its Applications: Wavelets and Frames
- Feb 25 2006     *Modulation spaces and smooth representations*, Louisiana State University, Workshop on Harmonic Analysis and Fractal Geometry

## Visits and Invitations

- Apr 2011        One week workshop at Oberwolfach
- July 2010        Two week visit to Louisiana State University to work with Gestur Ólafsson and Azita Mayeli
- July 2010        Two week visit to Louisiana State University to work with Gestur Ólafsson and Azita Mayeli
- June 2008        One week visit to Saint Louis University, Missouri to work with Bradley Currey.
- Spring 2008     One semester as visiting student at MIT. Mentor: Sigurdur Helgason
- Summer 2006     One month visit to the Numerical Harmonic Analysis Group in Vienna supported by the Louisiana Board of Regents under grant LEQSF(2005-2007)-ENH-TR-21

## Awards and Support

- Apr 2011        NSF young investigator travel award to Oberwolfach
- Dec 2008        Pasquale Porcelli Award for Graduate Research Excellence, Louisiana State University
- Nov 2008        Graduate Student Travel Award, Louisiana State University
- Summer 2008     Supported by NSF grant DMS-0801010 (PI Gestur Ólafsson during the summer and for travel)
- Summer 2007     Travel grant from Louisiana Board of Regents grant LEQSF(2005-00-7)-ENH-TR21
- Spring 2007     Teaching Excellence Award, Louisiana State University
- Summer 2006     Travel grant from Louisiana Board of Regents grant LEQSF(2005-00-7)-ENH-TR21
- May 2006        Graduate Student Travel Award, Louisiana State University

## Teaching Experience

### Tufts University

At Tufts I have taught the courses listed below.

- Fall 2012      Math 12 (Calculus II) and Math 13 (Multivariable calculus): Instructor for one class of 30+ students on each subject with help of course coordinator.
- Spring 2012    Math 12 (Calculus II) and Math 38 (Ordinary differential equations): Instructor for one class of 30+ students on each subject with help of course coordinator.
- Fall 2011      Math 12 (Calculus II): Instructor for two classes of 30+ students with help of course coordinator.

### University of Maryland, College Park

At UMDCP I have taught the courses listed below.

- Summer 2011    Math 410 (Advanced Calculus): Instructor in charge of all aspects of the course for a class of 33 students.
- Spring 2011    Math 141 (Calculus II): TA
- Fall 2010      Math 111 (Probability): Instructor in charge of all aspects of the course for a class of 30 students.
- Spring 2010    Stat 100 (Entry level statistics): Instructor in charge of all aspects of the course for two classes of 30 students.
- Fall 2009      Math 241H (Calculus 3 Honours): Instructor in charge of all aspects of the course for a class of 30 students.

### Louisiana State University

At LSU I have taught the courses listed below.

- Fall 2008      Math 1021 R2R (College Algebra): Instructor  
Math 7311 (Measure and Integration): Grader for Prof. Richardson
- Fall 2007      Math 1550 (Calculus 1): Instructor
- Spring 2007    Math 1550 (Calculus 1): Instructor
- Fall 2006      Math 1552 (Calculus 2): Instructor
- Spring 2006    Math 1550 (Calculus 1): Instructor
- Fall 2005      Math 1021 R2R (College Algebra): Lab assistant
- Spring 2005    Math 1021 R2R (College Algebra): Lab assistant for R2R pilot project
- Fall 2004      Grader for Math 4031 (Advanced Calculus with Prof. Delzell)

Notes:

- “Instructor” means that I was in charge of all aspects of the course: teaching, writing and administering tests, grading and and give office hours. At LSU the classes consists of 35-40 students.
- R2R stands for Roadmap to Redesign. In this model for delivering pre-calculus mathematics, students go to a traditional class one hour per week with a faculty member and then spend at least three hours per week in the learning lab. In the weekly one-hour class, the faculty member presents and reviews main ideas and provides overall guidance for the students as they progress through the course. In the learning lab, computer software provides algorithmically generated homework exercises and presents interactive help and detailed, worked-out examples along with videos. The lab is staffed with faculty members, math graduate students and undergraduate math majors who are available for individual assistance on demand.

### National University of Ireland in Galway

F2002–S2003     Directed problem sessions and corrected papers in mathematics for first year engineers at NUI Galway, Ireland

### Reviews

I have been a reviewer for the following journals:

- Applied and Computational Harmonic Analysis
- Applied Mathematics Letters
- Journal of Geometric Analysis
- Mathematische Nachrichten
- Monatshefte für Mathematik
- Numerical Functional Analysis and Optimization

### Other Scholarly Activities

2008 – 2009     Initiated and organized the Graduate Student Harmonic Analysis Seminar at Louisiana State University

2007-2009     Member of the AWM chapter at LSU. Gave presentation at job fair organized by the AWM and SIAM chapters at LSU.

Summer 2008     Helped organize and run the GEAUX (Graduate Education and Acclimation to the University eXperience) program at LSU. Here current graduate students welcome the incoming graduate students, show them around campus, give introductory talks and arrange social events.

### Professional Organizations

I am a member of American Mathematical Society (AMS) and Association for Women in Mathematics (AWM).