

Educational Background

2005.09 – 2010.07	Ph.D. in Applied Mathematics; University of Alberta, Canada; Supervisor: Prof. Bin Han
2003.09 – 2005.07	M.Sc. in Mathematics and Applied Mathematics; Sun Yat-sen University, China; Supervisor: Prof. Dao-Qing Dai
1999.09 – 2003.07	B.Sc. Major in Mathematics and Applied Mathematics and Minor in Computer Science; Sun Yat-sen University, China



Employment History

2024.07 –	Professor, City University of Hong Kong, Hong Kong
2018.07 – 2024.06	Associate Professor, City University of Hong Kong, Hong Kong
2018.09 – 2021.08	Associate Head, City University of Hong Kong, Hong Kong
2012.12 – 2018.06	Assistant Professor, City University of Hong Kong, Hong Kong
2012.07 – 2012.12	PIMS & MITAC PDF, University of Alberta, Canada; Advisor: Yaushu Wong
2011.10 – 2012.06	PDF, Technical University of Berlin, Germany; Advisor: Gitta Kutyniok
2010.09 – 2011.09	PDF, University of Osnabrueck, Germany; Advisor: Gitta Kutyniok
2005.09 – 2010.07	Research Assistant, University of Alberta, Canada
2010.07 – 2010.08	Summer Term Instructor, University of Alberta, Canada
2005.09 – 2010.04	Teaching Assistant, University of Alberta, Canada
2003.09 – 2005.07	Research Assistant, Sun Yat-sen University, China

Honors And Awards

2013.07	Early Career Award, 2013/2014, RGC, Hong Kong
2012.06	Oberwolfach Leibniz Graduate Student, Oberwolfach, Germany
2009.09	Eoin L Whitney Scholarship, University of Alberta, Canada
2008.12	Dr. Josephine Mitchell Graduate Research Prize, University of Alberta, Canada
2006.09	Provost Doctoral Entrance Award and Josephine Mitchell Scholarship, University of Alberta, Canada
2005.09	Provost Doctoral Entrance Award, University of Alberta, Canada
2002.09	1st Class Scholarship, and Lenovo Scholarship, Sun Yat-Sen University, China
2001.09	3rd Class Scholarship, Sun Yat-Sen University, China
2000.09	2nd Class Scholarship, and J.C. Hu & S.Q. Xu Memorial Scholarship, Sun Yat-Sen University, China

Research Interests

Applied and Computational Harmonic Analysis; Sparse Approximation; Directional Multiscale Representation Systems; Deep/Machine Learning and Pattern Recognition; Compressed Sensing; Image/Signal Processing.

Professional Service

A. Editorial Service: Multidimensional Systems and Signal Processing (SCI Journal, **Associate Editor**, since 2013); MDPI:Axioms (SCI Journal, **Topical Advisory Panel**, since 2021).

B. Referee Service: Acta Applicandae Mathematicae; Adv. in Computational Mathematics; Analysis and Applications; Annals of Functional Analysis; Appl. Computational Harmonic Analysis; Appl. Mathematics Letters; Artificial Intelligence Review; Banach Journal of Mathematical Analysis; Biomedical Signal Processing and Control; Bulletin of the Iranian Mathematical Society; Bulletin of the Malaysian Mathematical Sciences Society; Computer Vision and Image Understanding; Constructive Approximation; IEEE Trans. on Information Theory; IEEE Trans. on Neural Networks and Learning Systems; IEEE Trans. on Signal Processing; Information Fusion; International Journal of Mathematical, Engineering and Management Sciences; International J. of Numerical Analysis and Modeling, Series B; International J. of Wavelets, Multiresolution and Information Processing; International J. on Geomathematics; J. of Approximation Theory; J. of Computational and Applied Mathematics; J. of Computational Mathematics; J. of Fourier Analysis and Applications; Journal of the Franklin Institute; J. of Machine Learning Research; J. of Mathematical Analysis and Applications; J. of Mathematical Imaging and Vision; J. of Scientific Computing; Knowledge-Based Systems; Lecture Notes in Computer Sciences; Mathematics and Computers in Simulation; Mathematical Foundations of Computing; Mathematical Reviews (MR); MDPI: AppliedMath; Multidimensional Systems and Signal Processing; Neurocomputing; Neural Computing and Applications; Neural Networks; Neural Processing Letters; Numerical Functional Analysis and Optimization; Numerical Mathematics: Theory, Methods, and Applications; Optica Applicata; Pattern Recognition; Proceedings of the International Conference on Sampling Theory and Applications; SCIENCE CHINA Mathematics; SIAM J. on Control and Optimization; SIAM J. on Mathematical Analysis; SN Partial Differential Equations and Applications; Zentralblatt MATH.

Publication List

A. Articles Published or Accepted in Refereed Journals

1. Li M., Fang Y., Shen D., Feng H., Zhuang X., Xia K., and Lio P. (2026) **High-Pass Matters: Theoretical Insights and Sheaflet-Based Design for Hypergraph Neural Networks**. AAAI 2026.
2. Li M., Wang Y., Gao C., Bai L., Fang Y., Zhuang X., and Lio P. (2026) **Permutation Equivariant Framelet-based Hypergraph Neural Networks**. AAAI 2026.
3. Zheng R. and Zhuang X. (2026) **On the Probability Estimates of Quadrature Rules from Uniformly Sampled Points on Spheres**. Analysis and Applications. <https://doi.org/10.1142/S0219530526500119>.
4. Yang G., Li M., Feng H., and Zhuang X. (2026) **Deeper Insights into Deep Graph Convolutional Networks: Stability and Generalization**. IEEE Transactions on Pattern Analysis and Machine Intelligence. <https://doi.org/10.1109/TPAMI.2025.3616350>.
5. Xiao Y. and Zhuang X. (2025) **Spherical Designs for Function Approximation and Beyond**. Sampling Theory, Signal Processing, and Data Analysis. 23:9. <https://doi.org/10.1007/s43670-025-00105-4>
6. Li M., Gu Y., Wang Y., Fang Y., Lu B., Zhuang X., and Lio P. (2025) **When Hypergraph Meets Heterophily: New Benchmark Datasets and Baseline**. Proceedings of the AAAI Conference on Artificial Intelligence (AAAI 2025), 39(17), 18377-18384. <https://doi.org/10.1609/aaai.v39i17.34022>
7. Li Y.-R., Liu J., Ye Z., Shen L., and Zhuang X. (2025) **Enhancing Noise Robustness in Focus Measure Using Tight Framelet Features**. IEEE Signal Processing Letter. 32: 1435-1439. <https://doi.org/10.1109/LSP.2025.3553425>
8. Zheng R. and Zhuang X. (2024.11) **On the existence and estimates of nested spherical designs**. Applied and Computational Harmonic Analysis. 73: 101672. <https://doi.org/10.1109/TNNLS.2024.3370918>.
9. Li J., Zheng R., Feng H., Li M., and Zhuang X. (2024) **Permutation equivariant graph framelets for heterophilous graph learning**. IEEE Transactions on Neural Networks and Learning Systems. Doi: <https://doi.org/10.1109/TNNLS.2024.3370918>.
10. Li Y.-R., Chan R. H. F., Shen L., Zhuang X., Wu R., Huang Y., and Liu J. (2024.06) **Exploring structural sparsity of coil images from 3-dimensional directional tight framelets for SENSE reconstruction**. SIAM Journal on Imaging Sciences. 17(2) : 888 - 916. <https://doi.org/10.1137/23M1571150>.
11. Li J., Feng H., and Zhuang X. (2024.04) Convolutional neural networks for spherical signal processing via area-regular spherical Haar tight framelets. *IEEE Transaction on Neural Networks and Learning Systems*. 35(4): 4400 – 4410. <https://doi.org/10.1109/TNNLS.2022.3160169>.
12. Li M., Zhuang X., Bai L., and Ding W. (2024.01) **Multimodal graph learning based on 3D Haar semi-tight framelet for student engagement prediction**. Information Fusion. <https://doi.org/10.1016/j.inffus.2024.102224>.
13. Xiao Y. and Zhuang X. (2023) Spherical framelets from spherical designs. *SIAM Journal on Imaging Sciences*, 16(4) : 2072 - 2104. <https://doi.org/10.1137/22M1542362>.
14. Li Y.-R., Shen L., and Zhuang X. (2022.09) A tailor-made 3-dimensional directional Haar semi-tight framelet for pMRI reconstruction. *Applied and Computational Harmonic Analysis*. 60: 446-470. <https://doi.org/10.1016/j.acha.2022.04.003>.
15. Zheng X., Zhou B., Wang Y. G. and Zhuang X. (2022.01) Decimated framelet system on graphs and fast G-framelet transforms, *Journal of Machine Learning Research*, 23(18): 1-68. <https://jmlr.org/papers/v23/20-1402.html>.
16. Li Y.-R., Chan R. H., Shen L., and Zhuang X., (2021.07) Regularization with multilevel non-stationary tight framelets for image restoration, *Applied and Computational Harmonic Analysis*, 53: 332-348. <https://doi.org/10.1016/j.acha.2021.03.003>.
17. Xiao Y. and Zhuang X. (2021.04) Adaptive directional Haar tight framelets on bounded domains for digraph signal representations, *Journal of Fourier Analysis and Applications*, 27:7. <https://doi.org/10.1007/s00041-021-09816-3>.
18. Zhang J., Aviles-Rivero A. I., Heydecker D., Zhuang X., Chan R. H., Schönlieb C. B. (2021.04) Dynamic spectral residual superpixels, *Pattern Recognition*. 112: 107705. <https://doi.org/10.1016/j.patcog.2020.107705>.
19. Wang Y. G., Li M., Ma Z., Montufar G., Zhuang X., and Fan Y. (2020.07) Haar graph pooling. *Proceedings of ICML 2020 (ICML 2020)*: 3807-3817. (arXiv:1909.11580). <http://proceedings.mlr.press/v119/wang20m.html>.
20. Li M., Ma Z., Wang Y. G., and Zhuang X. (2020.08) Fast Haar transforms for graph neural networks, *Neural Networks*, 128: 188-198. <https://doi.org/10.1016/j.neunet.2020.04.028>.
21. Wang, Y.G., and Zhuang X. (2020.01) Tight framelets and fast framelet transforms on manifolds, *Applied and Computational Harmonic Analysis*, 48 (1): 64-96. <https://doi.org/10.1016/j.acha.2018.02.001>.
22. Han B., Mo Q., Zhao Z., and Zhuang X. (2019.10) Compactly supported directional tensor product complex tight framelets with applications to image denoising and inpainting, *SIAM Journal on Imaging Sciences*, 12 (4): 1739-1771. <https://doi.org/10.1137/19M1249734>.
23. Chao S. and Zhuang X. (2019.08) A study concerning soft computing approaches for stock price forecasting. *Axioms*, 8 (4): 116. <https://doi.org/10.3390/axioms8040116>.
24. Han B., Li T., and Zhuang X. (2019.05) Directional compactly supported box spline tight framelets with simple geometric structure. *Applied Mathematics Letters*, 91: 213 – 219. <https://doi.org/10.1016/j.aml.2018.12.016>.
25. Che Z., and Zhuang X. (2018.08) Digital affine shear filter banks with 2-layer structure and their applications in image processing, *IEEE Transaction on Image Processing*, 27 (8): 3931-3941. <https://doi.org/10.1109/TIP.2018.2829603>.
26. Han B., Jiang Q. T., Shen Z. W., and Zhuang X. (2018.01) Symmetric canonical quincunx tight framelets with high vanishing moments and smoothness. *Mathematics of Computation*, 87 (309):347-379. <https://doi.org/10.1090/mcom/3205>
27. Chui C. K., Mhaskar H. N., and Zhuang X. (2018.01) Representation of functions on big data associated with directed graphs. *Applied and Computational Harmonic Analysis*, 44 (1):165-188. <http://dx.doi.org/10.1016/j.acha.2016.12.005>.

28. Zhuang X. (2017.07) Quincunx fundamental refinable functions in arbitrary dimensions. *Axiom*, 6 (3):20. <http://dx.doi.org/10.3390/axioms6030020>.
29. Zhuang X. (2016.09) Digital affine shear transforms: fast realization and applications in image/video processing. *SIAM Journal on Imaging Sciences*, 9 (3):1437-1466. <http://dx.doi.org/10.1137/15M1048318>.
30. Han B., Zhao Z., and Zhuang X. (2016.09) Directional tensor product complex tight framelets with low redundancy. *Applied and Computational Harmonic Analysis*, 41 (2): 603-637. <http://dx.doi.org/10.1016/j.acha.2015.07.003>.
31. Chui C. K., De Villiers J., and Zhuang X. (2016.07) Multirate systems with shortest spline-wavelet filters. *Applied and Computational Harmonic Analysis*, 41 (1): 266-296. <http://dx.doi.org/10.1016/j.acha.2015.06.002>.
32. Han B. and Zhuang X. (2015.09) Smooth affine shear tight frames with MRA structures, *Applied and Computational Harmonic Analysis*, 39 (2): 300-338. <http://dx.doi.org/10.1016/j.acha.2014.09.005>.
33. Bodmann B. G., Kutyniok G., and Zhuang X. (2015.01) Gabor shearlets, *Applied and Computational Harmonic Analysis*, 38 (1):87-114. <http://dx.doi.org/10.1016/j.acha.2014.03.006>.
34. Tan C. and Zhuang X. (2014.06) The common Hardy space and BMO space for singular integral operators associated with isotropic and anisotropic homogeneity, *Journal of Mathematical Analysis and Applications*. 414: 480-487. <http://dx.doi.org/10.1016/j.jmaa.2013.12.037>.
35. King E. J., Kutyniok G., and Zhuang X. (2014.02) Analysis of inpainting via clustered sparsity and microlocal analysis, *Journal of Mathematical Imaging and Vision*. 48 (2): 205-234. <http://dx.doi.org/10.1007/s10851-013-0422-y>.
36. Han B. and Zhuang X. (2013.01) Algorithms for matrix extension and orthogonal wavelet filter banks over algebraic number fields. *Mathematics of Computation*. 82 (281): 459-490. <http://dx.doi.org/10.1090/S0025-5718-2012-02618-4>.
37. Specktor S. and Zhuang X. (2012) Asymptotic Bernstein type inequalities and estimation of wavelet coefficients. *Methods and Applications of Analysis*. 19 (3): 289-312. <http://dx.doi.org/10.4310/MAA.2012.v19.n3.a4>.
38. Kutyniok G., Shaharm M., and Zhuang X. (2012) ShearLab: A rational design of a digital parabolic scaling algorithm. *SIAM Journal on Imaging Sciences*. 5 (4):1291-1332. <http://dx.doi.org/10.1137/110854497>.
39. Mo Q. and Zhuang X. (2012) Matrix splitting with symmetry and dyadic framelet filter banks over algebraic number fields, *Linear Algebra and its Applications*. 437 (10): 2650-2679. <http://dx.doi.org/10.1016/j.laa.2012.06.039>.
40. Zhuang X. (2012) Matrix extension with symmetry and construction of biorthogonal multiwavelets with any integer dilation. *Applied and Computational Harmonic Analysis*. 33 (2): 159-181. <http://dx.doi.org/10.1016/j.acha.2011.10.003>.
41. Chui C. K., Han B. and Zhuang X. (2012) A dual-chain approach for bottom-up construction of wavelet filters with any dilation. *Applied Computational Harmonic Analysis*. 33 (2): 204-225. <http://dx.doi.org/10.1016/j.acha.2011.11.004>.
42. Han B. and Zhuang X. (2010) Matrix extension with symmetry and its applications to symmetric orthonormal multiwavelets. *SIAM Journal on Mathematical Analysis*. 42 (5): 2297-2317. <http://dx.doi.org/10.1137/100785508>.
43. Han B. and Zhuang X. (2009) Analysis and construction of Multivariate interpolating refinable function vectors. *Acta Applicandae Mathematicae*. 107:143-171. <http://dx.doi.org/10.1007/s10440-008-9399-8>.
44. Han B., Kwon S. G. and Zhuang X. (2009) Generalized interpolating refinable function vectors. *Journal of Computational and Applied Mathematics*. 227:254-270. <http://dx.doi.org/10.1016/j.cam.2008.03.014>.
45. Zhuang X. and Dai D. Q. (2007) Improved discriminate analysis for high dimensional data and its application to face recognition. *Pattern Recognition*. 40: 1570-1578. <http://dx.doi.org/10.1016/j.patcog.2006.11.015>.
46. Zhuang X., Dai D. Q. and Yuen P. C. (2005) Face recognition by inverse Fisher discriminant features. *Lecture notes in Computer Science*. 3832:92-98. http://dx.doi.org/10.1007/11608288_13.
47. Zhuang X. and Dai D. Q. (2005) Inverse Fisher discriminant criteria for small sample size problem and its application to face recognition. *Pattern Recognition*. 38: 2129-2194. <http://dx.doi.org/10.1016/j.patcog.2005.02.011>.

B. Book Chapters

- o Li Q. and Zhuang X. (2025) **Wavelets on the Interval: A Short Survey**. Book chapter in: Asharaf, N., Bauer, W., Bhat, B.V.R., Sarkar, J. (eds) Recent Developments in Spectral and Approximation Theory. ICSAT 2023. Trends in Mathematics. Birkhäuser, Cham. pp 111-143. https://doi.org/10.1007/978-3-031-90240-6_6
- o Dyn N. and Zhuang X. (2021) Linear Multiscale Transforms Based on Even-Reversible Subdivision Operators, book chapter in "Excursions in Harmonic Analysis, Volume 6: In Honor of John Benedetto's 80th Birthday", Springer. https://doi.org/10.1007/978-3-030-69637-5_16.
- o Kutyniok G., Lim W.-Q., and Zhuang X. (2011) Digital Shearlet Transforms, book chapter in "Shearlets: Multiscale Analysis for Multivariate Data", Springer. <http://dx.doi.org/10.1007/978-0-8176-8316-0>.
- o Zhuang X. (2010) Matrix extension with symmetry and its applications, Book chapter in *Approximation Theory XIII: San Antonio 2010*, M. Neamtu and L.L. Schumaker eds. Springer, 2012. http://dx.doi.org/10.1007/978-1-4614-0772-0_24.

C. Other Refereed Contributions

1. Zheng R., Li M., and Zhuang X. (2025) **High-Variance Graph Framelets for Heterophilous Graph Learning**. The 16th IEEE International Conference on Knowledge Graph (ICKG 2025), Limassol, Cyprus.
2. Li Q., Michelle M., Han B., and Zhuang X. (2025) **Wavelets on Intervals for Image Denoising**. 2025 International Conference on Sampling Theory and Applications (SampTA), Vienna, Austria.

3. Chan H. F., Lu Y., Qiu C., Xie J., Yung S. P., Zhang K., and Zhuang, X. (2025.05) **Breast Cancer Classification Through Meta-Learning on Multimodal MRIs**. 2025 IEEE World AI IoT Congress (AllIoT), Seattle, USA. <https://doi.org/10.1109/AllIoT65859.2025.11105353>
4. Xiao Y. and **Zhuang X.** (2023.07) Denoising on Sphere via Large Spherical t-designs and Spherical Framelets. SampTA 2023. <https://doi.org/10.1109/SampTA59647.2023.10301196>.
5. Wang Y.G. and **Zhuang X.** (2019.09) Tight framelets on graphs for multiscale data analysis. *Wavelets and Sparsity XVIII, SPIE Proc.* 11138-11. <https://doi.org/10.1117/12.2528414>.
6. Li Y.-R. and **Zhuang X.** (2019.09) Parallel magnetic resonance imaging reconstruction algorithm by 3-dimension directional Haar tight framelet regularization. *Wavelets and Sparsity XVIII, SPIE Proc.* 11138-47. <https://doi.org/10.1117/12.2528788>.
7. **Zhuang X.** and Han B. (2019) Compactly supported tensor product complex tight framelets with directionality. *The 13th International Conference on Sampling Theory and Applications (SampTA2019), Bordeaux, France.* <https://doi.org/10.1109/SampTA45681.2019.9030961>.
8. Che Z. and **Zhuang X.** (2017.09) Affine shear tight frames with two-layer structure. *Wavelets and Sparsity XVII, SPIE Proc.* 10394-22. <http://dx.doi.org/10.1117/12.2272398>
9. Che Z. and **Zhuang X.** (2017.09) Digital affine shear filter banks with 2-layer structure. *2017 International Conference on Sampling Theory and Applications (SampTA), Tallinn, Estonia.* 575-579. <http://dx.doi.org/10.1109/SAMPTA.2017.8024369>.
10. **Zhuang X.** (2015.08) Smooth affine shear tight frames: digitization and applications. *Wavelets and Sparsity XVI, SPIE Proc.* 9597.
11. Bodmann B. G., Kutyniok G., and **Zhuang X.** (2011) Coarse quantization with the fast digital shearlet transform. *Wavelet XI, San Diego, CA, SPIE Proc.* (8138). <http://dx.doi.org/10.1117/12.2186487>.
12. King E. J., Kutyniok G., and **Zhuang X.** (2011.09) Analysis of data separation and recovery problems using clustered sparsity. *Wavelet XI, San Diego, CA, SPIE Proc.* (8138). <http://dx.doi.org/10.1117/12.892720>.
13. Donoho D. L., Kutyniok G., Shahram M., and **Zhuang X.** (2011.09) A rational design of a digital shearlet transform. *The 9th International Conference on Sampling Theory and Applications*, Singapore.
14. **Zhuang X.** (2011) The digital shearlet transform on pseudo-polar grids. *Oberwolfach Report* 17/2011: 29-32.
15. **Zhuang X.** (2011) Interpolating refinable function vectors and matrix extension with symmetry. *Oberwolfach Report* 44/2010: 35-37.

D. Manuscripts Preprinted or Submitted

- Zheng R. and **Zhuang X.**, (2023) Data-Adaptive Graph Framelets with Generalized Vanishing Moments for Graph Signal Processing, arXiv: 2309.03537.

Organizing Activities

- 2024.05 [International Conference on Applied Mathematics](#) (ICAM2024), City University of Hong Kong, Hong Kong.
Co-Organized with Raymond CHAN, Hongyu LIU, Tao LU, Ya Yan LU, Chenchen MOU, Weifeng QIU, Jonathan James WYLIE, Ding-Xuan ZHOU
- 2023.05 [International Conference on Approximation Theory and Beyond](#), Nashville, USA.
Minisymposium: Sparsity for Data Representation and Learning: Analysis, Algorithms, and Applications.
Co-Organized with Lixin SHEN (*Syracuse Univ.*)
- 2023.05 [International Conference on Applied Mathematics](#) (ICAM2020+ICAM2022), City University of Hong Kong, Hong Kong.
Co-Organized with Raymond CHAN, Ya Yan LU, Junhui WANG, Roderick WONG, Ding-Xuan ZHOU
- 2022.02 [Hong Kong Mathematics Education Conference](#) (2021/22). 香港數學教育會議 2021/22, CityU, Hong Kong.
Co-Organized with 陳漢夫教授(*CityU*), 黃家樂先生(*HKU*), 何展鵬博士(*CityU*), 馬正源先生, 麥建偉先生, 潘維凱先生, 鄭恩樺女士(*CityU*)
- 2020.07 SIAM Conference on Imaging Sciences 2020, Toronto, Canada,
Minisymposium: Framelets, Compressed Sensing, Optimization, and Image Processing,
Co-Organized with Bin HAN(*Univ. of Alberta*)
- 2020.05 SIAM Conference on Mathematics of Data Science 2020, Cincinnati, Ohio, USA,
Minisymposium: Harmonic Analysis for Graph Signal Processing and Deep Learning Applications,
Co-Organized with Qiyu SUN (*University of Central Florida*)
- 2018.06 [SIAM Conference on Imaging Sciences 2018](#), Bologna, Italy,
Minisymposium: Framelets, Optimization, and Image Processing,
Co-Organized with Bin HAN (*Univ. of Alberta*), Yan-ran LI (*Shenzhen Univ.*), and Lixin SHEN (*Syracuse Univ.*)
- 2016.06 [International Conference on Applied Mathematics](#) (ICAM2016), City University of Hong Kong, Hong Kong.
Co-Organized with Ya Yan LU, Roderick WONG, Xiang ZHOU
- 2016.05 [15th International Conference on Approximation Theory](#), San Antonio, USA
Minisymposium: Sparse Approximation and Mathematical Imaging
Co-Organized with Bin HAN (*Univ. of Alberta*), Maria SKOPINA (*St. Petersburg State Univ.*)
- 2014.12 [The 5th Intl. Conf. on Scientific Computing and PDEs](#), Hong Kong Baptist University, Hong Kong
Minisymposium: Applied Harmonic Analysis and Sparse Approximation,
Co-Organized with Gitta KUTYNIOK (*TU-Berlin*)
- 2014.05 [SIAM Conference on Imaging Sciences 2014](#), Hong Kong Baptist University, Hong Kong
Minisymposium: Directional Multiscale Representation Systems and Mathematical Imaging, Organizer
- 2007.05 Summer School and Workshops on Mathematical Imaging and Digital Media. National Univ. of Singapore, Singapore.
“Student Seminar” Organizer

Invited and Plenary Talks**A. Plenary Speaker**

- 2024.12 [Learning on Graph 2024](#) (Meetup), 29/11-1/12, Duke Kunshan University, Kunshan, China
 2023.12 [Learning on Graph 2023](#) (Shanghai Meetup), 29/11-1/12, Shanghai Jiao Tong University, Shanghai, China
 2014.12 International Workshop on Wavelets, Frames and Applications – II, Dec 24-30, 2014. University of Delhi, India

B. Invited Presentations

- 2025.12 The Tenth Hangzhou International Conference on Harmonic Analysis and Applications, Hangzhou, China
 2025.12 The Second Sydney Workshop on Mathematics of Data Science, University of Sydney, Sydney, Australia
 2025.12 The SJTU-CityU Joint Workshop on Scientific Computing, Shanghai Jiao Tong University, Shanghai, China
 2025.11 ICKG2025 (online)
 2025.05 First Math Workshop of CityUHK and the Univ. of Edinburgh, CityUHK, Hong Kong
 2025.03 Advanced Methods and Theories in High-dimensional Image Processing, TYMRC, Kunming, China
 2025.02 [AAAI-2025](#), Philadelphia, USA
 2024.10 [Applied Geometry for Data Sciences Part I](#), National University of Singapore, Singapore
 2024.08 International Symposium on Approximation Theory and Computational Harmonic Analysis (ATCHA2024), Dalian University of Technology, Dalian, China
 2024.07 2024 应用与计算调和与分析国际会议 (2024 International Conference on Applied and Computational Harmonic Analysis), Lanzhou University, Lanzhou, China
 2024.06 [10th International Conference on Mathematical Methods for Curves and Surfaces](#) (MMCS10), University of Oslo, Oslo, Norway
 2023.12 Mathematics of Imaging and AI: Theories and Algorithms, Xiangtan University, Xiangtan, China
 2023.11 International Conference on Spectral and Approximation Theory (ICSAT-2023), Cochin University of Science and Technology, Kerala, India
 2023.08 ICIAM 2023 Tokyo, Waseda University, Tokyo, Japan
 2023.05 数据科学理论、算法与应用学术研讨会, Foshan, China
 2023.05 International Conference on Approximation Theory and Beyond, Nashville, USA
 2021.05 2021 Conference on Compressed Sensing, Learning Theory and Applications, Hangzhou, China
 2020.01 2020 Workshop on Optimal Configuration and Related Topics, Southwestern Univ. of Fin. & Econ., Chengdu, China
 2019.11 Fourth Hangzhou Workshop on Harmonic Analysis and Applications, Hangzhou, China
 2019.11 2019 Seminar on Machine Learning and Compressed Sensing Theory and Its Applications, Foshan, China
 2019.11 Seminar, University of Science and Technology Beijing, Beijing, China
 2019.08 Wavelets and Sparsity XVIII, SPIE Optical Engineering + Applications, San Diego, USA
 2019.07 Seminar, CAS, Beijing, China
 2019.07 The 13th Intl' Conf. on Sampling Theory and Applications (SampTA2019), Université de Bordeaux, Bordeaux, France
 2019.07 SPARS2019, INP-ENSEEIH, Toulouse, France
 2019.06 Seminar, HUST, Wuhan, China
 2019.05 Intl. Conf. on Computational Harmonic Analysis and Statistical Learning 2019, Hohai University, Nanjing, China
 2019.02 Joint Workshop on Mathematical Analysis and Applications, City Univ. of Hong Kong and Tel Aviv Univ. Hong Kong
 2018.12 International Workshop on Approximation Theory and Methods, Sun Yat-sen Univ., Guangzhou, China
 2018.11 Symposium on Applicable and Computational Analysis, TSIMF, Sanya, China
 2018.08 PIMS-AMI Workshop on Applied Harmonic Analysis and Statistical Learning, University of Alberta, Edmonton, Canada
 2018.06 International Symposium on Computational Harmonic Analysis, Beihang University, Beijing, China
 2018.06 Minisymposium: Framelets, Optimization, and Image Processing in SIAM Conf. on Imaging Science, Bologna, Italy.
 2018.05 7th International Conference on Computational Harmonic Analysis, Vanderbilt University, Nashville, Tennessee, USA
 2018.05 2nd Intl. Conference on Kernel-Based Approximation Methods, South China Normal University, Guangzhou, China
 2018.03 Fast Algorithms for Generating Static and Dynamically Changing Point Configurations, in ICERM Semester Program on "Point Configurations in Geometry, Physics and Computer Science", Brown University, Providence, RI, USA
 2017.12 From Approximation Theory to Real-World Applications, Tsinghua Sanya Intl' Mathematics Forum (TSIMF), Sanya, China
 2017.10 CityU-TAU Joint Workshop, Tel-Aviv University, Israel
 2017.09 Workshop on Mathematics for Data Sciences, Sun Yat-sen University, Zhuhai, China
 2017.08 Wavelets and Sparsity XVII, SPIE Optical Engineering + Applications, San Diego, USA
 2017.06 Joint Workshop on Mathematics and Applications, Wuhan University, Wuhan, China
 2017.06 Workshop on Computational Harmonic Analysis, NanKai University, Tianjin, China
 2017.05 Intl' Conf. of Kernel-Based Approximation Methods in Machine Learning, South China Normal Univ., Guangzhou, China
 2017.03 1st International Conference on Mathematics of Data Science, Baptist Univ., Hong Kong
 2017.03 2nd IM-Workshop on Applied Approximation, Signals and Images, Bernried, Germany
 2017.02 7th Workshop on High-Dimensional Approximation, University of New South Wales, Sydney, Australia
 2016.12 2016 Intl' Conf. on Some Mathematical Approximation Approaches in Data Science, Zhejiang Univ., Hangzhou, China
 2016.09 Mecklenburg Workshop on Approximation Methods and Data Analysis, University of Luebeck, Germany
 2016.06 International Conference: East Asia Section of SIAM (EASIAM 2016), University of Macau, Macau

- 2016.05 15th International Conference on Approximation Theory, San Antonio, USA
- 2016.02 IM-Workshop on Applied Approximation, Signals and Images, Bernried, Germany
- 2015.12 Workshop on Image Processing and PDE, Sun Yat-sen University, Guangzhou, China
- 2015.12 First Workshop on Computational Science, Jinan University, Guangzhou, China
- 2015.09 Workshop on PDE and Harmonic Analysis, City University of Hong Kong, Hong Kong
- 2015.08 SPIE on Wavelets and Sparsity XVI, San Diego, USA
- 2015.06 Intl' Conf. "Wavelets and Applications", Euler International Mathematical Institute, St. Petersburg, Russia
- 2015.01 Joint Workshop of Tel-Aviv University and City University of Hong Kong, City University of Hong Kong, Hong Kong
- 2014.12 The 5th Intl' Conf. on Scientific Computing and PDEs, Minisymposium on Applied Harmonic Analysis and Sparse Approximation, Hong Kong Baptist University, Hong Kong
- 2014.11 Workshop on Applied Harmonic Analysis and Approximation Theory, Sun Yat-sen University, Guangzhou, China
- 2014.11 ICERM Research Cluster: Computational Challenges in Sparse and Redundant Representations, Brown University, Providence, RI, USA
- 2014.06 International Conference on Harmonic Analysis and Applications, Nankai University, Tianjin, China
- 2014.05 5th International Conference on Computational Harmonic Analysis, Vanderbilt University, Nashville, USA
- 2014.05 Minisymposium: Directional Multiscale Representation Systems and Mathematical Imaging, SIAM Conference on Imaging Sciences, Hong Kong Baptist University, Hong Kong
- 2014.03 Workshop on Structured Preconditioning and Iterative Methods with Applications, TSIMF, Sanya, China
- 2014.04 Workshop on Applied Mathematics, City University of Hong Kong, Hong Kong
- 2013.12 The 2nd Guangzhou International Workshop on Mathematical Imaging, Sun Yat-sen University, Guangzhou, China
- 2013.08 Applied Harmonic Analysis Conference, University of Calgary, Calgary, Canada
- 2013.07 CMIV Workshop on Matrix Analysis and Applications, Hong Kong Baptist University, Hong Kong
- 2013.06 Seminar, School of Mathematical and Computational Sciences, Sun Yat-sen University, Guangzhou, China
- 2013.06 The Hong Kong Mathematical Society, Annual General Meeting, City University of Hong Kong, Hong Kong
- 2013.05 International Conference on Approximation Theory and Applications, City University of Hong Kong, Hong Kong
- 2013.04 14th International Conference in Approximation Theory, San Antonio, TX, USA
- 2013.04 Centre for Mathematical Imaging and Vision, Seminar, Hong Kong Baptist University, Hong Kong
- 2013.03 Mathematical Analysis and its Applications Colloquium, Liu Bie Ju Centre, City University of Hong Kong, Hong Kong
- 2012.11 PIMS/AMI Seminar, University of Alberta, Canada
- 2012.10 Imaging Seminar, University of Houston, USA
- 2012.08 Joint AB/BC Seminar, UBC, Canada
- 2012.06 Learning Theory and Approximation, Oberwolfach, Germany
- 2012.04 Campus Visit, City University of Hong Kong, Hong Kong
- 2011.07 Intl' Conf. on Applied Harmonic Analysis and Multiscale Computing, Univ. of Alberta, Edmonton, Canada
- 2011.06 Poster session in From Abstract to Computational Harmonic Analysis, Strobl, Austria
- 2011.05 Oberseminar, Jacobs University, Bremen, Germany
- 2011.05 International Symposium in Approximation Theory, Vanderbilt University, USA
- 2011.05 The 9th International Conference on Sampling Theory and Applications, Nanyang Technological University, Singapore
- 2011.03 Operator Algebras and Representation Theory: Frames, Wavelets and Fractals, Oberwolfach, Germany
- 2011.01 Sparse Representations and Efficient Sensing of Data, Dagstuhl, Germany
- 2010.10 Mini-workshop: Shearlets, Oberwolfach, Germany
- 2010.03 13th International Conference on Approximation Theory, San Antonio, USA
- 2010.01 Workshop on Optimal Frames and Operator Algebras, 2010 AMS National Meeting, San Francisco, USA
- 2009.01 Applied Mathematics Graduate Student Conference (AMGSC 2009), Simon Fraser University, Vancouver, Canada
- 2008.06 Summer School and Workshops on Mathematical Imaging and Digital Media, National Univ. of Singapore, Singapore
- 2008.04 Graduate Colloquium, University of Alberta, Edmonton, Canada

Grants

A. External Grants

No.	Approval Date	Project Title	Duration (Months)	PI/ Co-I	Funding Size	Funding Source	Status
11	2025.07.01	Nested Spherical Designs: Theory, Computation, and Applications	36	PI	882K	GRF	Ongoing
10	2024.07.01	Graph Framelets for Graph Deep Learning: Homophily and Heterophily	36	PI	637K	GRF	Ongoing
9	2023.08.29	Artificial Intelligence Methods and Applications for Breast Cancer Diagnosis and Treatment in Clinical Trials	24	Co-I	2,107K	ITF	Ongoing
8	2023.07.01	Framelets for Geometric Deep Learning: Spheres, Graphs, and Neural Networks	36	PI	643K	GRF	Ongoing
7	2022.07.01	Directional Framelets on Compact Sets: Theory, Construction, Realization, and Applications	36	PI	793K	GRF	Ongoing
6	2021.05.13	Development e-Math. Help Centre for e-Learning and e-Teaching of Fundamental Mathematical Courses via Modern Digital Technologies	24	PI	1,042K	UGC VTL Grant	Completed
5	2019.07.01	Framelets on Graphs for Deep Learning Applications	24	PI	332K	GRF	Completed
4	2018.07.01	Multiscale Data Analysis: Directional Framelets on Manifolds and Graphs	36	PI	456K	GRF	Completed
3	2017.07.01	Dual Framelets on Manifolds and Graphs with Applications in Multiscale Data Analysis	24	PI	315K	GRF	Completed
2	2014.07.01	On the Design and Applications of Multidimensional Subdivision Schemes and Directional FIR Filter Banks	42	PI	615K	GRF	Completed
1	2013.07.01	Directional Multiscale Representation Systems: Theory, Design, and Applications	42	PI	348K	ECS	Completed

B. Internal Grants

No.	Approval Date	Project Title	Duration (Months)	PI/ Co-I	Funding Size	Funding Source	Status
7	2024.11.01	Team-Based Learning with Artificial Intelligence in Mathematics	7	PI	240K	CityU TDG	Completed
6	2023.12.12	AI Method for Breast Cancer Detection	36	Co-I	274K	CityU	Ongoing
5	2023.09.13	Blended Learning in Statistics with AI Integration	4	PI	100K	CityU TDG	Completed
4	2021.09.01	Directional Framelets on Bounded Domains for Applications in Deep Learning and Mathematical Imaging	24	PI	100K	CityU SRG	Completed
3	2020.09.01	Adaptive Directional Framelets on Bounded Domains and Their Applications	24	PI	100K	CityU SRG	Completed
2	2015.09.01	Directional Multiscale Representation Systems with Low Redundancy Rate and Their Applications in High-Dimensional Data Analysis	24	PI	100K	CityU SRG	Completed
1	2015.05.22	Directional Multiscale Representation Systems in Manifold Learning	30	PI	200K	CityU stUp	Completed

Courses Taught@CityU

2013.01 – 2025.12 MA4542 Real Analysis (4 times), MA4537 Introduction to Actuarial Science (5), MA3522 Analysis (1), MA3518 Applied Statistics (3), MA3001 Differential Equations (1), MA2508 Multivariate Calculus (2), MA2507 Computing Mathematics Laboratory (1), MA2185 Discrete Mathematics (1), MA2172 Applied Statistics for Sciences and Engineering (5), MA2149 Mathematical Analysis (1), MA2001 Multivariate Calculus and Linear Algebra (12), MA1200 Calculus and Basic Linear Algebra I (1).

Student Supervisions**A. Ph.D. Students**

2025.09- Zehua FANG
 2024.09- Chenghao QIU (Co-Supervised with Prof. Raymond CHAN)
 2023.09- Quanhan LI
 2021.09-2025.07 Ruigang ZHENG
 2020.09-2024.08 Yuchen XIAO; Jianfei LI (Co-Supervised with Prof. Han FENG)
 2019.09-2023.08 Shuqi CHEN (Co-Supervised with Prof. Daniel W C HO)
 2021.10-2022.08 Bo XIAO (Co-Supervised with Prof. Xiang ZHOU and Prof. Wonjung LEE)
 2015.09-2018.08 Zhihua CHE

B. M.Sc Project Students

2024.09-2025.05 Botao CUI
 2022.09-2023.05 Quanhan LI
 2018.09-2019.05 Chao SHI

C. B.Sc Final Year Project Students

2025.09-2026.05 Ji FENG
 2024.09-2024.05 Shiyue PENG
 2023.09-2024.05 Zhongxi ZHU
 2022.09-2023.05 Zirui ZHANG
 2021.09-2023.05 Zhuoya XU
 2020.09-2021.05 Baoli HAO
 2019.09-2020.05 Qingyuan ZHANG
 2018.09-2019.05 Lijia CHE, Haozhen BO
 2016.09-2017.05 Xinrui TAN
 2013.09-2014.05 Ka Wing HO

D. Research Undergraduate Students

2025.09-2025.12 Yikun BAI, Yufeng HAN (CIS), Zixu WANG (CIS)
 2025.06-2025.08 Yufeng HAN (STEM Internship), Ji FENG (CIS)
 2025.01-2025.05 Yufeng HAN (CIS), Jianbo HE
 2024.09-2024.12 Ali Raza JATOI (CIS), HE Jianbo
 2024.06-2024.08 Aday YARULIN (CIS)
 2023.09-2023.12 Ho Kan Howard CHEUNG (CIS)
 2023.06-2023.08 Trung Hai LE
 2023.01-2023.06 Vojin RADOVANOVIC (CIS), Yonghao YU, Harsh LALWANI.
 2021.06-2021.12 Muhammad Usman FAROOQ (CIS), Songlin JIN (UBC: Summer Exchange Intern Student)
 2020.09-2021.05 Zian CHEN (CIS)
 2020.12-2020.03 Kan Wong YIM Kent (CARLS)
 2020.09-2021.05 Anupam PANI (CIS)
 2020.02-2020.06 Baoli HAO (CIS)
 2018.09-2019.05 Xilin ZHANG (CIS)
 2018.07-2018.08 Jiamin WU, Chuxiao FENG (CIS)
 2017.10-2017.12 Hao Zhang, Wenxuan DAN (CIS)
 2017.06-2017.08 Zhen ZHANG, Hao ZHANG (CIS)

PhD Thesis Examiner

2025	Kangling CUI, Yueguang HU, Yan MA, Hieu GIANG, Ziyang LI, Yuqing LIU
2024	Jie LIU, Shen ZHANG, Yuxiang LIANG, Jun XIE, Shiqi TANG, Ruoning LI, Tina NGUYEN
2023	Shuo HUANG, Qiantong LIANG, Linjia DAI, Haoning WU (HKU, External)
2022	Yu ZHAI, Tong MAO, Zhongjie SHI
2021	Huihui QIN (PolyU, External Examiner), Wuguannan YAO