

Curriculum Vitae

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Contact Information

Longxiu Huang
Department of Mathematics
University of California, Los Angeles
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Research Interest

Modern harmonic analysis, image/data Processing, geometric analysis, matrix/tensor analysis, dynamical sampling.

Education

Ph.D. Mathematics **Aug. 2014 – May. 2019**
Mathematics Department, Vanderbilt University
Nashville, TN 37240, U.S.A.

- Academic advisor: Akram Aldroubi
- Dissertation: Dynamical Sampling and its Applications

M.S. Mathematics **Sep. 2012 – Jun. 2014**
School of Mathematical Sciences, Fudan University
Yangpu District, Shanghai 200433, P. R. China

B.S. Mathematics **Sep. 2009 – Jun. 2012**
School of Mathematics and Computational Science, Sun Yat-sen University
Guangzhou, Guangdong 510275, P. R. China

- Bachelor thesis advisor: Yuesheng Xu & Weicai Ye
- Bachelor thesis: GPU-Based Parallel Implementation of the QR Decomposition Algorithm

B.S. Software Engineering **Sep. 2008 – Jun. 2009**
School of Software, Sun Yat-sen University
Guangzhou, Guangdong 510275, P. R. China

Employment

2019-Present: University of California, Assistant Adjunct Professor

- Supervisor: Deanna Needell

Honors and Awards

- [1] AMS - Simons Foundation Travel Grant (\$5,000 per year)
Two year travel grant awarded to young researchers, 2021 - 2023
- [2] Bjarni Jónsson Prize for Research (Vanderbilt University) **2019**
- [3] AWM travel award for AWM Research Symposium 2019 (\$625) **April**

Publication

Journal Articles and Preprints

- [1] L. Huang, D. Needell, and S. Tang “Robust Recovery of Bandlimited Graph Signals via Random Dynamical Sampling,” Submitted.
- [2] A. Aldroubi, L. Huang, K. Kornelson, and I. Krishtal “Predictive Algorithms in Dynamical Sampling for Burst-like Forcing Terms,” Submitted.

- [3] L. Huang, B. Sun, and T. Wang, "A Six-Neighbor Theorem for Planar Normal Tilings," Submitted.
- [4] H.Q. Cai, K., Hamm, L. Huang, and D. Needell, "Robust CUR Decomposition: Theory and Imaging Applications," *SIAM Journal on Imaging Sciences(SIIMS)*, Accepted.
- [5] H.Q. Cai, K., Hamm, L. Huang, and D. Needell, "Mode-wise Tensor Decompositions: Multi-dimensional Generalizations of CUR Decompositions," *Journal of Machine Learning Research (JMLR)*, Vol. 22, No.185(2021), 1-36.
- [6] A. Aldroubi, K. Gröchenig, L. Huang, P. Jaming, I. Krishtal, and J. Romero, "Sampling the Flow of a Bandlimited Function," *The Journal of Geometric Analysis*, 2021.
- [7] Z. Chao, L. Huang, and D. Needell, "HOSVD-based Algorithm for Weighted Tensor Completion," *Journal of Imaging*, Vol.7, No.7(2021), 110.
- [8] H.Q. Cai, K., Hamm, L. Huang, J.Q. Li, and T. Wang, "Rapid Robust Principal Component Analysis: CUR Accelerated Inexact Low Rank Estimation," *IEEE Signal Processing Letters*, Vol. 28 (2021), 116-120.
- [9] K. Hamm and L. Huang, "Perturbations of CUR Decompositions," *SIAM Journal on Matrix Analysis and Applications (SIMAX)*, Vol.42, No.1 (2021), 351-375.
- [10] K. Hamm and L. Huang, "Stability of Sampling for CUR Decompositions," *Foundations of Data Science*, Vol. 2, No. 2 (2020), 83-99.
- [11] K. Hamm and L. Huang, "Perspectives on CUR Decompositions," *Applied and Computational Harmonic Analysis*, Vol. 48, No. 3 (2020), 1088-1099.
- [12] A. Aldroubi, L. Huang, and A. Petrosyan, "Frames induced by the action of continuous powers of an operator," *Journal of Mathematical Analysis and Applications*, Vol.478, No.2 (2019), pp.1059-1084.
- [13] A. Aldroubi, L. Huang, I. Krishtal, R. Lederman, A. Ledeczki, and P. Volgyesi, "Dynamical sampling with additive random noise," *Sampling Theory in Signal and Image Processing*, Vol.17, No.2 (2018), pp.153-182.
- [14] L. Huang and T. Wang, "On the number of neighbors in normal tiling," *SIAM Journal of Discrete Mathematics*, Vol. 31, Issue 1 (2017), pp. 240-253.

Conference Publications

- [1] X. Li, L. Huang, and D. Needell."Distributed randomized Kaczmarz for adversarial workers," Proc. 53rd Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, November, 2021.
- [2] H.Q. Cai, Z. Chao, L. Huang, D. Needell, "Fast Robust Tensor Principal Component Analysis via Fiber CUR Decomposition," *IEEE/CVF International Conference on Computer Vision (ICCV) Workshops*, 2021.
- [3] R. Grotheer, K. Ha, L. Huang, Y. Huang, A. Kryshchenko, O. Kryshchenko, P. Li, X. Li, D. Needell, E. Rebrova, "COVID-19 Literature Topic-Based Search via Hierarchical NMF," *EMNLP 2020 Workshop NLP-COVID*
- [4] Z. Chao, L. Huang, and D. Needell, "Tensor Completion through Total Variation with Initialization from Weighted HOSVD," Proc. Information Theory and Applications (ITA 2020), San Diego, CA, February.

- [5] A. Aldroubi, L. Huang, K. Kornelson, and I. Krishtal, "Dynamical Sampling with a Burst-like Forcing Term," 13th International Conference on Sampling Theory and Applications (SampTA 2019), Bordeaux, France.
- [6] K. Hamm and L. Huang, "On Column-Row Matrix Approximations," 13th International Conference on Sampling Theory and Applications (SampTA 2019), Bordeaux, France.
- [7] A. Aldroubi, L. Huang, I. Krishtal, and R. Lederman, "Dynamical sampling with random noise," *2017 International Conference on Sampling Theory and Applications (SampTA)*, Tallin, Estonia, 2017, pp.409-412.

Poster

- "Numerical testing for Dynamical Sampling," *Workshop on Recent Developments on Mathematical/Statistical approaches in Data Science (MSDAS)*, June, 2019
- "Numerical testing for Dynamical Sampling," *February Fourier Talks 2018*, February, 2018
- "Expected Precision and Bias of T_1 and T_2 Relaxation Rates Derived from Magnetic Resonance Fingerprinting," *The Conference of the Frontiers of Biomedical Imaging Science VI*, May, 2017

Invited Research Visit

- [1] Northern Illinois University, Host: Professor Ilya Krishtal, September 2019

Talk

- [1] "CUR Decompositions and their Applications," CodEx Seminar, Online, August 24, 2021. [\[video\]](#)
- [2] "Tensor Completion through Total Variation with Initialization from Weighted HOSVD," Information Theory and Applications Workshop, San Diego, CA, February 3, 2020
- [3] "CUR Decompositions and Perturbations," Joint Mathematics Meetings, AMS Special Session on Group Actions in Harmonic Analysis, Denver, CO, January 15, 2020.
- [4] "CUR Decompositions and Perturbations," Approximation Theory 16, Vanderbilt in Nashville, Tennessee, May 20, 2019
- [5] "Dynamical Sampling," the AWM research symposium 2019, Rice University in Houston, Texas, April 6, 2019
- [6] "Dynamical Sampling with additive Random noise," Second International Conference on Mathematics of Data Science, Old Dominion University in Norfolk, Virginia, Nov 4, 2018
- [7] "Dynamical Sampling in Continuous time," Special Session on Applied Harmonic Analysis: Frame Theory and Applications, Fall Western Sectional Meeting, San Francisco, CA, October 27, 2018
- [8] "Dynamical Sampling," Seminar talk, Georgia Institute of Technology, October 17, 2018
- [9] "On noise and unknown evolution operators in dynamical sampling," Oak Ridge National Laboratory, July 19, 2018
- [10] "Frames Induced by the Continuous Actions of an Operator," *7th International Conference on Computational Harmonic Analysis*, Nashville, May 15, 2018
- [11] "Frames Induced by the Action of Continuous Powers of an Operator", *The Conference of AMS Nashville*, April 15, 2018

- [12] “Dynamical Sampling in Continuous time,” *Special Session on Applied Harmonic Analysis: Frames, Samplings, and Applications, AMS Fall South-eastern Sectional Meeting*, Orlando, FL, September 23, 2017
- [13] “Dynamical Sampling in random noise,” *12th International Conference on Sampling Theory and Applications (SampTA 2017)*, Tallinn, Estonia, July 6, 2017

Additional Training

- [1] Scientific Machine Learning, ICERM Topical Workshop, Providence, RI, **January 28–30, 2019**
- [2] Math + X Symposium on Inverse Problems and Deep Learning in Space Exploration, Rice University, **January 23–25, 2019**
- [3] Data Sparse Approximations and Algorithms of Gene Golub SIAM Summer School, Akademie Berlin-Schmöckwitz, Germany, **May 29–June 9, 2017**
- [4] The Eigenvalues Problems of Scientific Computational Summer School, Institute of Software, Chinese Academy of Sciences, Beijing, China, **July 22–27, 2013.**
- [5] “Personal investment based on neural network algorithm”, Undergraduate Research Project of Guangdong Province Sun Yat-sen University, Supervised by Professor Peixing Li, **Sep 2010–Mar 2012.**

Summer REU Mentored

- 2021 Research Experience for Undergraduates (REU), Applied Mathematics, UCLA Data Science for Innocence

Team members:

PI: Deanna Needell;

Mentor: Longxiu Huang;

Comentors: Joyce Chew, Ben Jarman;

Students: Pengyu Li, Imani Maliti, Christine Tseng, Yaxuan Zheng.

Teaching and grading

- Instructor, Mathematical Modeling Math 142, 2020 Fall, 2021 Spring and Fall
- Instructor, Applied Numerical Methods Math 151B, 2021 Winter, Spring
- Instructor, Directed Research for Undergraduates Math 199, 2021 Winter
- Instructor, Introduction to Discrete Structures Math 61(141 Students), 2020 Spring
- Instructor, Linear Algebra and its Applications 33A, 2019 Fall (160 students), 2020 Winter (78 students)
- Instructor, Linear Algebra 115A, 2019 Fall
- Teaching assistant, Multivariable Calculus and Linear Algebra, 2018 Spring.
- Teaching assistant, Differential Equations with Linear Algebra, 2017 Spring.
- Teaching assistant, Accelerated Single-Variable Calculus 1300, 2016 Fall, 2017 Fall, 2018 Fall

- Teaching assistant, Accelerated Single-Variable Calculus 1301, 2016 Spring, 2019 Spring
- Grader, Introduction to Numerical Mathematics, 2015 Fall.

Referee Work

SIAM Journal on Mathematics of Data Science (SIMODS)
Machine Learning
Applied and Computational Harmonic Analysis
The Journal of “Sampling Theory, Signal Processing, and Data Analysis”
Journal of Machine Learning Research
Linear Algebra and its Applications
Journal of Mathematical Analysis and Applications
IEEE Transactions on Knowledge and Data Engineering
Discrete and Continuous Dynamical Systems Series S
Mathematical Reviews
International Conference on Computer Vision (ICCV) Workshop 2021
SampTA Conference Proceedings

Programming Skills

Matlab, Julia, Cuda C, C, C++, Python

Language Skills

English, Chinese