

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

Summer Schools & Workshops

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

Awards & Honors

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

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