Keaton Hamm

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E D U C A T I O N

Ph.D. Mathematics, Texas A&M University – 2015
B.S. Mathematics (Honors), Texas A&M University – 2010
B.S. Chemical Engineering, Texas A&M University – 2010

E M P L O Y M E N T

2015 – Current: Vanderbilt University, Assistant Professor (Non-Tenure Track)
- Postdoctoral Supervisors: Akram Aldroubi and Alex Powell

2010 – 2015: Texas A&M University, Graduate Assistant
- Advisors: Thomas Schlumprecht and N. Sivakumar

R E S E A R C H I N T E R E S T S

Data Clustering, Subspace Clustering, Low rank matrix approximations, Approximation Theory, Sampling Theory, Harmonic Analysis and applications to signal processing, Radial Basis Function Approximation, Functional Analysis

P U B L I C A T I O N S

In Print

On the Structure and Interpolation Properties of Quasi Shift-Invariant Spaces. (with Jeff Ledford; Approximately 27 pages, *Journal of Functional Analysis*, To Appear, PDF).

Cardinal Interpolation with General Multiquadrics: Convergence Rates. (with Jeff Ledford; 29 pages, *Advances in Computational Mathematics*, In Press – Available Online) PDF

Stability and Robustness of RBF Interpolation. (with Jean-Luc Bouchot) *Sampling Theory in Signal and Image Processing*, 16 (2017), 37-53. PDF

Nonuniform Sampling and Recovery of Bandlimited Functions in Higher Dimensions, *Journal of Mathematical Analysis and Applications*, 240(2) (2017), 1459-1478. PDF

Cardinal Interpolation with General Multiquadrics, (with Jeff Ledford) *Advances in Computational Mathematics*, 42(5) (2016), 1149-1186. PDF

Approximation Rates for Interpolation of Sobolev Functions via Gaussians and Allied Functions, *Journal of Approximation Theory*, 189 (2015), 101-122. PDF

On the Interpolation of Smooth Functions via Translates of Radial Basis Functions. (PhD Dissertation).

Submitted Preprints

Regular Families of Kernels for Nonlinear Approximation. (with Jeff Ledford; Approximately 21 pages, PDF).

CUR Decompositions, Similarity Matrices, and Subspace Clustering (with Akram Aldroubi, Ahmet Bugra Koku, and Ali Sekmen; Approximately 23 pages, PDF).

On the Gibbs—Wilbraham Phenomenon for Sampling and Interpolatory Series (Approximately 8 pages; available upon request).

In Preparation

An Operator Theoretic Approach to the Convergence of Rearranged Fourier Series (with Armenak Petrosyan and Ben Hayes. Nearly completed preprint, approximately 15 pages).

Refereed Conference Publications

Principal Coordinate Clustering (with Akram Aldroubi, Ahmet Bugra Koku, and Ali Sekmen) 3rd Special Session on Intelligent Data Mining, 2017 *IEEE International Conference on Big Data 2017*, Boston, MA, 2095-2102. [PDF]

Matrix Reconstructions: Skeleton Decomposition Versus Singular Value Decomposition, (with Ali Sekmen, Akram Aldroubi, and Ahmet Bugra Koku*) 2017 International Symposium on Performance Evaluation of Computer and Telecommunication Systems* (SPECTS), IEEE, 1-8. PDF

On Bases of Cardinal Functions and Their Role in Approximate Sampling Methods, (with Jeff Ledford) *12th International Conference on Sampling Theory and Applications (SampTA 2017)*, IEEE, 203-206. PDF

Sampling and Recovery Using Multiquadrics, *11th International Conference on Sampling Theory and Applications (SampTA 2015)*, IEEE, 124-128. PDF

AWARDS

- Houston A&M Mother's Club Outstanding Teaching Assistant Award – 2014
  - Teaching award given yearly to the best 4-6 teaching assistants (out of approximately 150 total T.A.s)
- Graduate Teaching Academy Fellow (Texas A&M University) – 2015
  - Now called Academy for Future Faculty: a program designed to train graduate students and new faculty for teaching excellence. Consisted of a number of seminars on teaching strategies, course development, and best writing practices, as well as classroom observations of faculty.

CONFERENCE ORGANIZATION

- Co-organizer (with Akram Aldroubi and Alex Powell) of the 33rd Annual Shanks Conference and Lecture in conjunction with the International Conference on Computational Harmonic Analysis and Applications, Vanderbilt University, Summer 2018.
- Co-organizer (with Akram Aldroubi, Michael Northington V, and Alex Powell) of the Special Session on Harmonic Analysis, Functional Analysis, and Their Applications, Fall Central AMS Sectional Meeting, Vanderbilt University, April 14-15, 2018.
- Co-organizer (with Sui Tang) of a Minisymposium on Approximation Theory in Signal Processing at the 15th International Conference on Approximation Theory, San Antonio, TX, May 22-25, 2016.

TALKS

TBA – Mini-symposia on Advances in Radial Basis Approximation, 9th International Conference on Curves and Surfaces, Arcachon, France, July 2018.

CUR Matrix Decomposition and Subspace Clustering – AMS Special Session on Interactions of Inverse Problems, Signal Processing, and Imaging, I, Joint Mathematics Meeting, San Diego, CA, 10-13 January, 2018.

Data Clustering Algorithms – Millican Colloquium, University of North Texas, Denton, TX, 20 November, 2017.

Data Clustering Algorithms – Colloquium, University of Oklahoma, Norman, OK, 2 November, 2017.

CUR Matrix Decomposition and Subspace Segmentation – Special Session on Applied Harmonic Analysis: Frames, Samplings, and Applications, AMS Fall Southeastern Sectional Meeting, Orlando, FL, 23 September, 2017.

Approximation and Quasi Shift-Invariant Spaces – Special Session on Banach Spaces and Applications, AMS Fall Central Sectional Meeting, Denton, TX, 9 September, 2017.

On Bases of Cardinal Functions and Their Role in Approximate Sampling Methods – 12th International Conference on Sampling Theory and Applications (SampTA 2017), Tallin, Estonia, 7 July, 2017.

Regular Families of Kernels for Nonlinear Approximation – 7th Ohio River Analysis Meeting (ORAM), University of Cincinnati, Cincinnati, OH, 26 Mar, 2017.

Regular Families of Kernels for Nonlinear Approximation – 33rd Southeastern Analysis Meeting (SEAM), University of Tennessee, Knoxville, TN, 18 Mar, 2017.

Gabor Frames of Cardinal Functions – AMS Special Session on Frame Theory, AMS Spring Southeastern Sectional Meeting, Charleston, SC, 12 Mar, 2017.

Structure and Function Interpolation in Quasi Shift-Invariant Spaces – Analysis, Logic and Physics Seminar, Virginia Commonwealth University, Richmond, VA, 3 Mar, 2017.

Regular Families of Kernels for Nonlinear Approximation – February Fourier Talks (Poster Session), University of Maryland, 16 Feb, 2017.

Interpolation in Shifted Function Spaces – AMS Session on Topics in Analysis II, Joint Mathematics Meetings, Atlanta, GA, 6 Jan, 2017.

Interpolation in Shifted Function Spaces – AMS Special Session on Bases in Function Spaces: Sampling, Interpolation, Expansions and Approximations, Joint Mathematics Meetings, Atlanta, GA, 4 Jan, 2017.

Sampling on Lattices via Radial Basis Functions – 15th International Conference on Approximation Theory, San Antonio, TX, 25 May, 2016.

Sampling and Interpolation with Radial Basis Functions – Computational Analysis Seminar, Vanderbilt University, 9 September, 2015.

Convergence Rates for Cardinal Interpolation Using Multiquadrics – Workshop in Analysis and Probability Seminar, Texas A&M University, 15 July, 2015.

Sampling and Recovery Using Multiquadrics – 11th International Conference on Sampling Theory and Applications (SampTA 2015), Washington D.C., 25 May, 2015.

Riesz Bases of Exponentials and Connections with Multivariate Interpolation – Joint Banach Spaces and Approximation Theory Seminar, Texas A&M University, 1 May, 2015.

Sampling and Recovery of Bandlimited Functions – Graduate Student Organization Seminar, Texas A&M University, 12 March, 2015

Approximation Rates for Scattered-data Interpolation via Gaussians – AMS Session on Topics in Analysis II, Joint Mathematics Meetings, San Antonio, TX, 13 Jan, 2015.

Approximation Rates for Scattered-data Interpolation via Gaussians – Special Session on Harmonic Analysis and its Applications, AMS Sectional Meeting, Albuquerque, NM, 5 April, 2014.

Approximation Rates for Scattered-data Interpolation via Gaussians – Joint Banach Spaces and Approximation Theory Seminar, Texas A&M University, 22 November, 2013.

TEACHING EXPERIENCE

VANDERBILT UNIVERSITY:

Instructor of Record:

MATH 3620/5620, Introduction to Numerical Mathematics – Spring 2018
MATH 3100, Introduction to Analysis – Fall 2017
MATH 2420, Methods of Ordinary Differential Equations – Spring 2017
MATH 2300, Multivariable Calculus – Fall 2015
MATH 1301, Accelerated Single-Variable Calculus II – Fall 2017
MATH 1300, Accelerated Single-Variable Calculus I – Fall 2016
MATH 1011, Introduction to Probability and Statistical Inference II – Spring 2016, 2017

Teaching Assistant:

MATH 1300, Accelerated Single-Variable Calculus I – Fall 2015, Spring 2016

TEXAS A&M UNIVERSITY:

Instructor of Record:

MATH 131, Math Concepts - Calculus – Summer 2014

Teaching Assistant:

MATH 150, Functions – Spring 2011
MATH 151, Engineering Calculus I – Fall 2011, Fall 2013
MATH 152, Engineering Calculus II – Spring 2012, Spring 2014
MATH 409, Advanced Calculus I – Summer 2012 (online course)
MATH 411, Mathematical Probability – Spring 2013
MATH 437, Principles of Numerical Analysis, Fall 2014
MATH 446, Principles of Analysis I – Fall 2012
MATH 601, Methods of Applied Mathematics I – Fall 2010

MATH 664, Quantum Computation and Quantum Information – Summer 2015

SERVICE

- Referee Work: *Proceedings of the American Mathematical Society, IMA Journal of Numerical Analysis, Sampling Theory in Signal and Image Processing, Journal of Fourier Analysis and Applications, SampTA Conference Proceedings, Canadian Bulletin of Mathematics*
- Organizer of the Computational Analysis Seminar at Vanderbilt University – Fall 2016-current.
- Organized and led an informal reading course for a Freshman student at Vanderbilt University on Signal Processing – Spring 2016.
- Took part in a panel of graduate students on selecting an advisor for the "First Semester Graduate Students Seminar" – Fall 2013; also on a panel for advice from graduating students on navigating the job market for the same seminar – Spring 2015.
- Gave a research mini-talk for an REU at Texas A&M – Summer 2014.
- Organized (and gave weekly lectures in) an informal working seminar on Fourier analysis and function interpolation at Texas A&M – Fall 2014.

LEADERSHIP AND MENTORING

- Former Student Mentor to an undergraduate mathematics student at Texas A&M – Fall 2012—Fall 2013.
- Counseled approximately 15 undergraduate and graduate students in personal and academic growth and development through a student organization at Texas A&M – Fall 2008—2015.
- Coached a student group comprising 20-30 students weekly at A&M. Focused on leadership training, community service, conflict resolution, and character development – Spring 2010—2015.
- Took 4 years of coursework on Leadership Development through Fellowship Church. Topics ranging from Development of a healthy team, Effective communication, Personality theory, Conflict resolution, Handling sensitive issues, Empowering future leaders; College Station, TX – Fall 2007—2015.
- Designed and implemented curriculum for a course on global citizenship, making a positive societal impact, and personal integrity; Nashville, TN – Fall 2016—Current.

CONFERENCE PARTICIPATION

- (Upcoming) Curves and Surfaces, Arcachon, France, July 2018.
- (Upcoming) 34th Southeastern Analysis Meeting (SEAM), Atlanta, GA, March 2018.
- Joint Mathematics Meeting, San Diego, CA, January 2018.
- AMS Fall Central Sectional Meeting, Denton, TX, September 2017.
- AMS Fall Southeastern Sectional Meeting, Orlando, FL, September, 2017.
- 12th International Conference on Sampling Theory and Applications (SampTA 2017), Tallin, Estonia, July 2017.
- 7th Ohio River Analysis Meeting (ORAM), Cincinnati, OH, March 2017.
- 33rd Southeastern Analysis Meeting (SEAM), Knoxville, TN, March 2017.
- AMS Spring Southeastern Sectional Meeting, Charleston, SC, March 2017.
- February Fourier Talks (FFT), College Park, MD, February 2017.
- Joint Mathematics Meetings, Atlanta, GA, January 2017.
- 15th International Conference on Approximation Theory, San Antonio, TX, May 2016.
- 11th International Conference on Sampling Theory and Applications (SampTA 2015), Washington D.C., May 2015
- IMA 2015: Summer School in Modern Harmonic Analysis and Applications, University of Maryland, College Park, MD, July-August 2015.
- Joint Mathematics Meetings, San Antonio, TX, January 2015.
- AMS Spring Central Sectional Meeting, Lubbock, TX, April 2014.
- AMS Spring Western Sectional Meeting, Albuquerque, NM, April 2014.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Mathematical Society

OTHER SKILLS

Languages:

Spanish – Reading, writing, and conversational speaking
Matlab – Proficient