Maodong Pan

Personal information

Gender: Male

Date of Birth: January 5, 1990

Birthplace: Dongtai City, Jiangsu Province, P.R. China

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Education

09/2012–06/2017 **Ph.D**. in School of Mathematical Sciences, University of Science and Technology of China, Hefei, Anhui, P.R. China. Thesis Advisor: Prof. Falai Chen

09/2008–06/2012 **B.Sc**. in School of Mathematical Sciences, Nanjing Normal University, Nanjing, Jiangsu, P.R. China.

Work Experience

01/2021– **Associate professor**. in School of Mathematics, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, P.R. China.

07/2017–12/2020 **Postdoctoral researcher**. in School of Mathematical Sciences, University of Science and Technology of China, Hefei, Anhui, P.R. China. Mentor: Prof. Falai Chen

03/2020–09/2020 **Postdoctoral researcher**. in the group of "Geometry in Simulations", Johann Radon Institute for Computational and Applied Mathematics (RICAM), Austrian Academy of Sciences, Linz, Austria. Mentor: Prof. Bert Jüttler

03/2019–02/2020 **Postdoctoral researcher**. in Institute of Applied Geometry, Johannes Kepler University Linz, Austria. Mentor: Prof. Bert Jüttler

Research Interests

My basic research interest is in computer aided geometric design, computer graphics related subjects. More specifically, I am interested in the following research topics:

- CAD/CAE
- Computational Geometry
- Mesh Generation

- Geometric Deep Learning

Research Grants

- The Integration of CAD/CAE and The Relevant Mathematical Problems. Fundamental Research Funds for the Central Universities (No. NS2023041), 01/2023–12/2024, PI.
- Ultra-large-scale Efficient Isogeometric Topology Optimization Method for Complex Design Domains. National Key R&D Program of China (No. 2022YFB3302900), 11/2022–10/2025, Participant.
- Efficient Matrix Assembly for Isogeometric Analysis and Its Applications. Natural Science Foundation of China (No. 12101308), 01/2022–12/2024, PI.
- The Study of Two Fundamental Problems in Isogeometric Analysis. Natural Science Foundation of Jiangsu Province (No. BK20210268), 07/2021–06/2024, PI.
- The Study of Constructing Novel IGA-suitable Volumetric Parameterizations for Complex Domains. Start-up Funds for Scientific Research of New Teachers, Nanjing University of Aeronautics and Astronautics (No. 90YAH21060), 05/2021–04/2023, PI.
- The Study of Constructing Novel Analysis-suitable Volumetric Parameterizations of Complex Geometries. China Postdoctoral Science Foundation (No. 2018M632548), 06/2018–06/2020, PI.
- Research on Constructing High-quality Volumetric Parameterization Techniques for Isogeometric Analysis. Anhui Provincial Natural Science Foundation, PR China (No. 1908085QA11), 07/2019–06/2021, PI.
- The Study of Applications of Low-rank and Compact Representations in Geometric Modeling. Fundamental Research Funds for the Central Universities (No. WK0010460007), 01/2018–12/2019, PI.
- Investigation on Construction of Low-rank Volumetric Parameterization Method for Isogeometric Analysis. Open Project Program of the State Key Lab of CAD&CG (No. A1819), Zhejiang University, 01/2018–12/2018, PI.
- Research on Surface Reconstruction, Mesh Segmentation and Parameterization Based on Sparse Representation. Natural Science Foundation of China (No. 61877056), 01/2019–12/2022, Core Participant.
- Investigation on Theory and Methods of Geometric Modeling for Isogeometric Analysis. Natural Science Foundation of China (No. 61972368), 01/2020–12/2023, Core Participant.

Publications

[1] **Maodong Pan**, Ruijie Zou, Weihua Tong, Yujie Guo, and Falai Chen. G^1-smooth planar parameterization of complex domains for isogeometric analysis. *Computer Methods in Applied Mechanics and Engineering*, 2023.

[2] Lisa Groiss, Bert Jüttler, and **Maodong Pan***. Local linear independence of bilinear (and higher degree) B-splines on hierarchical T-meshes. *Computer Aided Geometric Design*, 103:102190, 2023 (*Corresponding author).

[3] Yujie Guo, **Maodong Pan**, Xiaohui Wei, Fei Luo, Fangbin Sun, and Martin Ruess. Implicit dynamic buckling analysis of thin-shell isogeometric structures considering geometric imperfections. *International Journal for Numerical Methods in Engineering*, 124:1055–1088, 2023.

[4] **Maodong Pan** and Falai Chen. Constructing planar domain parameterization with HB-splines via quasi-conformal mapping. *Computer Aided Geometric Design*, 97:102133, 2022.

[5] Sandra Merchel, Bert Jüttler, Dominik Mokriš, and **Maodong Pan***. Fast formation of matrices for least-squares fitting by tensor-product spline surfaces. *Computer-Aided Design*, 150:103307, 2022 (*Corresponding author).

[6] Ye Ji, Mengyun Wang, **Maodong Pan**, Yi Zhang, and Chungang Zhu. Penalty function-based volumetric parameterization method for isogeometric analysis. *Computer Aided Geometric Design*, 94:102081, 2022.

[7] **Maodong Pan***, Bert Jüttler, and Felix Scholz. Efficient matrix computation for isogeometric discretizations with hierarchical B-splines in any dimension. *Computer Methods in Applied Mechanics and Engineering*, 388:114210, 2022.

[8] **Maodong Pan***, Bert Jüttler, and Angelos Mantzaflaris. Efficient matrix assembly in isogeometric analysis with hierarchical B-splines. *Journal of Computational and Applied Mathematics*, 390:113278, 2021.

[9] **Maodong Pan**, Bert Jüttler, and Alessandro Giust. Fast formation of isogeometric Galerkin matrices via integration by interpolation and look-up. *Computer Methods in Applied Mechanics and Engineering*, 366:113005, 2020.

[10] **Maodong Pan**, Falai Chen, and Weihua Tong. Volumetric spline parameterization for isogeometric analysis. *Computer Methods in Applied Mechanics and Engineering*, 359:112769, 2020.

[11] Weihua Tong*, Xiankang Yang*, **Maodong Pan**, and Falai chen. Spectral mesh segmentation via ℓ_0 gradient minimization. *IEEE Transactions on Visualization and Computer Graphics*, 26(4):1807–1820, 2020 (*Joint first authors).

[12] Yufeng Tian and **Maodong Pan**. Corner-cutting subdivision surfaces of general degrees with parameters. *Journal of Computational Mathematics*, 38(5):732–747, 2020.

[13] Bert Jüttler, Alessandro Giust, and **Maodong Pan**. Some remarks on integration by interpolation and look-up. *Oberwolfach Reports*, 16(3):1981–2032, 2020.

[14] Xiankang Yang, **Maodong Pan**, and Weihua Tong. Feature lines extraction on meshes using ℓ_0 minimization. *Computer Engineering*, 45(7):251–257, 2019.

[15] **Maodong Pan*** and Falai Chen. Low-rank parameterization of volumetric domains for isogeometric analysis. *Computer-Aided Design*, 114:82–90, 2019.

[16] Ye Zheng, **Maodong Pan***, and Falai Chen*. Boundary correspondence of planar domains for isogeometric analysis based on optimal mass transport. *Computer-Aided Design*, 114:28–36, 2019 (*Corresponding authors).

[17] **Maodong Pan**, Falai Chen, and Weihua Tong. Low-rank parameterization of planar domains for isogeometric analysis. *Computer Aided Geometric Design*, 63:1–16, 2018.

[18] **Maodong Pan**, Weihua Tong, and Falai Chen. Phase-field guided surface reconstruction based on implicit hierarchical B-splines. *Computer Aided Geometric Design*, 52-53(9):154–169, 2017.

[19] **Maodong Pan**, Weihua Tong, and Falai Chen. Compact implicit surface reconstruction via low-rank tensor approximation. *Computer-Aided Design*, 78(9):158–167, 2016.

[20] Zhao Liu, **Maodong Pan**, Zhouwang Yang, and Jiansong Deng. Recovery of sharp features in mesh models. *Communications in Mathematics and Statistics*, 3(2):263–283, 2015.

Prizes and Awards

- Jiangsu Provincial Double-Innovation Doctor Program
- "Changkong Stars" of Nanjing University of Aeronautics and Astronautics
- Excellent Presentation Award of Annual Conference of JSIAM

Teaching activities

- Linear Algebra, Autumn 2023.
- Advanced Engineering Mathematics, Autumn 2023.
- Numerical Methods, Spring 2023.
- Advanced Engineering Mathematics, Autumn 2022.
- Numerical Methods, Autumn 2022.
- Computational Geometry, Spring 2022.
- Numerical Methods, Spring 2022.
- Advanced Engineering Mathematics, Fall 2021.

Invited presentations

- "The integration of CAD/CAE and related mathematical problems", The 20th National Symposium on Numerical Methods of Fluid Mechanics, Nanjing, March 31-April 2, 2023.
- "Fast Formation of Matrices for Least-Squares Fitting by Tensor-Product Spline Surfaces", Symposium on Solid and Physical Modeling, Singapore, June 27-29, 2022, Online Talk.
- "Efficient Matrix Computation for Isogeometric Discretizations with Hierarchical B-splines in Any Dimension", Virtual International Conference on Isogeometric Analysis, Lyon, France, September 26-29, 2021, Online Talk.
- "Planar Domain Parameterization with Hierarchical B-splines", 16th U.S. National Congress on Computational Mechanics, July 25-29, 2021, Online Talk.
- "Fast Formation of Matrices in Isogeometric Analysis", Workshop on the Theory and Application of Isogeometric Analysis, Tianyuan Mathematical Center, Jilin University, Changchun, China, July 20-22, 2021.
- "Efficient Matrix Assembly in Isogeometric Analysis", Soochow University, Suzhou, China, May 11, 2021.
- "Domain Parameterization for Isogeometric Analysis", Nanjing Center for Applied Mathematics, Nanjing, China, April 29, 2021.
- "Domain Parameterization for Isogeometric Analysis", Online Talk, South China University of Technology, Guangzhou, China, November 20, 2020.
- "Fast Formation of Isogeometric Galerkin Matrices via Integration by Interpolation and Look-up", 2nd workshop of the ERC project CHANGE, Sestri Levante, (GE), Italy, November 25-27, 2019.
- "Integration by Interpolation, Look-up and Sum Factorization for Galerkin-based Isogeometric Analysis", 15th NFN seminar, bifeb, Strobl, Austria, October 1–3, 2019.

- "Low-rank Parameterization of Volumetric Domains for Isogeometric Analysis", Symposium on Solid and Physical Modeling 2019, Simon Fraser University, Vancouver, Canada, June 17–21, 2019.
- "Volumetric Spline Parameterization for Isogeometric Analysis", SIAM Conference on Computational Geometric Design 2019, Simon Fraser University, Vancouver, Canada, June 17–21, 2019.
- "Phase-field Guided Surface Reconstruction Based on Implicit Hierarchical B-splines", International Conference on Geometric Modeling and Processing 2017, Xiamen, P.R. China, April 17–19, 2017.
- "Compact Implicit Surface Reconstruction via Low-rank Tensor Approximation", The International Geometry Summit 2016, Freie Universität Berlin, Berlin, Germany, June 20–24, 2016.
- "A Low-rank Surface Reconstruction Algorithm Based on Hierarchical Implicit Tensor-product B-spline Surfaces", 7th Conference of Computer Mathematics, University of Science and Technology of China, Hefei, P.R. China, October 30–November 2, 2015.

Refereeing activities

- SIAM Journal on Numerical Analysis
- Computer Methods in Applied Mechanics and Engineering
- International Journal for Numerical Methods in Engineering
- Computer-Aided Design
- Computer Aided Geometric Design
- IEEE Computer Graphics and Applications
- Journal of Computational and Applied Mathematics
- Applied Numerical Mathematics
- The Visual Computer
- Journal of Computational Design and Engineering
- Computer Modeling in Engineering & Sciences
- Mathematics

Computer skills

C, C++, MATLAB, OpenGL...

References

- Falai Chen, University of Science and Technology of China, Email: chenfl@ustc.edu.cn
- Bert Jüttler, Johannes Kepler University Linz, Email: bert.juettler@jku.at