

Bin Zhou

Associate professor

School of Mathematical Sciences, Peking University, Beijing 100871.

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PERSONAL DATA

Male

Chinese Citizen

Married

EDUCATION

Joint Ph.D. in Mathematics, The Australian National University and Peking University, 2010.

Supervisors: Xiaohua Zhu and Xu-jia Wang

B.S. in Mathematics and Its Application, Beijing Normal University, 2004.

PROFESSIONAL APPOINTMENTS

Associate professor(tenured), School of Mathematical Science, Peking University, 2023/02 –

Associate professor, School of Mathematical Science, Peking University, 2015/08–2023/01.

ARC DECRA research fellow, The Australian National University, 2012/07–2016/04.

Lecturer, School of Mathematical Science, Peking University, 2012/04 –2015/07.

Simons Postdoctoral Fellow, Beijing International Center for Mathematical Research, Peking University, 2010/07 – 2012/03.

RESEARCH INTERESTS

Differential geometry, Geometric analysis, Partial differential equations.

HONORS AND AWARDS

2011 Beijing Excellent Doctoral Dissertation

2012 Discovery Early Career Research Award, Australia Research Council

2024 Yang-Wang Academician Teaching Scholarship

PUBLICATIONS AND PREPRINTS

- [33] Ling Wang and **Bin Zhou**, The partial Legendre transform in Monge-Ampère equations, preprint.
- [32] Ling Wang and **Bin Zhou**, $C^{1,\alpha}$ Regularity of variational problems with a convexity constraint, arXiv:2403.04235.
- [31] Jiaxiang Wang and **Bin Zhou**, Sobolev inequalities and regularity of the linearized complex Monge-Ampère and Hessian equations, *Transactions of the American Mathematical Society*, 378(2025), 447-475.
- [30] Ling Wang and **Bin Zhou**, Liouville Theorems for a class of degenerate or singular Monge-Ampère equations, *Journal of Geometric Analysis* 34 (2024), no. 11, Paper No. 352.
- [29] Youngho Kim, Nam Quang Le, Ling Wang and **Bin Zhou**, The singular Abreu's equation and linearized Monge-Ampère equation with drifts, accepted by *Journal of the European Mathematical Society(JEMS)*, arXiv:2209.11681.
- [28] Jiaxiang Wang and **Bin Zhou**, Trace inequalities, isocapacitary inequalities and regularity of the complex Hessian equations, *Science China Mathematics* 67 (2024), 557-576.
- [27] Ling Wang and **Bin Zhou**, Interior regularity for Monge-Ampère typed fourth order equations, *Revista Matemática Iberoamericana* 39 (2023), no. 5, 1895-1923.
- [26] Nam Quang Le and **Bin Zhou**, Solvability of a class of singular fourth order equations of Monge-Ampère type, *Annals of PDE* 7 (2021), no. 2, Paper No. 13.
- [25] Liding Huang and **Bin Zhou**, Green's function for equations with conic metrics, *Calculus of Variations and PDE*. (2021) 60:232. <https://doi.org/10.1007/s00526-021-02103-5>.
- [24] Jiaxiang Wang and **Bin Zhou**, Regularity for a class of singular complex Hessian equations, *Acta Mathematica Sinica (Engl. Ser.)* 37 (2021), no. 11, 1709-1720.
- [23] Jiaxiang Wang and **Bin Zhou**, Monotonicity formulae for the complex Hessian equations, *Methods and Applications of Analysis*. 28 (2021), No. 1, 77-84.
- [22] Jiaxiang Wang, Xu-Jia Wang and **Bin Zhou**, A priori estimates for the complex Monge-Ampère equation, *Peking Mathematical Journal* (2021) 4:143-157.
- [21] Shibing Chen, Xu-Jia Wang and **Bin Zhou**, On the four vertex theorem for curves on locally convex surfaces, *Mathematical Research Letters* 27(2020), no. 5, 1261-1279.
- [20] Jiaxiang Wang, Xu-Jia Wang and **Bin Zhou**, Moser-Trudinger inequality for the complex Monge-Ampère equation, *Journal of Functional Analysis* 279 (2020) 108765.
- [19] Yan Li and **Bin Zhou**, Mabuchi metrics and properness of modified Ding functional, *Pacific Journal of Mathematics* 302(2019), 659-692.
- [18] Jianchun Chu and **Bin Zhou**, Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds, *Science China Mathematics* 62 (2019), 371-380.
- [17] Naoto Yotsutani, **Bin Zhou**, Relative Algebro-Geometric stabilities of Toric manifolds, *Tohoku Mathematical Journal* (2) 71 (2019), no. 4, 495-524.
- [16] Yan Li, **Bin Zhou** and Xiaohua Zhu, K-energy on polarized group compactifications of Lie groups, *Journal Functional Analysis* 275 (2018), no. 5, 1023-1072.

- [15] **Bin Zhou**, Variational solutions to extremal metrics on toric surfaces, *Mathematische Zeitschrift*, 283(2016), 1011-1031.
- [14] Feng Wang, **Bin Zhou** and Xiaohua Zhu, Modified Futaki invariant and equivariant Riemann-Roch formula, *Advances in Mathematics*, 289(2016), 1205-1235.
- [13] Qiuyi Dai, Xu-jia Wang and **Bin Zhou**, A potential theory for the k-curvature equation, *Advances in Mathematics*, 288(2016), 791-824.
- [12] Qiuyi Dai, Xu-jia Wang and **Bin Zhou**, The signed mean curvature measure, *Contemporary Mathematics*, Volume 644(2015) <http://dx.doi.org/10.1090/conm/644/12776>.
- [11] Xu-jia Wang and **Bin Zhou**, K-stability and canonical metrics on toric manifolds, *Bulletin of the Institute of Mathematics Academia Sinica(New Series)*, 9(2014), 85-110.
- [10] **Bin Zhou**, Extremal metrics on toric manifolds—existence and K-stability (in Chinese), *Science Sinica Mathematics*, 44(2014), 1-11, doi:10.1360/012013-144.
- [9] Jiakun liu and **Bin Zhou**, An obstacle problem for Monge-Ampère typed functionals, *Journal of Differential Equations* 254(2013), 1306-1325.
- [8] **Bin Zhou**, Sobolev inequality for complex Hessian equations, *Mathematische Zeitschrift*, 274(2013), 1306-1325.
- [7] Xu-jia Wang and **Bin Zhou**, Variational problems of Monge-Ampère type, in *Fifth International Congress of Chinese Mathematicians Part 1, AMS/IP Studies in Advanced Mathematics*, Vol. 51, Amer. math. Soc., Providence, RI, 2012, 383-296.
- [6] **Bin Zhou**, The first boundary value problem for Abreu's equation, *International Mathematics Research Notice*, 7(2012), 1439-1484. doi: 10.1093/imrn/rnr076.
- [5] **Bin Zhou**, The Bernstein theorem for a class of fourth order equations, *Calculus of Variations and PDE* 43(2012), 25-44.
- [4] Xu-jia Wang and **Bin Zhou**, On the existence and nonexistence of extremal metrics on toric Kähler surfaces, *Advances in Mathematics* 226(2011), 4429-4455.
- [3] **Bin Zhou** and Xiaohua Zhu, Minimizing weak solutions for Calabi's extremal metrics on toric manifolds, *Calculus of Variations and PDE* 32(2008), 191-217.
- [2] **Bin Zhou** and Xiaohua Zhu, K-stability on toric manifolds, *Proceedings of American Mathematical Society* 136(2008), 3301-3307.
- [1] **Bin Zhou** and Xiaohua Zhu, Relative K-stability and modified K-energy on toric manifolds, *Advances in Mathematics* 219(2008), 1327-1362.

TEACHING

Autumn 2025, Mathematical Analysis I(Honor class), Peking University.

Spring 2025, Selected topics in PDEs, Peking University.

Autumn 2024, Mathematical Analysis III(Honor class), Peking University.

Spring 2024, Mathematical Analysis II(Honor class), Peking University.

Autumn 2023, Mathematical Analysis I(Honor class), Peking University.

Spring 2023, Mathematical Analysis II, Peking University.

Autumn 2022, Mathematical Analysis I, Peking University.
 Spring 2021, Functional Analysis, Peking University.
 Autumn 2020, Mathematical Analysis III(Honor class), Peking University.
 Spring 2020, Mathematical Analysis II(Honor class), Peking University.
 Autumn 2019, Mathematical Analysis I(Honor class), Peking University.
 Spring 2019, Functional Analysis, Peking University.
 Autumn 2018, Mathematical Analysis III, Peking University.
 Spring 2018, undergraduate analysis seminar, Peking University.
 Autumn 2017, Mathematical Analysis III, Peking University.
 Spring 2017, Mathematical Analysis II, Peking University.
 Autumn 2016, Mathematical Analysis I, Peking University.
 Spring 2016, undergraduate analysis seminar, Peking University.
 Spring 2015, Advanced Mathematics Level C, Peking University.
 Autumn 2014, Linear Algebra, Peking University.
 2014, Analysis 2:Topology, Lebesgue Integration and Hilbert Spaces, MATH3320, ANU.
 Autumn 2013, Advanced Mathematics B, Peking University.

SUPERVISION

Postdocs:

Haibin Wang, 2025-, PKU.

PhD

Ling Wang, Monge-Ampère type fourth order equations and applications, 2020-2025, PKU.
 (2025-, postdoc at Bocconi University in Italy).

Yuxuan Hu, 2023-, PKU.

Jie Deng, 2024-, PKU.

Guoqing Cui, 2025-, PKU.

Hanyi Chen, 2026-, PKU.

Rui Zhu, 2026-, PKU.

Undergraduates:

Bingxue Tao, Topics on isoperimetric problems, 2020, PKU.

Chenyang Wu, Notes on Symmetrization and Applications, 2020, PKU.

Siwei Wang, A generalization of Reilly formula, 2022, PKU.

Yuxuan Hu, On the regularity of Monge-Ampère type equations, 2023, PKU.

Runze lin, Interior estimates of Monge-Ampère equations, 2023, PKU.

Yutong Wu, Interior estimates for the scalar curvature equation, 2023, PKU.

Zikang Lin, Weak solutions of Monge-Ampère equations and Minkowski problem, 2025, PKU.

Bowen Xue, Riemann sums on polytopes, 2025, PKU.

Keyu Zhong, Geometric inequalities for the complex Monge-Ampère equation, 2025, PKU.

Bingwei Chen, 2025, PKU.

Others:

Jun Liang, Existence and regularity of solutions to the Equation $\Delta u = f(x, u)$, Honours, 2013, ANU.

RESEARCH GRANTS

Principal Investigator, Extremal metrics on toric manifolds and Abreu's equation, *China Post-doctoral Science Foundation*, 2010-2012.

Principal Investigator, Extremal metrics on toric manifolds and Abreu's equation, *China Post-doctoral Science Foundation*, 2011.

Principal Investigator, Calabi's extremal metrics on toric manifolds, *Young Scientist Fund of NSFC*, 2012-2014.

Principal Investigator, Canonical metrics on Kahler manifolds and Monge-Ampere equations, *Discovery Early Career Research Award*, 2012-2015.

Principal Investigator, The generalized Yau-Tian-Donaldson conjectures in Kahler geometry, *NSFC*, 2016-2018.

Principal Investigator, Geometric analysis, *Excelent Young Scientist Fund of NSFC*, 2019-2021.

Principal Investigator, Regularity and geometric inequalities of the Monge-Ampere type equation, *NSFC*, 2023-2026.

Invited talks

First Chinese-Korea Workshop on Partial Differential Equations, August 20-25, 2025.

Seminar at Beijing Institute of Technology, Beijing, June 19.

Seminar at Jilin University, Changchun, May 28.

Nonlinear analysis and its applications in geometry, Chinese Academy of Sciences, Beijing, May 16-18, 2025.

Hangzhou Geometric Analysis Workshop, HNU, April 30-May 2, 2025.

Workshop on nonlinear analysis, HUST, Wuhan, March 29-30, 2025.

Workshop on nonlinear analysis, BNU(Zhuhai), January 4-5.

The 14th AIMS Conference on Dynamical Systems and Differential Equations, December 16-20, 2024, Abu Dhabi, UAE.

Tianyuan Math. Center, December 9-13, 2024.

Seminar at Tsinghua University, October 13, 2024.

Autumn workshop on geometric analysis, Ningbo, October 11-13, 2024.

Youth Forum on Differential Geometry, Jiaying, September 18-22, 2024.

Seminar at Central South University, September 6, 2024.

Youth Forum on Differential Geometry, Nanjing Technology University, August 29-31, 2024.

Seminar at Tianjin University, June 14, 2024.

Analysis and PDE seminar at Indiana University, April 24, 2024.

Seminar at CAS, Mar 28, 2024.

Seminar at Westlake University, Mar 27, 2024.

Workshop on nonlinear PDEs and geometric analysis, Harbin Normal University, December 29-31, 2023.

Youth differential geometry forum, Guangxi Normal University, November 24-26, 2023.

Seminar at Wuhan University, November 7, 2023.

2023 Differential Equation and Geometry Conference in Shing-Tung Yau Center of Southeast University, October 13-16, 2023.

Workshop on analysis and geometry on metric spaces, USTC, October 6, 2023.

Workshop on nonlinear elliptic PDEs and geometric analysis, HUST, September 22-24, 2023.

Seminar at Beihang University, September 18, 2023.

2023 International Conference on PDEs and Geometric Analysis, Shanghai Jiaotong University, June 19-24, 2023.

Seminar at Shanghai University, June 19, 2023.

Youth geometry forum, Nanjing Technology University, June 16-19, 2023.

Seminar at Nanjing University, May 25, 2023.

Seminar at CAS, May 17, 2023, online.

Seminar at Zhejiang University, April 7, 2023.

Seminar at Shantou University, March 9, 2023, online.

Conference on elliptic problems, South China Normal University, November 4-6, 2022, online.

Geometric Analysis seminar, Westlake University, June 14, 2022, online.

Nonlinear elliptic equations and geometric analysis, Harbin Institute of Technology, June 3-5, 2022, online.

Seminar at Shanghai University, May 20, 2022, online.

Seminar at HUST, May 18, 2022, online.

Nonlinear PDE Youth Forum, Fudan University, March 26-27, 2022, online.

Differential Geometry Youth Forum Xi'an, November 26-30, 2021, online.

MIS, Shandong University, Nov 4, 2021, online.

USTB, October 29, 2021, online.

Beihang University, October 26, 2021, online.

Interaction Between Partial Differential Equations and Convex Geometry, BIRS, October 19, 2021, online.

Seminar at Jiangxi Normal University, September 29, 2021.

Seminar at Wuhan, July 19, 2021.

SCNU, July 18, 2021.

Wuhan, July 16, 2021.

Seminar at Beijing Institute of Technology, May 20, 2021.

SCNU, April 9, 2021.

Zhejiang University, April 16, 2021, online.

Seminar at Shantou University, April 1, 2021, online.

SCMC, December 26-27, 2020, online.

Seminar at RUC, December 10, 2020.

Zhejiang University, December 4, 2020, online.

Seminar at Tongji University, July 3, 2020, online.

Fudan University, May 27, 2020, online.

Differential geometry youth forum 2019, Dec 4-9, 2019, Nanning, Guangxi University.

New progress in PDEs, Nov 1-3, 2019, Xi'an, Xi'an Jiaotong University

Workshop on Monge-Ampère equations: Aug 19-23, 2019, Kiama, Australia.

Jun 25-28, 2019, Beihang University.

Jun 22, 2019, Renmin University of China.

Jun 22, 2019, Beijing Normal University.

Jun 14-15, 2019, Nanjing Engineer University.

May 2-6, Harbin Institute of Technology.

Differential geometry youth forum 2018, Nov 30-Dec 9, 2018, Beijing, Guangxi University.

Nonlinear PDEs in real and complex geometry, Aug 13-17, 2018, San Jose, United States.

Geometric and Nonlinear Partial Differential Equations, July 2-6, 2018, Soochow University, Suzhou.

Geometric and nonlinear PDE conference, Feb 5-9, 2018, Murramurang, Australia.

Workshop on Geometric Analysis, Hangzhou Dec 16-18, 2017, Zhejiang University.

Siyuan workshop on Geometric Analysis, Shanghai Dec 1-3, 2017, Shanghai Jiaotong University.

Elliptic Partial Differential Equations of Second Order: Celebrating 40 years of Gilbarg and Trudinger's book, Oct 16-28, 2017, MATRIX, Melbourne, Australia.

Pacific Rim conference on complex and symplectic geometry, Jul 30-Aug 4, 2017, Pohang, Korea.

Dynamical Geometric Analysis in Orsay, Jun 27-30, 2017, Paris Sud, France.

Workshop on geometric analysis, May 23-29, 2017, Capital Normal University, Beijing.

Mini-Workshop on Geometry and PDE, Nov 12-13, 2016, Xiamen.

Young Researcher Symposium on Topology-2016 Nanjing, Aug 23-26, 2016, Nanjing.

Workshop on geometric analysis, May 18-22, 2015, Xiamen.

Mini-conference in complex geometry, April 10-11, 2015, Nanjing.

Youth geometric analysis Forum, Jan 26-31, 2015, Sanya.

BNU PDE workshop, Jan 24-25, Beijing Normal University, Beijing.

9th Pacific Rim conference on complex geometry, Jul 27-Aug 1, KIAS, Gunsan, Korea.

Geometric invariance and nonlinear partial differential equations(ANU special year conference), Feb 9-14, 2014, Kioloa Coastal Campus, Australian National University, Canberra Australia.

2nd Pacific Rim Mathematical Association Congress, Jun 24-28, 2013, Shanghai Jiaotong University, Shanghai, China.

56th Annual Meeting of the Australian Mathematical Society, Sep 24-Sep 27, 2012, University of Ballarat, Ballarat, Australia.

Transport, flows and applications: an one day workshop, Jul 17, 2012, ANU, Canberra, Australia.

Higher Order Problems in Geometric Analysis, Jun 5-Jun 8, 2012, University of Bath, UK.

The 7th Geometry Conference for Friendship of Japan and China, Jan 9-Jan 15, 2012, Tokyo Institute of Technology, Tokyo, Japan.

Complex Geometry and Symplectic Geometry Conference, Aug 15-Aug 20, 2011, University of Science and Technology of China, Hefei, China.

Workshop on Geometric Analysis, June 21-June 25, 2011, Zhejiang University, Hangzhou, China.

Mini Conference on Geometry and Topology, Nov 23-Nov 24, 2010, University of Science and Technology of China, Hefei, China.

The 6th Geometry Conference for Friendship of Japan and China, Sep 3-Sep 9, 2010, Northwest University, Xi'an, China.

53rd Annual Meeting of the Australian Mathematical Society, Sep 28-Oct 1, 2009, University of South Australia, Adelaide, Australia.

Workshop on Geometric Analysis, Oct 2-Oct 3, 2008, University of Wollongong, Wollongong, Australia.

The 3rd Geometry Conference for Friendship of Japan and China, Jan 26-Jan 29, 2008, Nagoya University, Nagoya, Japan.

EDITORIAL BOARDS

Communications on Pure and Applied Analysis

PROFESSIONAL SERVICES

Vice chair of department of mathematics in SMS at PKU since November, 2021.

Chief of the teaching and research section of analysis in SMS at PKU from 2018 to 2021.

Referee for: Acta Mathematica Sinica, Advances in Mathematics, Advanced Nonlinear Studies, Calculus of Variations and PDE, Crelle's journal, Communications in Mathematics and Statistics, Frontiers of Mathematics, International Mathematics Research Notices, Journal of Partial Differential Equations, Mathematische Zeitschrift, Methods and Applications of Analysis, Nagoya Mathematical Journal, Partial Differential Equations and Applications, Pacific Journal of Mathematics, Proceedings of the American Mathematical Society, Pure and Applied Mathematics Quarterly, Results in Mathematics, Science China Mathematics, Transactions of American Mathematical Society, Tohoku Mathematical Journal.

REFERENCES

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