

Curriculum Vitae of Ming-Jun Lai

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Academic Degrees

B. S. Jan., 1982 Hangzhou University, China
Ph. D. Aug., 1989 Texas A&M University (Advisor: Charles K. Chui)

Professional Experiences

1982-1984	Assistant Lecturer	Hangzhou University, China
1989-1992	Instructor	University of Utah, Utah, USA
1992-1995	Assistant Professor	University of Georgia, Georgia, USA
1995-2000	Associate Professor	University of Georgia, Georgia, USA
2000-present	Professor	University of Georgia, Georgia, USA
Jan.-May, 2003	Visiting Professor	Vanderbilt University, Tennessee, USA
Aug.-Dec., 2004	Visiting Professor	Georgia Institute of Technology, Atlanta, USA
April-May, 2006	Visiting Professor	University of Oslo, Oslo, Norway
Jan. 12-Feb. 12, 2014	Visiting Professor	Arizona State Univ., Phoenix, AZ, USA
April 30-May 20, 2015	Visiting Professor	University of Michigan, Ann Arbor, MI, U.S.A.
June 1-June 30, 2017	Visiting Professor	Hong Kong University of Science and Technology Hong Kong, China
May 20-June 10, 2018	Visiting Professor	Chinese University of Science and Technology, Hefei, China
June 23-July 22, 2018	Visiting Professor	Institute of Computational Mathematics, Chinese Academy of Science
June 1-Aug.3, 2019	Visiting Professor	Hangzhou Dianzi University, Xiasha, Hangzhou, China.

Specialization: Approximation Theory, Compressive Sensing, Computer Aided Geometric Design, Graph Clustering, Mathematical Image Analysis, Multivariate Splines, Numerical Analysis, Numerical Optimization, Numerical Solution of Partial Differential Equations, Wavelet and Frame Analysis.

Research and Related Activities

Publications

This section is divided into four parts: books (No. 1-3), journal papers (No. 4-113), referred conference proceeding papers (No. 114-146), and submissions.

a. books (monograph as well as conference proceedings)

- [1]G. Chen and M. -J. Lai (edited), *Wavelets and Splines, Athens, 2005*, 515 pages, Nashboro Press, Brentwood, Nashville, 2006.
- [2]M. -J. Lai and L. L. Schumaker, *Spline Functions over Triangulations*, 585+pages, Cambridge University Press, Cambridge, U.K. 2007.

[3]M.-J. Lai and Y. Wang, Sparse solutions of Underdetermined Linear Systems and Their Applications, 439+pages, SIAM Publication, 2021.

b. papers published in journals (No. 4– No. 113)

[4]M. -J. Lai, On estimations for the exact bounds of the coefficients of approximation by cubic spline interpolation, *Math. Numer. Sinica* **6**(1984), pp. 105-108.

[5]M. -J. Lai and X. H. Wang, A note to the remainder of a multivariate interpolation polynomial, *J. Approx. & Appli.* **1**(1984), pp. 57-63.

[6]M. -J. Lai and G. J. Feng, On the uniform convergence of the Birkhoff interpolation with two points, *Math. Numer. Sinica* **6**(1984), pp. 222-224.

[7]M. -J. Lai, Exact error bounds for cubic Birkhoff spline interpolation, *Numerical Math. J. Chinese Univ.* **7**(1985), pp. 369–372.

[8]M. -J. Lai and X. H. Wang, On multivariate Newtonian interpolation, *Scientia Sinica* **29** (1986), pp. 23-32.

[9]C. K. Chui and M. -J. Lai, Computation of box splines and B-splines on triangulations of nonuniform rectangular partitions, *J.Approx.Th. & Applic.* **3-4**(1987), pp. 37-62.

[10]C. K. Chui and M. -J. Lai, Multivariate analog of Marsden’s identity and a quasi-interpolation scheme, *Constructive Approximation* **3** (1987), pp. 111-122.

[11]G. R. Chen, C. K. Chui and M. -J. Lai, Construction of real-time spline quasi-interpolation scheme, *J. Approx. & Applic.* **4**(1988), pp. 61–75.

[12]M. -J. Lai, A remark on integer translates of a box spline, *J. Approx. & Applic.* **5**(1989), pp. 97–104.

[13]C. K. Chui and M. -J. Lai, Multivariate vertex splines and finite elements, *Journal of Approximation Theory* **60**(1990), pp. 245-343.

[14]C. K. Chui and M. -J. Lai, On bivariate super vertex splines, *Constructive Approximation* **6**(1990), pp. 399-419.

[15]M. -J. Lai, On dual functionals of polynomials in B-form, *Journal of Approximation Theory* **67**(1991), pp. 19–37.

[16]M. -J. Lai, Fortran subroutines for B-nets of box splines on three and four directional meshes, *Numerical Algorithm* **2**(1992), pp. 33–38.

[17]C. K. Chui and M. -J. Lai, Algorithms for generating B-nets and graphically displaying box spline surfaces, *Computer Aided Geometric Design* **8**(1992), pp. 479–493.

[18]M. -J. Lai, A characteristic theorem of multivariate splines in blossom form, *Computer Aided Geometric Design* **8**(1992), pp. 513–521.

[19]M. -J. Lai, Asymptotic formulae of multivariate Bernstein approximation, *Journal of Approximation Theory*, **70**(1992), pp. 229–242.

[20]M. -J. Lai, Some Sufficient Conditions for Convexity of Multivariate Bernstein-Bézier Polynomials and Box Spline Surfaces, *Studia Scientiarum Math. Hungarica* **28**(1993), pp. 363–374.

- [21]M. -J. Lai, A Serendipity Family of Locally Supported Splines in $S_8^2(\Delta)$, Journal of Approximation Theory and its Application **10**(1993), pp. 43–53.
- [22]M. -J. Lai, On computation of Battle-Lemarie’s wavelets, Mathematics of Computation **63**(1994), pp. 689–699.
- [23]M. -J. Lai, On Strömberg’s spline wavelets, Applied and Computational Harmonic Analysis **1**(1994), pp. 188–193.
- [24]M. -J. Lai, Approximation order from bivariate C^1 cubics on a four–directional mesh is full, Computer Aided Geometric Design **11**(1994), pp. 215–223.
- [25]M. -J. Lai, On the digital filter associated with Daubechies’ wavelets, IEEE Transactions on Signal Processing **43**(1995), pp. 2203–2205.
- [26]M. -J. Lai, Scattered data interpolation and approximation by C^1 piecewise cubic polynomials, Computer Aided Geometric Design **13**(1996), pp. 81–88.
- [27]M. -J. Lai, On the fundamental solutions for multivariate singular interpolation, Journal of Approximation Theory and its Application **12**(1996), pp. 73–92.
- [28]M. -J. Lai and P. Wenston, On multilevel bases for elliptic boundary value problems, Journal of Computational and Applied Mathematics **71**(1996), pp. 95–113.
- [29]M. -J. Lai, On C^2 quintic spline functions over triangulations of Powell-Sabin’s type, Journal of Computational and Applied Mathematics **73**(1996), pp. 135–155.
- [30]M. -J. Lai, Geometric interpretation of smoothness conditions of triangular polynomial patches, Computer Aided Geometric Design **14** (1997), pp. 191–199.
- [31]M. -J. Lai and L. L. Schumaker, Scattered data interpolation using piecewise polynomials of degree six, SIAM Journal on Numerical Analysis **34**(1997), pp. 905–921.
- [32]W. He and M. -J. Lai, On digital filters associated with bivariate box spline wavelets, Journal of Electronic Imaging **6**(1997), pp. 453–466.
- [33]M. -J. Lai and L. L. Schumaker, Approximation power of bivariate splines, Advances in Computational Mathematics **9**(1998), pp. 251–279.
- [34]W. He and M. -J. Lai, Construction of bivariate compactly supported biorthogonal box spline wavelets with arbitrarily high regularities, Journal of Applied Computational Harmonic Analysis **6**(1999), pp. 53–74.
- [35]M. -J. Lai and L. L. Schumaker, On the approximation power of splines on triangulated quadrangulations, SIAM Journal on Numerical Analysis **36** (1999), pp. 143–159.
- [36]M. -J. Lai and P. Wenston, On Schwarz’s domain decomposition methods for elliptic boundary value problems, Numerische Mathematik **84**(2000), pp. 475–495.
- [37]M. -J. Lai and P. Wenston, Bivariate spline method for numerical solution of Navier-Stokes equations over polygons in stream function formulation, Numerical Methods for P.D.E. **16**(2000), pp. 147–183.
- [38]W. He and M. -J. Lai, Examples of bivariate nonseparable compactly supported orthonormal continuous wavelets, IEEE Transactions on Image Processing **9**(2000), pp. 949–953.
- [39]C. K. Chui and M. -J. Lai, Filling polygonal holes using C^1 cubic triangular spline patches, Computer Aided Geometric Design **17**(2000), pp. 297–307.

- [40]M. -J. Lai, Convex preserving scattered data interpolation using bivariate C^1 cubic splines, Journal of Computational and Applied Mathematics **119**(2000), pp. 249–258.
- [41]C. K. Chui, M. -J. Lai, and J. Lian, Algorithms for G^1 connection of multiple parametric bicubic NURBS surfaces, Numerical Algorithm**23** (2000), pp. 285–313.
- [42]M. -J. Lai and L. L. Schumaker, Macro-Elements and Stable Local Bases for Splines on Clough-Tocher Triangulations, Numerische Mathematik**88**(2001), pp. 105-119.
- [43]X. H. Wang, C. Li, and M. -J. Lai, An Unified Convergence Theory for Newton’s Type Methods for Zeros of Nonlinear Operators in Banach spaces, BIT**42**(2002), pp. 206–213.
- [44]M. -J. Lai and L. L. Schumaker, Quadrilateral macro-elements, SIAM Journal on Mathematical Analysis**33**(2002), pp. 1107-1116.
- [45]M. von Golitschek, M. -J. Lai, L. L. Schumaker, Bounds for minimal energy bivariate polynomial splines, Numerische Mathematik**93**(2002), pp. 315–331.
- [46]M. -J. Lai and L. L. Schumaker, Macro-Elements and Stable Local Bases for Splines on Powell-Sabin Triangulations, Mathematics of Computation **72**(2003), pp. 335–354.
- [47]M. -J. Lai, C. Liu and P. Wenston, Bivariate spline method for numerical solution of time evolution Navier-Stokes equations over polygons in stream function formulation, Numerical Methods for P. D. E., **19**(2003), 776–827.
- [48]W. He and M. -J. Lai, Construction of Trivariate Compactly Supported Biorthogonal Box Spline Wavelets, Journal of Approximation Theory **120**(2003), pp. 1–19.
- [49]M. -J. Lai and P. Wenston, L^1 spline methods for scattered data interpolation and approximation, Advances in Computational Mathematics, 21(2004), 293–315.
- [50]M. -J. Lai and A. LeMehaute, A new kind of trivariate C^1 spline space, Advances in Computational Mathematics, 21 (2004), 273–292.
- [51]M. -J. Lai, Chun Liu and P. Wenston, On two nonlinear biharmonic evolution equations: existence, uniqueness and stability, Applicable Analysis, 83(2004), 541–562.
- [52]M. -J. Lai, Chun Liu and P. Wenston, Numerical Simulations on two nonlinear biharmonic evolution equations, Applicable Analysis, **83**(2004), 563–577.
- [53]M. -J. Lai and P. Wenston, Bivariate Splines for Fluid Flows, Computers and Fluids **33**(2004), pp. 1047–1073.
- [54]X. H. Wang, M. -J. Lai, S. Yang, On divided differences of the remainder of polynomial interpolation, J. Approximation Theory **127**(2004), pp. 193–197.
- [55]G. Awanou and M. -J. Lai, Trivariate Spline Approximations of 3D Navier-Stokes Equations, Math. of Computation, **74**(2005), 585–601.
- [56]G. Awanou and M. -J. Lai, On convergence rate of the augmented Lagrangian algorithm for nonsymmetric saddle point problems, Journal of Applied Numer. Math., **54**(2005), 122–134.
- [57]X. Wang, H. Wang, and M. -J. Lai, Some Results on numerical divided difference formulas, Scientia Sinica, Ser. A., **35**(2005), 712–720.
- [58]M. -J. Lai, Construction of multivariate compactly supported orthonormal wavelets, Advances in Computational Mathematics **25**(2006), 41–56.

- [59]V. Baramidze, M. -J. Lai, and C. K. Shum, Spherical Splines for Data Interpolation and Fitting, *SIAM J. Scientific Computing*, **28**(2006), 241–259.
- [60]J. Geronimo and M. -J. Lai, Factorization of multivariate positive Laurent polynomials, *J. Approximation Theory*, **139**(2006), 327–345.
- [61]M. -J. Lai and J. Stoeckler, Construction of multivariate compactly supported tight wavelet frames, *Applied and Comput. Harmonic Analysis*, **21**(2006), 324–348.
- [62]M. -J. Lai, Construction of multivariate compactly supported prewavelets in L_2 spaces and pre-Riesz basis in Sobolev spaces, *Journal of Approximation Theory*, **142**(2006), 83–115.
- [63]M. -J. Lai, A. Le Mehaute and T. Sorokina, An octahedral C^2 macro-element, *Comp. Aided Geom. Design* **23**(2006), pp. 640–654.
- [64]M. -J. Lai and L. L. Schumaker, Trivariate C^r polynomial macro-elements, *Constructive Approx.*, **26**(2007) 11–28.
- [65]M. -J. Lai and A. Petukhov, The method of virtual components for constructing wavelet frames, *Applied and Comput. Harmonic Analysis* **22**(2007) 304–318.
- [66]M. -J. Lai, Convergence of three L_1 spline methods for data interpolation and fitting, *Journal of Approximation Theory*, **145**(2007), 196–211.
- [67]X. Hu, D. Han and M. -J. Lai, Bivariate splines of various degrees for numerical solution of PDE, *SIAM J. Scientific Computing*, **29**(2007) 1338–1354.
- [68]T. Zhou, D. Han and M. -J. Lai, Energy minimization method for scattered data Hermite interpolation, *J. Applied Num. Math.*, **58**(2008), 646–659.
- [69]S. Kersey and M. -J. Lai, convergence of local variational spline interpolation, *Journal of Mathematical Analysis and Applications*, **314**(2008), 398–415.
- [70]M. -J. Lai and K. Nam, On the number of tight wavelet framelets associated with multivariate box splines, accepted by *J. of Approximation Theory and its Analysis*, 2008.
- [71]M. -J. Lai and L. L. Schumaker, Domain decomposition method for scattered data fitting, *SIAM J. Numerical Analysis*, **47**(2009), 911–928.
- [72]S. Foucart and M. -J. Lai, Sparsest Solutions of Underdetermined Linear Systems via ℓ_q -minimization for $0 \leq q \leq 1$, *Applied and Computational Harmonic Analysis*, **26**(2009) 395–407.
- [73]M. -J. Lai, C. K. Shum, V. Baramidze, and P. Wenston, Triangulated spherical splines for geopotential reconstruction, *J. of Geodesy*, **83** (2009), 695–708.
- [74]M. -J. Lai and A. Petukhov, Method of Virtual Components in the Multivariate Setting, *Journal of Fourier Analysis and Its Applications*, **16**(2010), 471–494.
- [75]S. Foucart and M. -J. Lai, Sparse Recovery with Pre-Gaussian Random Matrices, *Stud. Math.*, **200** (2010), 91–102.
- [76]M. -J. Lai, On sparse solution of underdetermined linear systems, *Journal of Concrete and Applicable Mathematics*, **8**(2010), 296–327.
- [77]S. Guillas and M. -J. Lai, Bivariate Splines for Spatial Functional Regression Models, *Journal of Nonparametric Statistics*, **22**(2010), 477–497.

- [78]M. -J. Lai, R. Pan, and K. Zhao, Initial Boundary Value Problem for 2D Viscous Boussinesq Equation, Arch Rational Mech Anal (2010) 199:739–760.
- [79]M. -J. Lai and J. Wang, An unconstrained l_q minimization for sparse solution of underdetermined linear systems, SIAM J. Optimization, 21(2011), 82–101.
- [80]M. -J. Lai and Louis Y. Liu, The null space property for sparse recovery from multiple measurement vectors, Applied and Computational Harmonic Analysis, vol. 30 (2011) pp. 402–406.
- [81]V. Baramidze, and M. -J. Lai, Convergence of Discrete and Penalized Least Squares of Spherical Splines, Journal of Approximation Theory, 163(2011) pp. 1091–1106.
- [82]B. Ettinger, S. Guillas, M. -J. Lai, Bivariate Splines for Functional Regression Models with Application to Ozone Forecasting, Environmetrics, 23 (2012) pp. 317–328,
- [83]M. -J. Lai and T. Zhou, Scattered data interpolation by bivariate splines with higher approximation order, Journal of Applied and Computational Mathematics, vol. 242 (2013) pp. 125–140
- [84]M. -J. Lai and L. Wang, Bivariate penalized splines for regression, Statistica Sinica, vol. 23 (2013) pp. 1399–1417
- [85]M. -J. Lai and L. Matamba Messi, Piecewise Linear Approximation of the continuous Rudin-Osher-Fatemi model for image denoising, SIAM Journal on Numerical Analysis, vol. 50 (2013) pp. 2446–2466.
- [86]M. -J. Lai, Xu, Y. Y. and Yin, W. T., Improved iteratively reweighted Least squares for unconstrained smoothed ℓ_p minimization, SIAM Journal on Numerical Analysis, vol. 51 (2013) pp. 927–957.
- [87]W. H. Guo and Lai, M. -J., Box Spline wavelet frames for image edge analysis, SIAM J. Image Sciences, vol. 6 (2013) pp. 1553–1578.
- [88]M. -J. Lai and W. T. Yin, Augmented L_1 and Nuclear-Norm Models with a Globally Linearly Convergent Algorithm, SIAM Journal Imaging Sciences, vol. 6 (2013) pp. 1059–1091.
- [89]M. -J. Lai and M. Matt, A C^r Trivariate Macro-Element Based on Alfeld Split, Journal of Approximation Theory, 175 (2013), pp. 114–131.
- [90]M. -J. Lai and Liu, L. Y., The probabilistic estimates on the largest and smallest q -singular values of random matrices. Math. of Computation, 84 (2015), 1775–1794.
- [91]Lai, M. -J. and Meile, C., Scattered data interpolation with nonnegative perservation using bivariate splines and its application, Computer Aided Geometric Design, vol. 34 (2015) pp. 37–49.
- [92]Z. Wang, Lai, M. -J., Lu, Z., Fan, W., Davulcu, H. and Ye, J., Orthogonal Rank-One Matrix Pursuit for Low Rank Matrix Completion, SIAM J. Scientific Computing , vol. 37 (2015), A488–A514.
- [93]J. Gutierrez, M. -J. Lai, and G. Slavov, Bivariate Spline Solution of Time Dependent Nonlinear PDE for a Population Density over Irregular Domains, Mathematical Biosciences, vol. 270 (2015) pp. 263–277.
- [94]M. Floater, and M. -J. Lai, Polygonal spline spaces and the numerical solution of the Poisson equation, SIAM Journal on Numerical Analysis, (2016) pp. 797–824.
- [95]M. -J. Lai and Slavov, G. , On Recursive Refinement of Convex Polygons, Computer Aided Geometric Design, 45(2016), 83–90.

- [96]Liu, X., S. Guillas, and M. -J. Lai, Efficient spatial modeling using the SPDE approach with bivariate splines, *Journal of Computational and Graphical Statistics* , vol. 25 (2016) pp. 1176–1194.
- [97]W. Deng, M. -J. Lai, Peng, Z. and Yin, W. T., Parallel Multi-Block ADMM with $o(1/k)$ Convergence, on-line, *Journal of Scientific Computing*, vol. 71 (2017) pp. 712–736.
- [98]M. -J. Lai and Wang, C. M., A bivariate spline method for 2nd order elliptic equations in non-divergence form, *Journal of Scientific Computing*, (2018) pp. 803–829.
- [99]Baramidze, V. and Lai, M. -J., Nonnegative Data Interpolation by Spherical Splines, *J. Applied and Comput. Math.*, vol. 342 (2018) pp. 463–477.
- [100]Kang, Hongmei, Lai, M. -J. and Li, Xin, An economecal representation of PDE solution by using compressive sensing approach, *J. Computer Aided Design* , vol. 115 (2019) pp. 78–86.
- [101]Wen, Jinming, Zhou, Zhengchun, Liu, Zilong, Lai, M. -J. and Tang, Xiaohu, Sharp sufficient conditions for stable recovery of block sparse signals by block orthogonal matching pursuit, *Applied and Computational Harmonic Analysis*, (2019) pp. 948–974.
- [102]Hong, Qianying, Lai, Ming-Jun, Messi, Leopold Matamba, and Wang, Jingyue, Galerkin method with splines for total variation minimization. *J. Algorithms Comput. Technol.* 13 (2019), 16 pp.
- [103]Gao, Fuchang and Lai, M. -J., New regularity conditions for the solution to Dirichlet problem of the Poisson equation and their applications , *Acta Mathematica Sinica*, vol. 36 (2020) pp. 21–39.
- [104]Wang, L., Wang, G., Lai, M. -J. and Gao, L., Efficient Estimation of Partially Linear Models for Spatial Data over Complex Domains, *Statistica Sinica*, 30 (2020) pp. 347–360.
- [105]Lai, M. -J. and Mckenzie, Daniel, Compressive sensing for cut improvement and local clustering, *SIAM J. Math. Data Sci.* (2020), Vol. 2, No. 2, pp.368–395.
- [106]Chongyang Deng, Xiali Fan and Ming-Jun Lai, A Minimization Approach for Constructing Generalized Barycentric Coordinates and Its Computation, *Journal of Scientific Computing*, vol.84 (2020).
- [107]Lai, M. -J., Liu, Y., Li, S. and Wang, H., On the Schatten p norm minimization for low rank matrix recovery, *Applied Comput. Harmonic Analysis*, vol. 51 (2021) pp. 157–170.
- [108]Hong, Qianying; Lai, Ming-jun; Wang, Jingyue The convergence of a numerical method for total variation flow. *J. Algorithms Comput. Technol.* 15 (2021).
- [109]Feng, Renzhong, Aitong Huang, Ming-Jun Lai, and Zhaiming Shen, Reconstruction of Sparse Polynomials via Quasi-Orthogonal Matching Pursuit Method, *Journal of Computational Mathematics*, vol. 41 (2023) pp. 18–38.
- [110]Lai, M. -J. and Lanterman, J., Construction of C^1 Polygonal Splines over Quadrilateral Partition, appear, *Computer Aided Geometric Design*, vol. 92 (2022) pp. Paper No.102063.
- [111]Lai, M. -J., Jiaying Xie, and Zhiqiang Xu, Graph Sparsification by Universal Greedy Algorithm, in *Journal of Computational Mathematics*, online, 2023.
- [112]Lai, M. -J. and Shen, Z., An effective approach to semi-supervised cluster extraction, *Journal of Scientific Computing*, 94 (2023), no. 3, Paper No. 63

- [113]Lai, M. -J. and Lee, J., Trivariate Spline based Collocation Methods for Numerical Solution to 3D Monge-Ampere Equations, Published Online, Journal of Scientific Computing, 95 (2023), no. 2, Paper No. 56, 29 pp

c. papers appeared in refereed conference proceedings (No. 114–No. 146)

- [114]C. K. Chui and M. -J. Lai, On bivariate vertex splines, in *Multivariate Approximation theory III*, W. Schempp & K. Zeller, eds., Birkhäuser, 1985, pp. 84-115.
- [115]C. K. Chui and M. -J. Lai, VanderMonde determinants and Lagrange interpolation in \mathbf{R}^s , *Nonlinear and Convex analysis*, B.L.Lin & S.Simons eds., Marcel Dekker, 1987, pp. 23-35.
- [116]C. K. Chui and M. -J. Lai, On multivariate vertex splines and applications, in *Topics in Multivariate Approximation*, Chui, C.K., L.L. Schumaker, and F. Utreras eds. Academic Press, 1987, pp. 19-36.
- [117]M. -J. Lai, A matrix approach to computations of various wavelets, *Proceedings of IMACS World Congress*, 1(1994), pp. 284–286.
- [118]M. -J. Lai, Bivariate spline spaces on FVS-triangulations, in *Approximation Theory VIII*, C. K. Chui and L. L. Schumaker, (eds.), Academic Press, 1995, pp. 309–316.
- [119]M. -J. Lai, Bivariate box splines for image processing, in *Wavelet Applications in Signal and Image Processing IV*, proceedings of SPIE, vol. 2825 (1996), pp. 474–487.
- [120]W. He and M. -J. Lai, Examples of bivariate nonseparable compactly supported orthonormal continuous wavelets, in *Wavelet Applications in Signal and Image Processing IV*, proceedings of SPIE, vol. 3169 (1997), pp. 303–314.
- [121]M. -J. Lai and P. Wenston, Bivariate spline method for numerical solution of steady state Navier-Stokes equations over polygons in stream function formulation, in *Advances in Computational Mathematics*, edited by Z. Chen, Y. Li, C. Micchelli, and Y. Xu, Marcel Dekker, New York, 1998, pp. 245–277.
- [122]W. He and M. -J. Lai, Bivariate box spline wavelets in Sobolev spaces, in *Wavelet Applications in Signal and Image Processing VI*, proceedings of SPIE, vol. 3458(1998), pp. 56–66.
- [123]W. He and M. -J. Lai, A New Sufficient Condition for the Orthonormality of Refinable Functions, in *Approximation Theory IX: Computational Aspects*, Charles K. Chui and Larry L. Schumaker (eds.) Vanderbilt University Press (Nashville), 1998, pp. 121–128.
- [124]K. W. Farmer and M. -J. Lai, Scattered Data Interpolation by C^2 Quintic Splines Using Energy Minimization, in *Approximation Theory IX: Computational Aspects*, Charles K. Chui and Larry L. Schumaker (eds.) Vanderbilt University Press (Nashville), 1998, pp. 47–54.
- [125]M. -J. Lai and P. Wenston, Bivariate Spline Method for Navier-Stokes Equations: Domain Decomposition Technique in *Approximation Theory IX: Computational Aspects*, Charles K. Chui and Larry L. Schumaker (eds.) Vanderbilt University Press (Nashville), 1998, pp. 153–160.
- [126]M. -J. Lai and D. W. Roach, Nonseparable symmetric wavelets with short support, *Proceedings of SPIE Conference on Wavelet Applications in Signal and Image Processing VII*, Vol. 3813, pp. 132-146, July 1999.
- [127]M. -J. Lai and P. Wenston, Trivariate C^1 cubic splines for numerical solution of biharmonic equations, in: *Trends in Approximation Theory*, K. Kopotun, T. Lyche, and M. Neamtu (eds.), Vanderbilt University Press, Nashville, 2001, pp. 224–234.

- [128]M. -J. Lai, and D. W. Roach, The nonexistence of bivariate symmetric wavelets with short support and two vanishing moments, in: *Trends in Approximation Theory*, K. Kopotun, T. Lyche, and M. Neamtu (eds.), Vanderbilt University Press, Nashville, 2001, pp. 213–223.
- [129]M. -J. Lai and D. Roach, Parameterizations of univariate orthogonal wavelets with short support, in *Approximation Theory X: Wavelets, Splines, and Applications*, edited by C. K. Chui, L. L. Schumaker, J. Stoeckler, Vanderbilt Univ. Press, 2002, pp. 369–384.
- [130]M. -J. Lai, P. Wenston, L. A. Ying, Bivariate splines for exterior biharmonic equations, in *Approximation Theory X: Wavelets, Splines and Applications*, edited by C. K. Chui, L. L. Schumaker, J. Stoeckler, Vanderbilt Univ. Press, 2002, pp. 385–404.
- [131]G. Awanou and M. -J. Lai, C^1 quintic spline interpolation over tetrahedral partitions, in *Approximation Theory X: Wavelets, Splines and Applications*, edited by C. K. Chui, L. L. Schumaker, J. Stoeckler, Vanderbilt Univ. Press, 2002, pp. 1–16.
- [132]M. -J. Lai, Methods for constructing nonseparable compactly supported orthonormal wavelets, in *Wavelet Analysis: Twenty Year's Development*, edited by D. X. Zhou, World Scientific, 2002, pp. 231–251.
- [133]V. Baramidze and M. -J. Lai, Volume data interpolation by tensor products of spherical and radial splines, in *Advances in Constructive Approximation*, edited by M. Neamtu and E. Saff, Nashboro Press, 2004, pp. 75–88.
- [134]V. Baramidze and M. -J. Lai, Error Bounds for Minimal Energy Interpolatory Spherical Splines, *Approximation Theory XI*, Nashboro Press, 2005, pp. 25–50.
- [135]G. Awanou, M. -J. Lai, P. Wenston, The multivariate spline method for numerical solution of partial differential equations, in *Wavelets and Splines*, Nashboro Press, Brentwood, 2006, pp. 24– 74.
- [136]V. Baramidze and M. -J. Lai, Spherical spline solution to a PDE on the sphere, in *Wavelets and Splines*, Nashboro Press, Brentwood, 2006, pp. 75–92.
- [137]O. Cho and M. -J. Lai, A class of compactly supported orthonormal B-Spline wavelets, in *Wavelets and Splines*, edited by G. Chen and M. -J. Lai, Nashboro Press, 2006, pp. 123–151.
- [138]M. -J. Lai, J.-A. Lian, P. Cassidy, Removal of Gaps among Compound C^1 Bi-Cubic Parametric B-spline Surfaces, in *Wavelets and Splines*, edited by G. Chen and M. -J. Lai, Nashboro Press, 2006, pp. 287–313.
- [139]M. -J. Lai and K. Nam, Tight Wavelet Frames over Bounded Domains , in *Wavelets and Splines*, edited by G. Chen and M. -J. Lai, Nashboro Press, 2006, pp. 314–327.
- [140]M. -J. Lai, Multivariate splines for data fitting and approximation, the conference proceedings of the 12th Approximatin Theory, San Antonio, 2007, edited by M. Neamtu and L. L. Schumaker, Nashboro Press, 2008, Brentwood, TN, pp. 210–228.
- [141]M. -J. Lai, B. Lucier, and J. Wang, The convergence of a central difference discretization of Rudin-Osher-Fatemi model for image denoising, *Proceedings of SSVN 2009*, X.-C.Tai et al (Eds), pp. 514–526, 2009.
- [142]Wang, Z., Lai, M. -J., Lu, Z., Fan W., Davulcu, H. and Ye, J., Orthogonal Rank One Matrix Pursuit for Matrix Completion, *Proceedings of The 31st International Conference on Machine Learning*, pp. 91–99, 2014.

- [143]Lai, M. -J. and Mersmann, C., Adaptive Triangulation Methods for Bivariate Spline Solutions of PDEs, Approximation Theory XV: San Antonio, 2016, Springer Verlag, (2017) edited by G. Fasshauer and L. L. Schumaker pp. 155–175
- [144]Lai, M. -J. and Lanterman, J., A polygonal spline method for general 2nd order elliptic equations and its applications, Approximation Theory XV: San Antonio, 2016, Springer Verlag, (2017) edited by G. Fasshauer and L. L. Schumaker pp. 119–154.
- [145]Huang, Meng, Lai, M. -J., Varghese, Abraham and Xu, Zhiqiang, On DC based methods for Phase Retrieval, Approximation Theory XVI: San Antonio, 2019, Springer Verlag , (2021) edited by G. Fasshauer, M. Neamtu, and L. L. Schumaker.
- [146]Shen, Z. M., Lai, M. -J. and Li, S., Graph-based Semi-supervised Local Clustering with Few Labeled Nodes, accepted, International Joint Conference on Artificial Intelligence, IJCAI , (2023).

e. papers submitted for publication

- [147]Lai, M. -J. and Mersmann, C., A bivariate spline Soluton of Helmholtz Equation with large wave number, submitted , (2019).
- [148]Kapita, S. and Lai, M. -J., A bivariate spline Soluton to the Exterior Helmholtz Equation and Its Applications, submitted , (2019)
- [149]Deng, Chongyang, Hong, Q. F., Lai, M. -J., Mersmann, Clayton and Xu, Yidong, Multivariate Splines for Curve and Surface Interpolation and Fitting, submitted, (2020).
- [150]Lai, M.-J and Z. Shen, The Kolmogorov Superposition Theorem can Break the Curse of Dimensionality When Approximating High Dimensional Functions, submitted, 2023.

Software Development

- A Matlab Package of Bivariate Splines for Scattered Data Fitting. This package uses bivariate splines of arbitrary degree, arbitrary smoothness over arbitrary triangulation to interpolate scattered data, fitting or smoothing scattered data, and data prediction.
- A Matlab Package of Trivariate Splines for Scattered Data Fitting. This package uses trivariate splines of arbitrary degree, arbitrary smoothness over arbitrary tetrahedral partition to interpolate scattered data and fitting or smoothing scattered data.
- Matlab Packages of Bivariate Splines for Numerical Solution of Poisson equations, Biharmonic Equations, and Naiver-Stokes equations. These packages uses bivariate splines of arbitrary degree, arbitrary smoothness over arbitrary triangulation to numerically solve Poisson equations and Navier-Stokes equations.
- A Matlab Package of Bivariate Box Splines for Image Edge Detection. This package uses various B-spline and box spline wavelet framelets to find edges of images.

Invited Presentations

- [1]June, 1992 a talk at Chevron Oil Field Research Company, 1300 Beach Boulevard, La Habra, California.
- [2]Oct., 1992 a colloquium talk at Department of Mathematics, Vanderbilt University, Nashville, Tennessee.

- [3]April, 1993 a colloquium talk at Department of Mathematics, Georgia Institute of Technology, Atlanta, Georgia.
- [4]Aug. 22, 1996 Invited to give seminar talks at Dept. of Math., Nankai University, Tianjin, China.
- [5]Mar. 18, 1999 a seminar talk at Dept. of Math. Penn. State Univ., University Park, Penn.
- [6]June 17, 1999 a seminar talk at Dept. of Math. University of Nante, France.
- [7]Mar. 6, 2000, a colloquium talk at Dept. of Math. University of Missouri at St. Louis, Missouri. The talk title is "Multivariate Splines: Theory and Its Applications".
- [8]April 10, 2000, a colloquium talk at Dept. of Mathematics, Temple University, Philadelphia. The talk title is "Multivariate Splines: Theory and Applications".
- [9]June 1, 2000 a seminar talk at Dept. of Applied Math., School of Mathematical Sciences, Peking Univ., Beijing, China. The talk title is "Multivariate Splines for Numerical Solution of PDE's".
- [10]June 8–22, 2000 seminar talks at Dept. of Math., City Univ. of Hong Kong, China. The talk titles are "Multivariate Splines and Numerical Solution of PDE's."
- [11]June 23, 2000 a seminar talk at Dept. of Math., Zhongshan University, Guangzhou, China. The talk title is "Multivariate Splines for Scattered Data Interpolation".
- [12]July 2, 2000 a seminar talk at Dept. of Math., Zhejiang University, Hangzhou, China. The talk title is "Methods for Constructing Nonseparable Orthonormal Wavelets".
- [13]March 9, 2001 a seminar talk at Dept. of Math., University of Michigan, Ann Arbor, Michigan, U.S.A. The talk title is "Multivariate Splines for Fluid Flow Simulation".
- [14]May 2, 2001 a seminar talk at Dept. of Math., University of Wisconsin, Madison, Wisconsin, U.S.A. The talk title is "Multivariate Splines for Navier-Stokes Equations".
- [15]May 31, 2001 a seminar talk at Dept. of Math., Zhejiang University, Hangzhou, China. The talk title is "Multivariate Splines for PDE's".
- [16]April 10, 2002, a seminar talk at School of Mathematics, Georgia Institute of Technology, Atlanta, Georgia. The talk title is "Construction of Compactly Supported Orthonormal Wavelets".
- [17]April 20, 2002, a seminar talk at Dept. of Mathematics, Texas A& M University, College Station, Texas. The title of talk is "Multivariate Splines and Its Applications".
- [18]May 23, 2002, a seminar talk at Dept. of Computer Science and Engineering, Brigham Young University, Provo, Utah. "Multivariate Splines for Applications".
- [19]Nov. 26, 2002 a seminar talk at Department of Mathematics, University of Maryland. The title of talk is "Multivariate Splines for Numerical Solution of PDE's".
- [20]March 18, 2003 a seminar talk at the Department of Mathematics, Vanderbilt University. The talk title is "Construction of Compactly Supported Prewavelets in Sobolev Spaces."
- [21]Aug. 18–Oct. 5, 2004 presented two talks on in the Analysis seminar, one talk in the PDE seminar, and one talk in the Applied Math. seminar at School of Mathematics, Georgia Institute of Technology.
- [22]Dec. 8, 2004 a colloquium talk at the College of Software Engineering, Georgia Southern Polytech. State University. The talk title is "Box Spline Tight Wavelet Frames for Image Edge Detection".

- [23]Sept. 15, 2005 a colloquium talk at the Department of Statistics, University of Georgia. The talk title is "Spherical Splines for Scattered Data Fitting".
- [24]Oct. 21, 2005 a colloquium talk at the Georgia Southern University. The talk title is "Spherical Splines for Scattered Data Fitting".
- [25]April 18, 2006 a colloquium talk at the Center of Mathematics for Application, University of Oslo, Oslo, Norway. The talk title is "Multivariate Splines for Numerical Solution of PDE's".
- [26]March 9, 2007 a colloquium talk at Texas A&M University, Prairie View, Texas. The talk title is "Box spline tight wavelet frames and their applications".
- [27]June 25, 2007 invited to give a talk at Nanjing University, Nanjing, China. The talk title is "multivariate splines for data fitting and approximation".
- [28]Sept. 13–14, 2007 two colloquium talks at Northern Illinois University, DeKalb, Illinois.
- [29]Oct. 15, 2007 a colloquium talk at Dept. of Statistics, Harvard University.
- [30]Mar. 11, 2008 a colloquium talk at Department of Applied Math., Cambridge University, England.
- [31]March 31, 2008 a seminar talk at Department of Math., Penn. State University.
- [32]May 13–15, 2008 two seminar talks at Department of Mathematics, Zhongshan University.
- [33]Oct. 30, 2008, e a seminar talk at Department of Mathematics, Harvard University.
- [34]Jan. 26, 2009, a seminar talk at School of Mathematics, Georgia Institute of Technology.
- [35]Feb. 19, 2009, a Seminar Talk at Department of Mathematics, University of Alabama, Tuscaloosa.
- [36]March 5, 2009, a Seminar Talk at Department of Mathematics at the Renmin University, Beijing, China.
- [37]Oct. 8, 2009, a Seminar talk at Institute of Bioinformatics, University of Georgia.
- [38]March, 25, 2010, a colloquium talk at Georgia Southern University, Statesboro, Georgia.
- [39]June 11, 2010, a seminar talk at Fudan University, Shanghai, China.
- [40]June 24, 2010, a colloquium talk at Zhejiang University, Hangzhou, China.
- [41]March 14, 2011, a colloquium talk at Rice University, Houston, Texas.
- [42]April 15, 2011, a colloquium talk at Case Western University, Ohio.
- [43]Oct. 27, 2011, a colloquium talk at Dept. of Math., Mannheim University, Mannheim, Germany, 2011.
- [44]Oct. 28, 2011, a seminar talk at University of Heidelberg, Heidelberg, Germany, 2011.
- [45]Nov. 14, 2011, a colloquium talk at Dept. of Math. Kennesaw State University, Atlanta, 2011.
- [46]Feb. 22, 2012, a colloquium talk at Department of Mathematics, University of Kansas, Lawrenceville, Kansas.
- [47]May 28, 2012, a colloquium talk at Department of Mathematics, Drexel University, Philadelphia, Penn.

- [48]Oct. 10, 2012, a colloquium talk at Department of Mathematics, University of California, Los Angeles. The title of talk is "Boxspline Wavelet Frames for Image Edge Analysis".
- [49]Oct. 25, 2012, a colloquium talk at Department of Mathematics, University of Idaho, Moscow, Idaho. The title of talk is "Boxspline Wavelet Frames for Image Edge Analysis".
- [50]Nov. 9, 2012, a colloquium talk at Department of Mathematics, Purdue University, West Lafayette, IN. The title of talk is "Title: Some Recent Advances on Compressed Sensing and Matrix Completion".
- [51]Feb. 11, 2013, a colloquium talk at Dept. of Math., Wayne State University on Feb. 11, 2013 on multivariate splines and their applications.
- [52]Feb. 3, 2013, a colloquium talk at Arizona State University, Phoenix, AZ. on compressed sensing and matrix reconstruction.
- [53]March 14, 2013, a colloquium talk at Dept. of Applied Math. Illinois Institute of Technology.
- [54]March 15, 2013, a colloquium talk at Department of Mathematics, University of Illinois at Chicago.
- [55]Oct. 11, 2013, presented a colloquium talk at Department of Mathematics, University of California, Los Angeles on Multivariate Splines for Applications.
- [56]Nov. 24, 2013, visited University of College, London, England for three day visit.
- [57]April 7, 2014, presented a seminar talk at Georgia Institute of Technology on scattered data interpolation with shape preservation.
- [58]March 8–11, 2015, visited Department of Mathematics, University of Illinois at Chicago.
- [59]April 5–8, 2015, visited Department of Mathematics, University of California at Los Angeles and presented a talk on Matrix Completion at Osher's Level Set Seminar.
- [60]June 18, 2015, visited the Department of Mathematics, Zhejiang University, Hangzhou, China and presented a seminar talk on matrix completion.
- [61]June 22, 2015, visited the Department of Mathematics, Southwest Jiaotong University, Chengdu, China and presented a colloquium talk.
- [62]June 25, 2015, visited the Department of Mathematics, Zhongshan University Guanzhou, China and presented a talk on matrix completion.
- [63]Sept,3–8, 2015, invited to visit Simon Fraser University, Vancouver, Canada and present a talk.
- [64]March 26, 2016, presented a colloquium talk at Department of Mathematics, University of Arizona, Tucson, Arizona. The talk title is "Bivariate Spline Solution of Reaction-Diffusion PDE with Biological Applications".
- [65]Oct. 28, 2016, presented a colloquium talk at Department of Mathematics, College of William and Mary, on spline solutions to some reaction and diffusion equations with Allee affect and their application to malaria study.
- [66]April 25, 2017, presented a seminar talk at Applied and Computational Mathematics, University of South Carolina, Columbus, South Carolina.
- [67]June 22, 2017, presented a colloquium talk at Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong, China.

- [68]July 19, 2017, presented a colloquium talk at Department of Mathematics, Politecnico University, Milano, Italy.
- [69]Oct. 20, 2017, presented a colloquium talk at Department of Mathematics, Auburn University, Alabama, U.S.A.
- [70]Oct. 26, 2017, presented a colloquium talk at Department of Industrial Engineering, Northern Illinois University, DeKalb, Illinois.
- [71]March 16, 2018, presented a colloquium talk at Department of Mathematics, College of Charleston, South Carolina.
- [72]May 10, 2018, presented a colloquium talk at Department of Mathematics, University College, Dublin, Ireland.
- [73]May 20–June 10, 2018, visited Department of Mathematics, Chinese University of Science and Technology for three weeks and presented a colloquium talk.
- [74]June 23–July 22, 2018, visited the Institute of Computational Mathematics, Chinese Academy of Science and presented three seminar talks.
- [75]Oct. 25, 2018, presented a seminar talk at Department of Mathematics, University of Tennessee, Knoxville.
- [76]Oct. 26, 2018, visited Oak Ridge National lab and presented a seminar talk at its Computer Science and Mathematics Division.
- [77]March 8, 2019, visited University of Calgary, Canada and give a colloquium talk at the Pacific Institute of Mathematical Science, University of Calgary.
- [78]July 8, 2019, visited Beihang University, Beijing, China and give a colloquium talk at the Department of Mathematics, Beihang University.
- [79]July 18, 2019, visited Suzhou University and give 5 talks at Department of Mathematics, Suzhou University, China.
- [80]Sept. 6, 2019, visited Brown University and presented a seminar talk at Applied Math. Division.
- [81]Oct. 30, 2019, visited Tufts University and presented a colloquium talk at Department of Mathematics.
- [82]Dec. 10, 2019, visited Zhejiang University, Hangzhou, China and presented a seminar talk at Department of Mathematics, Zhejiang University.
- [83]Sept. 14. 2020, present a zoom colloquium talk at Purdue University.
- [84]March 12, 2021, give a zoom talk at Weill Cornell Medical College.
- [85]Jan. 21, 2022, give a zoom talk at University of California, Irvine on multivariate spline based collocation method for numerical solution of partial differential equations.
- [86]Jan. 21, 2022, give a zoom talk at School of Mathematics, Georgia Institute of Technology on Kolmogorov superposition theorem can overcome the curse of dimensionality.
- [87]March 10, 2022, give a zoom talk at University of William and Mary on multivariate spline based collocation method for numerical solution of partial differential equations.

[88]Oct. 31, 2022, give a colloquium talk at University of Virginia at Charlottesville on Kolmogorov superposition theorem for breaking the curse of dimensionality.

[89]April 24, 2023, give a colloquium talk at Rensselaer Polytechnic Institute on Kolmogorov superposition theorem for breaking the curse of dimensionality.

Presentation in Conferences

- May 1, 1993 a 20 minute talk at a conference on interaction between operator, wavelets, and control theory at Charlotte, University of North Carolina at Charlotte.
- Mar. 2, 1995 a 20 minute talk at an international conference on scattered data fitting in Cancun, Mexico.
- May 10, 1997 a 30 minute talk at an international conference on Multivariate Approximations at Oberwolfach, Germany
- Aug. 12, 1997 a 30 minute talk at an international conference on computational mathematics at Guangzhou, China.
- July 28–Aug. 2, 1998 a 30 minute talk at the eighth international congress of applied and computational mathematics at Lueven, Belgium.
- Dec. 12–16, 1998 a 30 minute talk at the first international congress of Chinese mathematicians at Beijing, China.
- April 16–20, 1999 a 30 minute talk at the second international conference on scattered data interpolation in Puerto Vallarta, Mexico.
- Nov. 2–7, 1999 a 30 minute talk at the SIAM conference on computer aided geometric design in Albuquerque, New Mexico.
- Nov. 6, 2001 a 30 minute talk at Geometric Design and computing, a SIAM conference at Sacramento, California. The talk title is "The L1 spline method for scattered data interpolation".
- July 8, 2002 a 30 minutes talk at SIAM Annual conference at Philadelphia. The title of talk is "Multivariate Splines for PDE's".
- Sept 22–27, 2002 a 30 minutes talk at an international conference on Multivariate Approximation, Haus Bommerholz, Germany. The title of the talk is "Multivariate Splines for Applications".
- Dec. 20–23, 2002 a 40 minute talk at an international conference on computational mathematics, Zhongshan University, Guangzhou, China. The talk title is "Construction of Compactly Supported Tight Frames".
- Nov. 12, 2003 invited to participate a minisymposium and present a talk at the Geometric Design and Computing at Seattle, WA. The talk title is "Construction of Compactly Supported Vertex Splines"
- Nov. 12, 2003 organized a minisymposium during the Geometric Design and Computing at Seattle, WA. The minisymposium title is "Spherical Data Interpolation and Approximation".
- Dec. 8, 2003 invited to attend a workshop at Dept. of Math., Vanderbilt University and presented a talk on "Spherical Splines for Scattered Data Interpolation".
- Nov. 2, 2005 organized a mini-symposium during the Geometric Design and Computing at Phoenix, AR. The mini-symposium title is "Spherical Spline Approximation".
- Feb. 24, 2006 a keynote speech at the Eleventh Annual Mathematics Technology Conference at Valdosta State University. The talk title is "Multivariate Splines and Their Applications".
- March 3–8, 2007 a plenary speech at the Twelveth Approximation Theory Conference at San Antonio, TX. The talk title is "Multivariate Splines for Data Fitting".
- June 18–23, 2007 a 40 minutes talk at international conference on Applied and Computational Harmonic Analysis at Fudan University, Shanghai. The talk title is "The virtual component method in the multivariate setting".
- May 20–22, 2011, an invited talk at Workshop on Applied Harmonic Analysis and Approximation Theory, Guangzhou, China.

- May 24–25, 2011, attended Triennial Strategy Planning Workshop of the Mathematical Sciences Division of the Army Research Office at the Marriott Hotel, Research Triangle Park, North Carolina.
- Feb. 24–March 2, 2013, attended a workshop and gave a talk at Oberwolfach Mathematical Research Institute, Germany during Feb. 24–March 2, 2013 and presented a talk on tight wavelet frames on sphere.
- May 20–24, 2013, attended an international conference on Approximation Theory and Applications and invited to give a talk on May 20–24, 2013 at the City University of Hong Kong.
- May 16, 2014, attended the first international conference on Dynamical System and Numerical Analysis and was invited to give a talk in Yangzhou, China.
- Dec. 8–12, 2014, attended an international conference on Learning and Approximation Theory and was invited to give a talk on Dec. 8–12, 2014 at Fudan University.
- April 19–25, 2015, attended a workshop on Multivariate Splines and Algebraic Geometry at Oberwolfach, Germany, and presented a talk on polygonal spline spaces and their applications.
- April 30–May 30, 2015, visited the Ye Lab at Department of Computational Medicine and Bioinformatics, University of Michigan, Ann Arbor, MI.
- July 14, 2015, attended the 22nd International Symposium on Mathematical Programming and presented an invited talk at a minisymposium during the conference. The talk title is "On Nonconvex, Non-Lipschitz differentiable minimization for sparse solutions".
- Oct. 26–28, 2015, invited to give a talk at Polytopyal Element Methods in Mathematics and Engineering at Georgia Institute of Technology.
- Feb. 20, 2016, attended Georgia Scientific Computing Symposium and presented a poster on polygonal splines for general second order elliptic PDE.
- March 20–22, 2016, attend a Advanced Mathematics on Finite Element at UT Austin, Texas and presented a poster.
- April 9, 2016, presented a seminar talk at School of Mathematics, Georgia Institute of Technology, Atlanta, Georgia. The talk title "Bivariate Spline Solution of Reaction-Diffusion PDE with Biological Applications".
- May 22–25, 2016, attended the 15th international conference on Approximation Theory in San Antonio, Texas and presented a talk. Also, I organized two minisymposiums. One on multivariate splines for applications and one on compressive sensing.
- June 23–29, 2016, attended the 9th international conference on mathematical methods for curves and surfaces, in Tonsberg, Norway and presented a talk on range restricted spline interpolation over spherical domain.
- Dec. 14, 2016, attended an international conference on mathematical approaches to data science in Hangzhou, China and presented a plenary speech on approximation of multivariate spline methods for data fitting.
- Dec. 1–5, 2019, attended an international conference on machine learning and data science at Sanya, China and presented a talk on a compressive sensing approach for graph clustering.
- Sept. 26–30, 2022, attended the SIAM conference on Mathematical Data Science, San Diego, California, U.S.A.
- Feb. 28–March 2, 2023, attended the SIAM Computational Science and Engineering at Amsterdam, Netherlands.
- May 14–18, 2023, attended an international conference (Shanks Lectures) and presented a plenary speech on multivariate splines and their applications.

Research Grants

- Dec., 1989 P. I. on a Faculty Grant from the University of Utah Research Committee.
- Sept. 8, 1993–1996 P. I. on a research grant from National Science Foundation (#DMS9303121) for three years 1993–1996 for an amount \$76,096.
- Aug. 1, 1998–2001 P. I. on a research grant from National Science Foundation (#DMS 9870178) for three years 1998–2001 for an amount \$70,334.

- March 18, 2002 P. I. on a conference grant from the U. S. Army Research Office for an amount \$4,448.
- July 1, 2003 P. I. on a computer equipment grant from the U.S. Army Research Office (# 44659-MA-RIP) for an amount \$54,179.
- Sept. 1, 2003–2007 P. I. on a collaborative mathematical research grant from the National Science Foundation (#EAR-0327577) for four years for an amount \$250,166.
- April 12, 2004 P. I. on a conference grant from the U. S. Army Research Office for an amount \$13,293.
- Sept. 15, 2004 P. I. on a conference grant from the National Science Foundation for an amount \$18,000.
- Sept. 1, 2007–2010 P.I. with co-PI A. Petukhov on a research grant from the National Science Foundation (#DMS 0713807) for three years for an amount \$215,855.
- Aug. 15, 2011 P. I. with co-PI D. Robinson on a research grant from the U.S. Army Research Office for an amount \$49,998.
- Aug. 1, 2015–2018, P.I. on a research grant from from the National Science Foundation (#DMS 1521537) for three years for an amount \$150,336.

Total Amount of Federal Grants Received: \$892,696.

Sept. 1, 2013–2018 P. I on a collaboration grant from the Simon Foundation for 5 years for an amount \$35,000.

Sept. 1, 2021–2026 P. I on a collaboration grant from the Simon Foundation for 5 years for an amount \$45,000.

Research Awards

- April 2, 2003, received a Creative Research Medal Award from the University of Georgia Research Foundation.
- May 1, 2013–2016, received a McCay Award from Department of Mathematics, University of Georgia with the citation is "The selection committee cited Dr. Lai's effective leadership of the applied mathematics group as well as the large number of PhD. students he has directed, several of whom have already distinguished themselves in the profession".

Teaching and Related Activities

Graduate Student Supervision

Masters Degree students graduated

- [1] Jiangxiang Liu, Masters of Sciences, graduated in Aug. 1995.
- [2] Kathleen Farmer, Masters of Sciences, graduated in Aug., 1997. She is now an instructor at Dept. of Math., North Louisiana State University.
- [3] Richard Tatum, Masters of Applied Mathematics and Sciences, graduated in Aug., 1999. He is now a scientist at Naval Surface Warfare Center, VA.
- [4] Victoria Baramidze, Masters of Applied Mathematics and Sciences, graduated in Aug., 1999.
- [5] Clay Mersmann, Masters of Applied Mathematics and Sciences, graduated in Aug., 2016.

Ph.D. students graduated

- [1] Wenjie He, graduated with Ph.D. in Aug., 1998. He is now an associate professor at Dept. of Math. and Computer Science, University of Missouri at St. Louis, Missouri.
- [2] Xiangming Xu, graduated with Ph.D. in May, 2001. He is now a software engineer at Telchemy company in Atlanta.
- [3] Gerard Awanou, graduated with Ph.D. in Aug. 2003. He was a post-doc associate at the Institute for Mathematics and Applications at University of Minnesota for three years. He is now an assistant professor at Dept. of Math., Northern Illinois University, DeKalb, Illinois. He received a Sloan fellowship in 2009. He is now an associate professor at Department of Mathematics, University of Illinois at Chicago.
- [4] Victoria Baramidze, graduated with Ph.D. in Aug. 2005, She is now an assistant professor at West Illinois University.
- [5] Kyunglim Nam, graduated with Ph.D. in Aug. 2005. She was a visiting assistant professor at University of Toledo, Toledo, Ohio. She is an instructor at Baylor University.
- [6] Jie Zhou, graduated with Ph.D. in Aug., 2006. He is an assistant professor at Department of Mathematics, Coastal Carolina University in fall, 2007.
- [7] Okkyung Cho, graduated with Ph.D. in Aug., 2006. She is a visiting assistant professor at University of Toledo, Toledo, Ohio in the fall, 2006. Now she is an assistant professor at Montgomery College, Maryland.
- [8] Haipeng Liu, graduated with Ph. D. in Aug. 2007. He is a lecturer at Georgia State University, 2007.
- [9] Jianbao Wu, graduated with Ph. D. in Aug. 2007. I have no his further information.
- [10] Bree Ettinger, graduated with Ph. D. in Aug. 2009. She is a lecturer at Georgia State University starting from fall, 2009. Now she was a lecturer at Morehead College, Atlanta, GA. She has been a postdoc in Italy for two years and now is a teaching assistant professor at Emory University.
- [11] Louis Yang Liu, graduated with Ph. D. in Aug. 2010 working on random matrix theory. He has been a visiting assistant professor at College of William and Mary and has been a visiting assistant professor at Michigan State University from 2012–2015.

- [12] Qianying Hong, graduated with Ph. D. in Aug. 2011 working on mathematical image analysis. She is a lecturer at University of Kansas, Lawrensville, Kansas. She is now an assistant professor at Fuzhou University, China.
- [13] Leopold Matamba Messi, graduated with Ph. D. in Aug. 2012 working on multivariate splines for numerical solution of partial differential equations. He is a postdoc at Mathematical Biology Institute. He is now a senior financial analyst at Ally Bank in Charlotte, NC.
- [14] George Slavov, graduated with Ph. D. in Aug. 2016. His dissertation title is "Bivariate Splines for a Class of Reaction–Diffusion Equations." He works at a hedge fund company in Sofia, Bulgaria.
- [15] Jay Lanternman, graduated with Ph. D. in May, 2018. He works at IHG, Atlanta.
- [16] Abraham Varghese, graduated with Ph. D. in Aug. 2018. He is now an assistant professor at Shenandoah University in Virginia.
- [17] Danial Mckenzie, graduated with Ph.D. in May, 2019 working on sparse graph clustering/communities detection problems. He is a postdoc at University of California, Los Angeles.
- [18] Clayton Mersmann, graduated with Ph.D. in Aug. 2019 working on multivariate splines for numerical solution of partial differential equations, in particular, the Helmholtz equation and Maxwell equations. He is a lecturer
- [19] Yidong Xu, graduated with Ph.D. in Dec. 2019 working on numerical optimization for 3D spline data fitting problem. He returns to Shanghai, China and works for industry.
- [20] Kenneth Allen, Ph.D. student working on matrix completion, graduated in Dec. 2021 and works for a data analysis company.
- [21] Tsung-wei He, Ph.D. student working on GBC functions and image deformation, graduated in May, 2023 and is a postdoc at Cornell University in June, 2023.
- [22] Jinsil Lee, Ph.D. student working on multivariate splines for numerical solution of PDEs, graduated in Aug. 2023 and will be a postdoc at Ewha University, Korea in Aug. 2023.

Students (after written and oral qualifying exams) under Supervision:

- [23] Zhaiming Shen, Ph.D. student working on graph clustering.

Research Internships for Graduate Students:

- (1) Bree Etting was awarded an internship at the Boeing Company in 2004.
- (2) A Master degree student of Dr. Sornborger was awarded an internship at NASA Langley Research center in 2010.
- (3) Kenneth Allen is awarded an internship at the Oak Ridge National lab in 2021.
- (4) Zhaiming Shen received a summer support from the NSF to work at the Oak Ridge National lab in 2022.
- (5) Zhaiming Shen received an internship from the FDA for the summer and fall, 2023.

Research Experience for Undergraduate Students Katie Agle, James Alexander, Dustin Burn, Coop Cunliffe, Grant Fiddymont, Max Mautner, and Terik Trent for seven weeks in the summer, 2008.

Courses taught at University of Georgia

- [1] Summer, 1992 MAT253 Analytic Geometry and Calculus
- [2] Fall, 1992 MAT403 Introduction to Numerical Analysis
- [3] Winter, 1993, MAT253 Analytic Geometry and Calculus
- [4] Winter, 1993, MAT404/604 Introduction to Numerical Analysis
- [5] Spring, 1993, MAT405/605, Introduction to Numerical Analysis
- [6] Summer, 1993, MAT254, Integral Calculus
- [7] Fall, 1993 , MAT254, Integral Calculus
- [8]* Fall, 1993 MAT833, Advanced Numerical Analysis
- [9]* Winter, 1994, MAT834, Advanced Numerical Analysis
- [10]* Spring, 1994, MAT835, Advanced Numerical Analysis
- [11] Winter, 1995, MAT253, Analytic Geometry and Calculus
- [12] Winter, 1995 Mat403/603, Introduction to Numerical Analysis,
- [13] Spring, 1995 Mat404/604, Introduction to Numerical Analysis
- [14] Spring, 1995 Mat254, Integral Calculus
- [15]* Fall, 1995 Mat833, Advanced Numerical Analysis
- [16]* Winter, 1996 Mat834, Advanced Numerical Analysis(II)
- [17]* Spring, 1996 Mat835, Advanced Numerical Analysis(III)
- [18]* Spring, 1996 Mat894, Wavelet Analysis
- [19] Summer, 1996 Mat254, Integral Calculus
- [20]* Fall, 1996 Mat833, Advanced Numerical Analysis
- [21]* Winter, 1997 Mat834, Advanced Numerical Analysis(II)
- [22]* Spring, 1997 Mat835, Advanced Numerical Analysis(III)
- [23]* Fall, 1997 Mat894, Wavelet Analysis
- [24] Fall, 1997 Mat253, Differential Calculus
- [25]* Winter, 1998 Mat894, Wavelet Analysis
- [26]* Spring, 1998 Mat894, Wavelet Analysis
- [27]* Fall, 1998 Mat8500, Advanced Numerical Analysis
- [28] Fall, 1998 Mat2200, Differential Calculus
- [29]* Spring, 1999 Mat8510, Advanced Numerical Analysis(II),

- [30] Fall, 1999 Mat2200, Differential Calculus,
- [31]* Fall, 1999 Mat8500, Advanced Numerical Analysis
- [32]* Spring, 2000, Mat8770, Partial Differential Equations
- [33] Spring, 2000, Mat2200, Differential Calculus
- [34]* Fall, 2000 Mat8550, Special Topics in Numerical Analysis
- [35] Fall, 2000 Mat2200, Differential Calculus
- [36] Spring, 2001, Math2210, Integral Calculus
- [37]* Fall, 2001, Math8550, Special Topics in Numerical Analysis,
- [38] Fall, 2001, Math2200, Differential Calculus
- [39] Fall, 2001, Fres 1010, Freshman Seminar
- [40] Summer, 2001, Math 2200, Differential Calculus
- [41]* Spring, 2002, Math8550, Special Topics in Numerical Analysis,
- [42] Spring, 2002, Math2200, Differential Calculus
- [43] Summer, 2002, Math 2500, Multivariate Calculus.
- [44] Fall, 2002, Math2200, Differential Calculus
- [45] Fall, 2002, Math2200, Differential Calculus
- [46]* Fall, 2002, Math8500, Advances in Numerical Analysis
- [47] Summer, 2003, Math2210, Integral Calculus
- [48] Fall, 2003, Math2210, Integral Calculus
- [49]* Fall, 2003, Math8510, Advances in Numerical Analysis(II)
- [50] Fall, 2003, Fres 1010, Freshmen Seminar
- [51] Spring, 2004, Math2500, Multivariate Calculus
- [52] Spring, 2005, Math2210, Integral Calculus
- [53]* Spring, 2005, Math8500, Advanced Numerical Analysis
- [54] Fall, 2005, Math2210, Integral Calculus
- [55]* Fall, 2005, Math8550, Special Topic on Numerical Analysis
- [56] Fall, 2006, Math2500, Multivariable Calculus
- [57]* Fall, 2006, Math8500, Advanced Numerical Analysis
- [58]* Spring, 2007, Math8770, Partial Differential Equation
- [59]* Fall, 2007, Math8510, Advanced Numerical Analysis(II)
- [60] Fall, 2007, Math2500, Multivariate Calculus

- [61] Spring, 2008, Math. 3200, Sequence and Series
- [62] Fall, 2008, Math2500, Multivariate Calculus
- [63] Fall, 2008, Math4500, Numerical Analysis
- [64] Spring, 2009, Math4510, Numerical Analysis II
- [65] Fall, 2009, Math2250, Differential Calculus
- [66] Fall, 2009, Math2250, Differential Calculus (second session)
- [67]* Spring, 2010, Math 8550, Special Topics on Numerical Analysis
- [68] Fall, 2010, Math2250, Differential Calculus
- [69]* Fall, 2010, Math8500, Advanced Numerical Analysis.
- [70]* Spring, 2011, Math8510, Advanced Numerical Analysis(II).
- [71] Fall, 2011, Math. 2260, Multivariate Calculus
- [72]* Fall, 2011, Math8850, Vigre seminar
- [73]* Spring, 2012, Math8550, Special Topics on Numerical Analysis
- [74] Spring, 2012, Math8850, Vigre Seminar
- [75] Fall, 2012, Math2700, Differential Equations.
- [76]* Fall, 2012, Math8710, Variational Methods for PDE.
- [77] Fall, 2013, Math2700, Differential Equations.
- [78] Fall, 2013, Math2700, Differential Equations.
- [79] Fall, 2013, Math8950, VIGRE seminar.
- [80] Summer, 2014, Math3000, Linear Algebra.
- [81]* Fall, 2014, Math8510, Advances on Numerical Analysis (II).
- [82] Fall, 2014, Math4500/6500, Introduction to Numerical Analysis.
- [83] Spring, 2015, Math4510/6510, Numerical Analysis.
- [84] Fall, 2015, Math2500, Multivariate Calculus.
- [85]* Fall, 2015, Math8500, Advances on Numerical Analysis.
- [86] Fall, 2016, Math4500/6500, Numerical Analysis.
- [87]* Fall, 2016, Math8510, Advances on Numerical Analysis (II).
- [88] Spring, 2017, Math2260, Multivariate Calculus
- [89]* Fall, 2017, Math8550, Special Topics on Numerical Analysis(Multivariate Splines)
- [90] Spring, 2018, Math2500, Multivariate Calculus
- [91] Fall, 2018, Math2270, Multivariate Calculus

- [91]* Fall, 2018, Math8550, Special Topics on Numerical Analysis(Compressive Sensing)
- [92] Spring, 2019, Math2270, Multivariate Calculus
- [93]* Fall, 2019, Math8500, Advanced Numerical Analysis
- [94] Fall, 2019, Math2260, Integral Calculus
- [95] Spring, 2020,
- [96*] Fall, 2020, MATH 8550 Special Topics on Numerical Analysis(Multivariate Splines)
- [97] Fall, 2020, Math 2500, Multivariate Calculus
- [98] Spring, 2021, Math 3200, Sequences and Series
- [99] Fall, 2021, MATH2250, Differential Calculus (three sections)
- [100] Fall, 2022, MATH3300, Applied Linear Algebra
- [101*] Fall, 2022, MATH8550, Topics for Numerical Analysis
- [102] Spring, 2023, MATH4500/6500, Numerical Analysis
- [103] Spring, 2023, MATH4740/6740, Optimization and Data Analysis.

where * indicates the graduate level classes.

Service and Related Activities

Departmental Committees

- 1996–1998, member of the departmental facility committee
- 1997, member of CITF, University of Georgia
- 1998–2000, member of the departmental personnel committee
- 2001, chair of Kossack calculus committee
- 2000–2002, member of the departmental graduate committee
- 2002, member of Kossack calculus committee
- 2003–2005, member of college promotion and tenure committee
- 2005–2006, member of college promotion and tenure committee
- March, 2006, chair of the 3rd year review committee for Dr. Sornborger.
- 2005–2007, member of the departmental facilities committee
- 2007–2009, member of the departmental personnel committee
- 2008–2009, chair of the departmental personnel committee
- 2009–2011, member of the departmental executive committee (acting vice chair and vice chair).
- 2011–2012, the organizer of the departmental colloquium talks.
- 2011, the chair of the Cantrell Lecturer committee.
- 2011, member of the Math+X professorship search committee.
- 2011–2013, member of the departmental executive committee
- 2013, the chair of the Cantrell Lecturer committee.
- 2013–2016, departmental Graduate coordinator.

University Committees

- 2011, member of the Chemistry Department Review Committee.
- 2011, member of the Assistant Professor search committee for statistics department.
- 2012, member of the Statistics Department Review Committee.
- 2013–2015, member of the University Council.
- 2015–2018, member of the University Council.
- 2020–2023, member of the personnel committee.

Conferences organized

- April 11–13, 1997, chair of the organizing committee of the eighth southeastern approximation theory conference at University of Georgia, Athens.
- March 23–24, 2002, chair of the organizing committee of the tenth southeastern approximation theory conference at University of Georgia, Athens.
- May 16–19, 2005, chair of the organizing committee of the international conference on Wavelets and Splines at Athens, Georgia. It was attended by more than 100 people from 14 countries including plenary speakers Ingrid Daubechies from Princeton, David Donoho from Stanford University, Mauro Magagnoni from Yale University, Schumaker from Vanderbilt University as well as Program director Dr. Mike Coyle from the Army Research Office.
- May 11–22, 2009, The organizer of the summer school on multivariate splines and their applications.
- Feb. 25, 2012, the organizer of the 4th Georgia Scientific Computing Symposium.
- March, 12, 2016, the co-organizer of the SIAM SEAS Conference in Athens, GA.
- Feb. 25, 2017, the co-organizer of the 9th Georgia Scientific Computing Symposium.
- Feb. 27, 2021, the co-organizer of the 13th Georgia Scientific Computing Symposium via zoom.

Seminars Organized

- Jan. 20 –Dec. 30, 2007, organizer of the departmental applied math. seminar.
- Jan. 12 –Dec. 30, 2008, organizer of the departmental applied math. seminar.
- Jan. 10 –Dec. 30, 2009, organizer the departmental applied math. seminar.

- Jan. 8–Dec. 18, 2010, organizer of the departmental applied math. seminar.
- Jan.– Dec., 2011, organizer of the departmental applied math. seminar.
- Jan. –Dec., 2012, organizer of the departmental applied math. seminar.
- Oct. 1, 2010–May. 1, 2012, organizing the departmental colloquium talks.
- Jan.– May, 2023, organizer of the departmental applied math. seminar.

Referee for following journals and funding agencies since 2016:

ACM Transactions on Mathematical Software, Advanced in Computational Math., BIT, Computer Aided Geometric Design, Computers and Mathematics with Applications, Constructive Approximation, Journal of Approximation Theory, Journal of Applied and Computational Harmonic Analysis, Advances on Computational Mathematics, Journal of Computational and Applied Mathematics, Numerical Algorithm, SIAM Journal of Mathematical Analysis, SIAM Journal on Numerical Analysis, Proceedings of A. M. S., Journal of Mathematical Analysis and its Applications, American Math. Society, IEEE Trans. Information Theory, IEEE Trans. Signal Processing, Department of Energy, National Science Foundation, U.S. Army Research Office.

A panelist for National Science Foundation, April, 2016.

Editor for following journals:

- An Associate Editor for Journal of Applied and Computational Harmonic Analysis since 2009.
- An Associate Editor for Journal of Applied Numerical Mathematics since 2017.

Preparation Date: May 8, 2023