Yuguang Zhang (Curriculum Vitae)

Affiliation: Institut für Differentialgeometrie, Gottfried Wilhelm Leibniz Universität Hannover
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Education

1) 09, 2002, – 06, 2006, Nankai Institute of Mathematics, Nankai University, Ph.D.. Adviser: Fuquan Fang. Thesis title: *Convergence of Kähler manifolds and calibrated fibrations.*

2) 09, 1999, – 04, 2002, College of Science, Nanjing University of Aeronautics and Astronautics, Master of Science.

3) 09, 1995, – 07, 1999, Department of Aircraft, Nanjing University of Aeronautics and Astronautics, Bachelor of Engineering.

Professional Experience

1) 10, 2020, – present, Institut für Differentialgeometrie, Gottfried Wilhelm Leibniz Universität Hannover, instructor.

2) 11, 2017, – 08, 2020, Department of Mathematical Sciences, University of Bath, Research Associate.

3) 09, 2017, – 11, 2017, Department of Mathematics, Imperial College, Research Associate.

4) 12, 2013, – 06, 2017, Yau Mathematical Sciences Center, Tsinghua University, Associate Professor.

5) 07, 2006, – 11, 2013, Department of Mathematics, Capital Normal University, Lecturer and Associate Professor.

6) 08, 2012, – 08, 2013, Department of Mathematics, University of California San Diego, Visiting Scholar.

7) 10, 2007, – 03, 2009, Department of Mathematics, Korea Advanced Institute of Science and Technology, Republic of Korea, Post-Doctor.

Publications

1) M. Gross, V. Tosatti, **Y. Zhang**, *Geometry of twisted Kähler-Einstein metrics and collapsing*, arXiv:1911.07315, accepted by Comm. Math. Phys.

2) V. Datar, A. Jacob, **Y. Zhang**, *Adiabatic limits of anti-self-dual connections on collapsed K3 surfaces*, arXiv:1809.08583, accepted by J. Differential Geom.

3) **Y. Zhang**, *Note on equivalences for degenerations of Calabi-Yau manifolds*, in *Surveys in Geometric Analysis 2017*, 186–202, Science Press, Beijing, 2018.

4) V. Tosatti, **Y. Zhang**, *Collapsing hyperkähler manifolds*, Annales Scientifiques de l'Ecole Normale Superieure, 53, (2020), 751–786.

5) Y. Li, Y. Yuan, **Y. Zhang**, *A new geometric flow over Khler manifolds*, Communications in Analysis and Geometry, 28 (2020), 1251–1288.

6) **Y. Zhang**, *Degeneration of Ricci–flat Calabi–Yau manifolds and its applications.* Uniformization, Riemann-Hilbert correspondence, Calabi–Yau manifolds Picard–Fuchs equations, 551–592, Adv. Lect. Math. (ALM), 42, Int. Press, Somerville, MA, 2018.

7) V. Tosatti, **Y. Zhang**, *Finite time collapsing of the Kähler-Ricci flow on threefolds.* Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) 18 (2018), no. 1, 105–118.

8) X. Wang, **Y. Zhang**, *Balanced embedding of degenerating Abelian varieties.* String-Math 2015, 247–263, Proc. Sympos. Pure Math., 96, Amer. Math. Soc., Providence, RI, 2017.

9) **Y. Zhang**, *Collapsing of Calabi-Yau manifolds and special Lagrangian submanifolds.* Univ. Iagel. Acta Math. No. 54 (2017), 53–78.

10) **Y. Zhang**, *Completion of the moduli space for polarized Calabi-Yau manifolds*, J. Differential Geom., 103 (2016), 521–544.

11) M. Gross, V. Tosatti, **Y. Zhang**, *Gromov-Hausdorff collapsing of Calabi-Yau manifolds*, Communication in Geometry and Analysis, Volume 24, Number 1, (2016), 93–113.

12) **Y. Zhang**, *Collapsing of negative Kähler-Einstein metrics*, Mathematical Research Letters, Volume 22, Number 6, (2015), 1843–1869.

13) V. Tosatti, **Y. Zhang**, *Infinite-time singularities of the Kähler-Ricci flow.* Geom. Topol. 19 (2015), no. 5, 2925–2948.

14) V. Tosatti, **Y. Zhang**, *Triviality of fibered Calabi-Yau manifolds without singular fibers*, Mathematical Research Letters, Volume 21, (2014), no.4, 905–918.

15) M. Gross, V. Tosatti, **Y. Zhang**, *Collapsing of Abelian Fibred Calabi-Yau Manifolds*, Duke Math. J. 162 (2013), 517–551.

16) X. Rong, **Y. Zhang**, *Degenerations of Ricci-flat Calabi-Yau manifolds*, Commun. Contemp. Math. 15 (2013), no. 4.

17) X. Rong, **Y. Zhang**, *Continuity of Extremal Transitions and Flops for Calabi-Yau Manifolds,* Appendix B by Mark Gross, J. Differential Geom. 89 (2011), no. 2, 233–269.

18) W.-D. Ruan, **Y. Zhang**, *Convergence of Calabi-Yau manifolds*, Adv. Math. 228 (2011), 1543–1589.

19) **Y. Zhang**, Z. Zhang, *A note on the Hitchin-Thorpe inequality and Ricci flow on 4-manifolds.* Proc. Amer. Math. Soc. 140 (2012), no. 5, 1777–1783.

20) W.-D. Ruan, **Y. Zhang**, Z. Zhang, *Bounding sectional curvature along the Kähler-Ricci flow.* Commun. Contemp. Math. 11 (2009), no. 6, 1067–1077.

21) **Y. Zhang**, *Miyaoka-Yau inequality for minimal projective manifolds of general type.* Proc. Amer. Math. Soc. 137 (2009), no. 8, 2749–2754.

22) F. Fang, **Y. Zhang**, Z. Zhang, *Maximum solutions of normalized Ricci flow on 4-manifolds.* Comm. Math. Phys. 283 (2008), no. 1, 1–24.

23) F. Fang, **Y. Zhang**, Z. Zhang, *Non-singular solutions to the normalized Ricci flow equation.* Math. Ann. 340 (2008), no. 3, 647–674.

24) F. Fang, **Y. Zhang**, *Perelman's λ-functional and Seiberg-Witten equations.* Front. Math. China 2 (2007), no. 2, 191–210.

Preprints

1) **Y. Zhang**, *Pair-of-pants decompositions of 4-manifolds diffeomorphic to general type hypersurfaces*, arXiv:2102.10037.

Teaching record (recent years)

1) 2018, autumn. Advanced real analysis, undergraduate course, 3-4 year students, 100 students, Mathematics Department, University of Bath.

2) 2018 spring. Analysis in Hilbert space, undergraduate course, 3-4 year students, 40 students, Mathematics Department, University of Bath.

3) 2017 spring. Topics in geometric analysis, advanced topic course, Yau Mathematical Science Centre, Tsinghua University.

4) 2016 autumn. Linear algebra I, the first year undergraduate course for non-mathematics department, 170 students, Tsinghua University.

5) 2016 spring. Topics in differential geometry, advanced topic course, Yau Mathematical Science Centre, Tsinghua University.

6) 2015 autumn. Linear algebra I, the first year undergraduate course for non-mathematics department, 120 students, Tsinghua University.

7) 2015 spring. Differential topology, postgraduate course for Mathematics Department, Tsinghua University.

Research Grants (as principal investigator)

1) National Nature Science Foundation of China, 11271015, 'Convergence of Calabi-Yau manifolds', 500,000CHY, from 01, 2013 to 12, 2016.

2) National Nature Science Foundation of China, 10901111, 'Convergence of Einstein manifolds', 160,000CHY, from 01, 2010 to 12, 2012.

3) Beijing Municipal Education Commission, KM-210100028003, 'Metric geometry of Calabi-Yau manifolds', 100,000CHY, from 01, 2010 to 12, 2012.

Research Visits

1) 07–08, 2017, Max Planck Institute for Mathematics, Bonn.

2) 01–02, 2016, Mathematical Science Research Institute, Berkeley.

3) 07–08, 2015, Simons Center for Geometry and Physics, Stony Brook.

4) 01–02, 07–08, 2010, Institut des Hautes Études Scientifiques, Paris.

Professional Services

1) Reviewer for Zentralblatt MATH.

2) Referee for J. Differential Geom, and Amer. Journal of Math..

Seminar co-organised

Student study seminar of the Gross-Siebert program. Co-organised with Eduard Looijenga (Tsinghua University) and Chengyang Xu (Peking University).

Invited talks at conferences, seminars, and research workshops (recent years)

1) 01, 2020, Loughborough University, 'Equivalences for degenerations of Calabi-Yau manifolds'.
2) 09, 2018, Simons Center for Geometry and Physics, 'Adiabatic limits of anti-self-dual connections on collapsed K3 surfaces'.
3) 06, 2018, Eastern Normal University, 'Equivalences for degenerations of Calabi-Yau manifolds'.
4) 05, 2018, Institute Henri Poincaré, 'Equivalences for degenerations of Calabi-Yau manifolds'.
5) 04, 2018, Duke University, 'Collapsing of Calabi-Yau manifolds and special lagrangian submanifolds'.
6) 10, 2017, University of Bath, 'Collapsing of Calabi-Yau manifolds'.
7) 09, 2017, University of Cambridge, 'Balanced embedding of degenerating Abelian varieties'.
8) 09, 2017, New York, 'Collapsing of HyperKähler manifolds'.
9) 05, 2016, Higher School of Economics, National Research University, Moscow, 'Balanced embedding of degenerating Abelian varieties'.
10) 01, 2016, Mathematical Science Research Institute, Berkeley, 'Collapsing of negative Kähler-Einstein metrics'.
11) 07, 2015, Simons Center for Geometry and Physics, Stony Brook, 'Collapsing of negative Kähler-Einstein metrics', and 'Completion of the moduli space for polarized Calabi-Yau manifolds'.
12) 07, 2015, Capital Normal University, Beijing, 'Collapsing of negative Kähler-Einstein metrics'.
13) 06, 2015, Mittag-Leffler Institute, Stockholm, 'Completion of the moduli space for polarized Calabi-Yau manifolds'.

Professional training

1) Applied Data Science Bootcamp, Cambridge Spark. 6 months from February 2020. Credential ID 23130867
2) Data-driven Astronomy Certificate, University of Sydney (online course offered through Coursera).
3) Research Software Skills Courses, University of Bath.

Skills

1) Mathematics (Differential geometry, geometric analysis, Kähler geometry).
2) Python (programming lagrange, intermediate level, including Numpy, Pandas, Scikit-Learn, and Keras etc.).
3) Data Science (Machine learning, SQL etc.).

Industrial project

2020 Cambridge Spark Capstone Project with industry partner (British Antarctic Survey): A deep learning approach to airglow spectra analysis
Denoising observational data collected by the British Antarctic Survey in the study of temperature of atmosphere. Building a Convolution Neural Network denoiser by using a cutting-edge technology of deep image learning without ground-truth, called Deep Image Prior.

Administrative activities

1) Recruitment trip to the Nankai University in 2014.

2) Recruitment trip to the Sichuan University in 2015.

3) Oral examiner of postgraduate entrance exams at the Capital Normal University.

References

1) Mark Gross, University of Cambridge, mg475@dpmms.cam.ac.uk.

2) Valentino Tosatti, McGill University, valentino.tosatti@mcgill.ca.

3) Xiaochun Rong, Rutgers University, rong@math.rutgers.edu.

4) Roger Moser, University of Bath, r.moser@bath.ac.uk. (teaching)