Bin Zhou

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PERSONAL DATA

Male

Born August 14, 1982, Jiangxi, China

Chinese Citizen

Married

EDUCATION

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

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

Supervisors: Xiaohua Zhu and Xu-jia Wang,

PROFESSIONAL APPOINTMENTS

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

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

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

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

RESEARCH INTERESTS

Differential geometry; Partial differential equations

HONORS AND AWARDS

2011 Beijing Excellent Doctoral Dissertation

2012 Discovery Early Career Research Award, Australia Research Council

PUBLICATIONS AND PREPRINTS

[1] **Bin Zhou** and Xiaohua Zhu, Relative K-stability and modified K-energy on toric manifolds, *Advances in Mathematics* 219(2008), 1327-1362.

[2] **Bin Zhou** and Xiaohua Zhu, K-stability on toric manifolds, *Proceedings of American Mathematical Society* 136(2008), 3301-3307.

[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.

[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.

[5] **Bin Zhou**, The Bernstein theorem for a class of fourth order equations, *Calculus of Variations and PDE* 43(2012), 25-44.

[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.

[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.

[8] **Bin Zhou**, Sobolev inequality for complex Hessian equations, *Mathematische Zeitschrift*, 274(2013), 1306-1325.

[9] Jiakun liu and **Bin Zhou**, An obstacle problem for Monge-Ampère typed functionals, *Journal of Differential Equations* 254(2013), 1306-1325.

[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.

[11] Xu-jia Wang and **Bin Zhou**, K-stabilty and canonical metrics on toric manifolds, *Bulletin of the Institute of Mathematics Academia Sinica(New Series)*, 9(2014), 85-110.

[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 .

[13] Qiuyi Dai, Xu-jia Wang and **Bin Zhou**, A potential theory for the k-curvature equation, *Advances in Mathematics*, 288(2016), 791-824.

[14] Feng Wang, **Bin Zhou** and Xiaohua Zhu, Modified Futaki invariant and equivariant Riemann-Roch formula, *Advances in Mathematics*, 289(2016), 1205-1235.

[15] **Bin Zhou**, Variational solutions to extremal metrics on toric surfaces, *Mathematische Zeitschrift*, 283(2016), 1011-1031.

[16] Naoto Yotsutani, **Bin Zhou**, Relative Algebro-Geometric stabilities of Toric manifolds, *Tohoku Mathematical Journal*, Tohoku Math. J. (2) 71 (2019), no. 4, 495-524.

[17] 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.

[18] Jianchun Chu and **Bin Zhou**, Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds, *Science China Mathematics* 62 (2019), 371-380.

[19] Yan Li and **Bin Zhou**, Mabuchi metrics and properness of modified Ding functional, *Pacific Journal of Mathematics* 302(2019), 659-692.

[20] Xu-Jia Wang, Jiaxiang Wang and **Bin Zhou**, Moser-Trudinger inequality for the complex Monge-Ampère equation, *Journal of Functional Analysis* 279 (2020) 108765.

[21] Xu-Jia Wang, Jiaxiang Wang and **Bin Zhou**, A priori estimates for the complex Monge-Ampère equation, *Peking Mathematical Journal* (2021) 4:143-157.

[22] 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.

[23] Jiaxiang Wang and **Bin Zhou**, Monotonicity Formulae for the Complex Hessian Equations, to appear in *Methods and Applications of Analysis*.

[24] Jiaxiang Wang and **Bin Zhou**, Regularity for a class of singular complex Hessian equations, to appear in *Acta Mathematica Sinica*.

[25] Liding Huang and **Bin Zhou**, Green's function for equations with conic metrics, accepted by *Calculus of Variations and PDE*.

[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.

TEACHING

Autumn 2013, Advanced Mathematics B, Peking University.

2014, Analysis 2:Topology, Lebesgue Integration and Hilbert Spaces, MATH3320, ANU.

Autumn 2014, Linear Algebra, Peking University.

Spring 2015, Advanced Mathematics C, Peking University.

Spring 2016, undergraduate analysis seminar, Peking University.

Autumn 2016, Mathematical Analysis I, Peking University.

Spring 2017, Mathematical Analysis II, Peking University.

Autumn 2017, Mathematical Analysis III, Peking University.

Spring 2018, undergraduate analysis seminar, Peking University.

Autumn 2018, Mathematical Analysis III, Peking University.

Spring 2019, Functional Analysis, Peking University.

Autumn 2019, Mathematical Analysis I(Honor class), Peking University.

Spring 2020, Mathematical Analysis II(Honor class), Peking University.

Autumn 2020, Mathematical Analysis III(Honor class), Peking University.

Spring 2021, Functional Analysis, Peking University.

SUPERVISION

Jun Liang, Existence and regularity of solutions to the Equation $\triangle u = f(x, u)$, Honours, 2013, ANU.
Ling Wang, PhD, PKU.

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, *Exelent Young Scientist Fund of NSFC*, 2019-2021.

CONFERENCE PRESENTATION

Title: Minimizing weak solutions for Calabi's extremal metrics on toric manifolds,

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

Title: Calabi's extremal metrics on toric manifolds,

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

Title: K-stability on toric manifolds,

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

Title: K-stability and K-energy on toric manifolds,

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

Title: Futaki invariant and K-stability on toric surfaces,

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

Title: K-stability on toric surfaces,

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

Title: Variational solutions to extremal metrics on toric surfaces,

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

Title: Variational solutions to extremal metrics on toric surfaces,

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

Title: Bernstein theorem for a class of fourth order equations,

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

Title: Variational solutions to extremal metrics on toric surfaces,

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

Title: Sobolev inequality for complex Hessian equations,

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

Title: A class of Weingarten curvature measures,

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

Title: A class of Weingarten curvature measures,

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

Title: Sobolev inequality for complex Hessian equations,

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

Title: Sobolev inequality for complex Hessian equations,

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

Title: Modified Futaki invariant and equivariant Riemann-Roch formula,

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

Title: A potential theory for Weingarten curvatures,

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

Title: A potential theory for Weingarten curvatures,

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

Title: Relative algebro-geometric stabilities of toric manifolds,

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

Title: Minimizers of the K-energy on toric manifolds,

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

Title: Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds,

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

Title: Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds,

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

Title: Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds,

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

Title: Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds,

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

Title: *K*-energy on polarized compactifications of Lie groups,

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

Title: *K*-energy on polarized compactifications of Lie groups,

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

Title: Properness of energy functionals on polarized compactifications of reductive Lie groups,

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

Title: On the uniform estimate of the complex Monge-Ampère equation,

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

Title: On the CSCK problem on *G*-manifolds,

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

Title: A four vertex theorem for space curve on locally convex surfaces

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

Title: Moser-Trudinger type inequality for the complex Monge-Ampère equations,

May 2-6, Harbin Institute of Technology.

Title: Optimal regularity of plurisubharmonic envelopes on compact Hermitian manifolds, Jun 14-15, 2019, Nanjing Engeneer University.

Title: Moser-Trudinger type inequality and regularity of the complex Monge-Ampère equations,

Jun 22, 2019, Beijing Normal University.

Title: Moser-Trudinger type inequality for the complex Monge-Ampère equations,

Jun 22, 2019, Renmin University of China.

Title: Moser-Trudinger type inequality for the complex Monge-Ampère equations,

Jun 25-28, 2019 Beihang University.

Title: A priori estimates for the complex Monge-Ampère equations,

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

Title: A four vertex theorem for space curve on locally convex surfaces

New progress in PDEs, Nov 1-3ïïjŇ2019, Xi'an, Xi'an Jiaotong University

Title: Green's function for equaitons with conic metrics,

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

REFERENCES

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