Qian Wang

Oxford Center for Nonlinear PDE
Mathematical Institute, University of Oxford
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Education

Ph.D. in Mathematics, Princeton University, September 26 2006
Advisor: Professor Sergiu Klainerman
Dissertation: Causal Geometry of Einstein Vacuum Spacetimes

Bachelor of Science in Mathematics, Nanjing University, 2001

Research Interests

Hyperbolic Partial Differential Equations, Mathematical Relativity

Professional Experience

September 2006 - August 2007: Visiting Postdoc in Department of Mathematics, Stanford University

September 2007 - August 2010: Simons instructor, Department of Mathematics, Stony Brook University

October 2010 - September 2012: Postdoc in Max Planck Institute for Gravitational Physics

February 2011 - May 2011: Visiting Postdoc in IHES

September 2012: Associate professor, Oxford Center for Nonlinear PDE, Mathematical Institute, University of Oxford

October 2023: Professor, Oxford Center for Nonlinear PDE, Mathematical Institute, University of Oxford

Publications

- Q. Wang, Causal geometry of Einstein vacuum spacetimes. Ph.D thesis, Princeton University 2006.

- Q. Wang, On the geometry of null cones in Einstein Vacuum Spacetimes, *Ann. Inst. H. Poincarè Anal. Non Linéaire*, 26 (2009), no. 1, 285–328.

- Q. Wang, Improved breakdown criterion for Einstein vacuum equation in CMC gauge, *Comm. Pure Appl. Math*, 65 (2012), Issue 1, 0021–0076.

- Q. Wang, On Ricci coefficients of null hypersurfaces with time foliation in Einstein vacuum space-time: Part I, *Calculus of Variations and Partial Differential Equations*, 46 (2013), Issue 3-4, pp 461–503.

- Q. Wang, On Ricci coefficients of null hypersurfaces with time foliation in Einstein vacuum space-time: Part II, *Preprint*. (see arXiv:1006.5963)

- Q. Wang, Rough solutions of Einstein vacuum equations in CMCSH gauges, *Communications in Mathematical Physics*, 328 (2014), Issue 3, 1275–1340.

- Q. Wang, Breakdown criteria of Einstein equations in CMC gauge, *XVIIth International Congress on Mathematical Physics*, 392–399, World Sci. Publ., Hackensack, NJ 2014.

- Q. Wang, Rough Solution of Einstein vacuum equation in CMCSH gauge, *Mathematisches Forschungsinstitut Oberwolfach Report No. 37/2012, Mathematical Aspects of General Relativity,* pp.2321-2324, (DOI: 10.4171/OWR/2012/37)

- Q. Wang, Causal geometry of rough Einstein CMCSH spacetime. *Journal of Hyperbolic Differential Equations*, 11 (2014), No. 3, 563–601.

- Q. Wang, A geometric approach for sharp local well-posedness of quasilinear wave equations. *Annals of PDE*, 3 (2017), no. 1, 108 pages.

- Q. Wang, An intrinsic hyperboloid approach for Einstein Klein-Gordon equations. *Journal of Differential Geometry*, Volume 115, issue 1, Pages 27-109 (07 Apr 2020)

- Q. Wang, A geometric perspective of method of descent. *Communications in Mathematical Physics* 360 (3): 827-850, June 2018

- S. Klainerman, Q. Wang, and S. Yang, Global solution for massive Maxwell-Klein-Gordon equations. *Communications on Pure and Applied Mathematics*, Volume 73, Issue 1 January 2020 Pages 63-109.

- Q. Wang, On the exterior stability of nonlinear wave equations, *Ann. of PDE* Volume 6, 9 (2020), 98 pages. doi:10.1007/s40818-020-00084-w

- A. Fang, Q. Wang and S. Yang, Global solution for Massive Maxwell-Klein-Gordon equations with large Maxwell field, *Ann. of PDE*, Volume 7, Article number: 3 (2021) 69 pages

- Q. Wang, Rough solutions of the 3-D compressible Euler equations, *Annals of Mathematics*, Volume 195, issue 2 509-654 (28 Feb 2022)

- Q. Wang, On global dynamics of 3-D irrotational compressible fluids, preprint Dec 2023, 165 pages

Talks

Invited to give seminar talks in various universities and institutes, including home institutes, Institut Henri Poincaré, Jussieu at Paris, Oberwolfach, Princeton University, Harvard University, MSRI, and other universities in Europe including Cambridge, Imperial College London, Edinburgh, Warwick, EPFL, etc, as well as Peking University, Tsinghua University and Chinese Academy of sciences. Some of the recent talks are listed below.

- November 17, 2015, plenary talk in the conference " A celebration of the 100th anniversary of general relativity" at Institut Henri Poincaré, Paris.

- May 15-20, 2016, a minicourse in Oberwolfach Seminar: Recent Advances on the Global Nonlinear Stability of Einstein Spacetimes

- December, 2019, talks in Peking University (BICMR), Tsing-Hua University, and Academy of Mathematics and Systems Science in Chinese Academy of Sciences

- January-March, 2020, talks in Nanjing University, Wuhan University, Central China Normal University and Birmingham

- Feb-April, 2022, talks in Cambridge, Univ of Rochester, London, Harvard, University of Bath, Princeton

- Dec 22 to Dec 29, 2022, a talk in "Frontier in Mathematical Science," at Tsinghua-Sanya International Mathematics Forum (TSIMF), Sanya, Hainan Province, China.

- Invited to give a talk at University of Muenster, Germany, April 2023

- Invited to give a talk at the workshop "Singularity formation in general relativity and dispersive PDEs", taking place at the ICMS in Edinburgh, June, 2023

- Invited to speak at the workshop "Singularities and Curvature in General Relativity" in Nijmegen, June 2023

- Invited to give a plenary lecture in the first International Forum in Basic Science (IFBS) (chaired by Prof. Shing-Tung Yau), Beijing, late July 2023.