

## EDUCATIONAL BACKGROUND

2005.09 – 2010.07	Ph.D. in Applied Mathematics; University of Alberta, Canada; Supervisor: Prof. <a href="#">Bin Han</a>
2003.09 – 2005.07	M.Sc. in Mathematics and Applied Mathematics; Sun Yat-sen University, China; Supervisor: Prof. <a href="#">Dao-Qing Dai</a>
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: <a href="#">Yaushu Wong</a>
2011.10 – 2012.06	PDF, Technical University of Berlin, Germany; Advisor: <a href="#">Gitta Kutyniok</a>
2010.09 – 2011.09	PDF, University of Osnabrueck, Germany; Advisor: <a href="#">Gitta Kutyniok</a>
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; 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; 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; 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; Neural Computing and Applications; Neural Processing Letters; Numerical Functional Analysis and Optimization; Numerical Mathematics: Theory, Methods, and Applications; Optica Applicata; 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. 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>
2. Li J., Zheng R., Feng H., Li M., and Zhuang X. (2024) **Permutation equivariant graph framelets for heterophilous graph learning**. *IEEE Transaction on Neural Networks and Learning Systems*. Doi: <https://doi.org/10.1109/TNNLS.2024.3370918>
3. 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>.
4. 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>.
5. 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>.
6. 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>.
7. 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>.
8. 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>.
9. 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>.
10. 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>.
11. 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>.
12. 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>.
13. 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>.
14. 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>.
15. 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>.
16. 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>.
17. 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>.
18. 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>.
19. 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>
20. 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>.
21. **Zhuang X.** (2017.07) Quincunx fundamental refinable functions in arbitrary dimensions. *Axiom*, 6 (3):20. <http://dx.doi.org/10.3390/axioms6030020>.
22. **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>.
23. 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>.
24. 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>.
25. 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>.
26. 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>.
27. 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>.

28. 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>.
29. 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>.
30. 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>.
31. 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>.
32. 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>.
33. 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>.
34. 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>.
35. 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>.
36. 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>.
37. 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>.
38. Zhuang X. and Dai D. Q. (2007) Improved discriminant 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>.
39. 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](http://dx.doi.org/10.1007/11608288_13).
40. 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 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 80<sup>th</sup> Birthday", Springer. [https://doi.org/10.1007/978-3-030-69637-5\\_16](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](http://dx.doi.org/10.1007/978-1-4614-0772-0_24).

## C. Other Refereed Contributions

1. Xiao Y. and Zhuang X. (2023) Denoising on Sphere via Large Spherical t-designs and Spherical Framelets. *SampTA 2023*. <https://doi.org/10.1109/SampTA59647.2023.10301196>.
2. Wang Y.G. and Zhuang X. (2019) Tight framelets on graphs for multiscale data analysis. *Wavelets and Sparsity XVIII, SPIE Proc.* 11138-11. <https://doi.org/10.1117/12.2528414>.
3. Li Y.-R. and Zhuang X. (2019) 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>.
4. 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>.
5. Che Z. and Zhuang X. (2017) Affine shear tight frames with two-layer structure. *Wavelets and Sparsity XVII, SPIE Proc.* 10394-22. <http://dx.doi.org/10.1117/12.2272398>.
6. Che Z. and Zhuang X. (2017) 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/SAMPPTA.2017.8024369>.
7. Zhuang X. (2015) Smooth affine shear tight frames: digitization and applications. *Wavelets and Sparsity XVI, SPIE Proc.* 9597.
8. 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>.
9. King E. J., Kutyniok G., and Zhuang X. (2011) 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>.
10. Donoho D. L., Kutyniok G., Shahram M., and Zhuang X. (2011) A rational design of a digital shearlet transform. *The 9<sup>th</sup> International Conference on Sampling Theory and Applications*, Singapore.
11. Zhuang X. (2011) The digital shearlet transform on pseudo-polar grids. *Oberwolfach Report 17/2011*: 29-32.
12. 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.
- Yang G., Li M., Feng H., and **Zhuang X.** (2023) Towards Understanding the Stability and Generalization of Deep Graph Convolutional Networks: A Theoretical Study, submitted.

#### 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 [15<sup>th</sup> 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

- 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

- 2024.06 [10<sup>th</sup> 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
- 2023.11 2023 年压缩感知理论及其相关领域学术会议, Zhejiang University, Hangzhou, China
- 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 7<sup>th</sup> International Conference on Computational Harmonic Analysis, Vanderbilt University, Nashville, Tennessee, USA
- 2018.05 2<sup>nd</sup> 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 1<sup>st</sup> International Conference on Mathematics of Data Science, Baptist Univ., Hong Kong
- 2017.03 2<sup>nd</sup> IM-Workshop on Applied Approximation, Signals and Images, Bernried, Germany
- 2017.02 7<sup>th</sup> 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 15<sup>th</sup> 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 5<sup>th</sup> 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 5<sup>th</sup> 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 2<sup>nd</sup> 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 14<sup>th</sup> 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

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- 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**

<b>A. External Grants</b>							
No.	Approval Date	Project Title	Duration (Months)	PI/ Co-I	Funding Size	Funding Source	Status
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>B. Internal Grants</b>							
No.	Approval Date	Project Title	Duration (Months)	PI	Funding Size	Funding Source	Status
5	2023.09.13	Blended Learning in Statistics with AI Integration	4	YES	100K	CityU TDG	Completed
4	2021.09.01	Directional Framelets on Bounded Domains for Applications in Deep Learning and Mathematical Imaging	24	YES	100K	CityU SRG	Completed
3	2020.09.01	Adaptive Directional Framelets on Bounded Domains and Their Applications	24	YES	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	YES	100K	CityU SRG	Completed
1	2015.05.22	Directional Multiscale Representation Systems in Manifold Learning	30	YES	200K	CityU stUp	Completed

**COURSES TAUGHT@CITYU**

2013.01 – 2024.05 MA4542 Real Analysis (4 times), MA4537 Introduction to Actuarial Science (4), MA3522 Analysis (1), MA3518 Applied Statistics (1), MA3001 Differential Equations (1), MA2508 Multivariate Calculus (2), MA2507 Computing Mathematics Laboratory (1), MA2185 Discrete Mathematics (1), MA2172 Applied Statistics for Sciences and Engineering (2), 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**

2024.09- Chenghao QIU (Co-Supervisor Prof. Raymond Chan)  
 2023.09- Quanhan LI  
 2021.09- Ruigang ZHENG  
 2020.09-2024.08 Yuchen XIAO; Jianfei LI (Co-Supervisor Prof. Han FENG)  
 2019.09-2023.08 Shuqi CHEN (Co-Supervisor with Prof. Daniel W C HO)  
 2021.10-2022.08 Bo XIAO (Co-Supervisor with Prof. Xiang ZHOU, Prof. Wonjung LEE)  
 2015.09-2018.08 Zihua CHE

**B. M.Sc Project Students**

2022.09-2023.05 Quanhan LI  
 2018.09-2019.05 Chao SHI

**C. B.Sc Final Year Project Students**

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**

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**

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