

Jingbo Wan

Academic Curriculum Vitae

CNRS Postdoctoral Researcher Sorbonne Université (LJLL)

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Employment

- CNRS Postdoctoral Researcher, Sorbonne Université (LJLL), Paris 2025–present
Supervisor: Jérémie Szeftel

Education

- **Ph.D. in Mathematics** Aug 2020 – May 2025
Advisors: Elena Giorgi and Mu-Tao Wang Columbia University
 - **B.Sc. in Mathematics (International Research Enrichment Track)** Aug 2016 – May 2020
Mentor: Frederick Fong HKUST
First-Class Honors (CGA: 4.069)

Research Interests

General Relativity, Partial Differential Equations, Differential Geometry, Geometric Flows

Publications

1. (Joint with Chung-Jun Tsai, Mao-Pei Tsui, and Mu-Tao Wang) *Constructing Entire Minimal Graphs by Evolving Planes*, arXiv preprint arXiv:2510.24978 (2025).
 2. (Joint with Elena Giorgi and Dawei Shen) *Cauchy Data for Multiple Collapsing Boson Stars*, arXiv preprint arXiv:2512.01844 (2025).
 3. (Joint with Allen Juntao Fang and Elena Giorgi) *Einstein–Maxwell Equations on Mass-Centered GCM Hypersurfaces*, arXiv preprint arXiv:2510.10814 (2025).
 4. (Joint with Allen Juntao Fang and Elena Giorgi) *Mass-Centered GCM Framework in Perturbations of Kerr(-Newman)*, arXiv preprint arXiv:2510.10811 (2025).
 5. (Joint with Dawei Shen) *Formation of Multiple Black Holes from Cauchy Data*, arXiv preprint arXiv:2506.16117 (2025).
 6. (Joint with Dawei Shen) *Formation of Trapped Surfaces for the Einstein–Maxwell–Charged Scalar Field System*, arXiv preprint arXiv:2504.19976 (2025).
 7. (Joint with Sergiu Klainerman and Dawei Shen) *A Canonical Foliation on Null Infinity in Perturbations of Kerr*, arXiv preprint arXiv:2412.20119 (2024), submitted.

8. (Joint with Elena Giorgi) *Boundedness and Decay for the Teukolsky System in Kerr-Newman Spacetime II: The Case $|a| << M, |Q| < M$ in Axial Symmetry*, arXiv preprint arXiv:2407.10750 (2024)
9. *Sharp Interior Gradient Estimate for Area Decreasing Graphical Mean Curvature Flow in Arbitrary Codimension.*, arXiv preprint arXiv:2407.05602 (2024), submitted
10. (Joint with Man-Chun Lee and Luen-Fai Tam) *Rigidity of area non-increasing maps.*, arXiv preprint arXiv:2312.10940 (2023), submitted
11. (Joint with Man-Chun Lee) *Rigidity of contracting map using harmonic map heat flow.*, arXiv preprint arXiv:2306.12258 (2023), submitted
12. (Joint with Elena Giorgi) *Physical-space estimates for axisymmetric waves on extremal Kerr spacetime*, J. Funct. Anal. 287 (2024), no. 12, 110668.
13. (Joint with Florian Johne and Tsz-kiu Aaron Chow) *Perserving positive intermediate curvature*, J Geom Anal 33, 366 (2023).
14. (Joint with Nicholas Cheng-Hoong Chin and Frederick Tsz-Ho Fong) *Uniqueness theorems of self-conformal solutions to inverse curvature flows*, Proc. Amer. Math. Soc. 148 (2020), 4967-4982, 2020

Invited Talks

Mathematical GR and Hyperbolic PDE Seminar	Virtual
<i>Topic: Axisymmetric Solution of the Teukolsky System</i>	Sep 2024
Harmonic Analysis and Differential Equations Seminar	UC Berkeley
<i>Topic: Axisymmetric Solution of the Teukolsky System</i>	Sep 2024
Mini-workshop in Geometric Analysis	SUSTech
<i>Topic: Sharp Interior Gradient Estimate for GMCF in Arbitrary Codimension</i>	Aug 2024
Seminar ON Pure Mathematics	HKUST
<i>Topic: Sharp Interior Gradient Estimate for GMCF in Arbitrary Codimension</i>	Aug 2024
Topics in general relativity at Mathematics Münster	Münster University
<i>Topic: Axisymmetric Solution of the Teukolsky System</i>	Jul 2024
Westlake University Geometric Analysis Seminar	Westlake University
<i>Topic: Rigidity of Area Non-Increasing Maps</i>	Apr 2024
BIMCR Geometric Analysis Seminar	BIMCR
<i>Topic: Rigidity of Area Non-Increasing Maps</i>	Mar 2024
CUNY Geometric Analysis Seminar	CUNY Graduate Center
<i>Topic: Rigidity of contracting map using harmonic map heat flow</i>	Sep 2023
Geometric Analysis Seminar	CUHK
<i>Topic: Short course in semi-linear wave equation on blackholes</i>	Aug 2023
Seminar ON Pure Mathematics	HKUST
<i>Topic: Rigidity of contracting map using harmonic map heat flow</i>	Aug 2023
MIST 2023 Workshop on Geometry	CUHK
<i>Topic: Rigidity of contracting map using harmonic map heat flow</i>	Aug 2023
Joint Geometric Analysis Seminar	CUHK
<i>Topic: Wave equations on Blackholes</i>	Jun 2023
Columbia General Relativity & Geometric Analysis Seminar	Columbia University
<i>Topic: The Existence of a Black Hole Due to Condensation of Matter</i>	Oct 2022

Co-Organized Seminars

Informal Reading Seminar in GR	Columbia University
<i>Topic: various aspects of general relativity</i>	<i>2024 Fall</i>
Student PDE Seminar	Columbia University
<i>Topic: BV Functions and Regularity of the Minimal Surface</i>	<i>2024 Fall</i>
Student Geometric Analysis Seminar	Columbia University
<i>Topic: Regularity Theory of the Monge-Ampère Equation</i>	<i>2024 Spring</i>
Student Geometric Analysis Seminar	Columbia University
<i>Topic: Geometric Flows and Their Applications</i>	<i>2023 Fall</i>
Student Geometric Analysis Seminar	Columbia University
<i>Topic: Scalar Curvature and Dihedral Rigidity</i>	<i>2023 Spring</i>
Student Geometric Analysis Seminar	Columbia University
<i>Topic: Scalar Curvature and Topology</i>	<i>2022 fall</i>
Informal student GR seminar, over zoom	Columbia University
<i>Topic: Semilinear wave equation on blackholes</i>	<i>2021 fall</i>

Summer Schools & Workshops

Introductory Workshop: Special Geometric Structures and Analysis	Berkeley
<i>Program Workshop, SLMath</i>	<i>Sep 3 – Sep 6, 2024</i>
Introductory Workshop: New Frontiers in Curvature	Berkeley
<i>Program Workshop, SLMath</i>	<i>Aug 26 – Aug 30, 2024</i>
Geometric Analysis Workshop	Shenzhen
<i>Mini Workshop, SUSTech</i>	<i>Aug 18 – Aug 19, 2024</i>
Mathematics of General Relativity and Fluids	Crete
<i>Summer Graduate School, SLMath and FORTH</i>	<i>Jul 22 – Aug 2, 2024</i>
Symmetries and Dynamics of Extremal Black Holes	Princeton
<i>Workshop, PCTS, PGI</i>	<i>Mar 6 – Mar 8, 2024</i>
The Fifth Taiwan International Conference on Geometry	Taipei
<i>Mini courses & Conference, NTU</i>	<i>Jan 12 – Jan 19, 2024</i>
Mass, Einstein Constraint Equations, and Penrose Inequality	Stony Brook
<i>Conference, Simon Center</i>	<i>Sep 18 – Sep 22, 2023</i>
Nonlinear Aspects of General Relativity	Princeton
<i>Workshop, PCTS, PGI</i>	<i>Oct 10 – Oct 13, 2023</i>
Conference on Nonlinear Waves and Mathematical Relativity	Beijing
<i>Conference, Tsinghua</i>	<i>Jul 10 – Jul 14, 2023</i>
Rutgers Geometric Analysis Conference	Rutgers
<i>Mini Workshop, Rutgers</i>	<i>May 15 – May 16, 2023</i>
37th Geometry Festival	Princeton
<i>Workshop, Princeton</i>	<i>Apr 28 – Apr 30, 2023</i>
Northeast Workshop in Geometric Analysis (NEWGA)	Connecticut
<i>Mini Workshop, UConn</i>	<i>Nov 5 – Nov 6, 2022</i>
Cauchy Problem in General Relativity	Online
<i>EWM-EMS Summer School, Mittag-Leffler</i>	<i>Jun 13 – Jun 17, 2022</i>
Geometry of Submanifolds	Online
<i>Workshop, Tianyuan Center of Southeast China</i>	<i>Jul 20 – Jul 24, 2020</i>

Awards & Honors

Dean's Fellow	2020-Present
<i>Graduate School of Arts and Sciences, Columbia University</i>	
Academic Achievement Medal	2020
<i>Department of Mathematics, Hong Kong University of Science and Technology</i>	
Chern Class Achievement Scholarship	2020
<i>Department of Mathematics, Hong Kong University of Science and Technology</i>	
Chern Class Talent Scholarship	2017-2020
<i>Department of Mathematics, Hong Kong University of Science and Technology</i>	
First Runner-Up, Mr Armin and Mrs Lillian Kitchell Undergraduate Research Award	2019
<i>Undergraduate research competition held by Hong Kong University of Science and Technology</i>	
Epsilon Fund Award	2019
<i>Department of Mathematics, Hong Kong University of Science and Technology</i>	
University's Scholarship Scheme for Continuing Undergraduate Students	2017-2020
<i>Hong Kong University of Science and Technology</i>	
Dean's List	2016-2020
<i>Hong Kong University of Science and Technology</i>	
32th Chinese Physics Olympiad - First prize	2015
<i>within Guangdong Province</i>	
Pan Pearl River Delta Physics Olympiad - second prize	2014
<i>Hong Kong University of Science and Technology</i>	

Teaching

Spring 2025	Calculus II, Instructor
Fall 2024	Accelerated Multivariable Calculus, Teaching Assistant
Summer 2024	Analysis and Optimization, Instructor
Spring 2024	Accelerated Multivariable Calculus, Teaching Assistant
Fall 2023	Accelerated Multivariable Calculus, Teaching Assistant for second half of semester
Fall 2023	Number theory and Cryptography, Teaching Assistant for first half of semester
Spring 2023	Linear Algebra, Teaching Assistant
Fall 2022	Linear Algebra, Teaching Assistant
Spring 2022	Number theory and Cryptography, Teaching Assistant
Fall 2021	Ordinary Differential Equations, Teaching Assistant