Kai Fu

MPI MIS

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Curriculum Vitae

Employment

2025–present **Postdoc**, *Max Planck Institute for Mathematics in the Sciences (MPI-MiS), Leipzig.*

Education

2022–2025 **Ph.D. in Mathematics**, *IMB, Université de Bordeaux.*

2020–2022 **Master in Mathematics**, *Indiana University Bloomington.*

2017–2020 **Master in Mathematics**, *Nankai University.*

2013–2017 **Bachelor in Mathematics and Applied Mathematics**, *Beijing Institute of Technology.*

Research Interests

Keywords: Flat cone surfaces, translation surfaces, saddle connections, Delaunay triangulations, moduli spaces, linear subvarieties.

My research centers on surfaces (real two-dimensional manifolds) and their associated moduli spaces, with a particular emphasis on the connections between geometry, combinatorics, and dynamics. In particular, I study the geometry and dynamics of translation surfaces and flat cone surfaces by analyzing the combinatorial structures that represent them.

Publications and Preprints

Siegel-Veech Measures of Convex Flat Cone Spheres , 2025, eprint arXiv:2504.14731.

Uniform Length Estimates for Trajectories on Flat Cone Surfaces , 2024, eprint arXiv:2409.14188, submitted.

Bounds on saddle connections for flat spheres, *with Guillaume Tahar*, 2023, eprint arXiv:2308.08940, submitted.

In Preparation

Computing the Multiscale Boundary I. Real Linear Subvarieties of Abelian and Quadratic Differentials, *with Vincent Delecroix and Bradley Zykoski.*

Programming Project

I have a strong interest in **SageMath**, an open-source mathematics software system built on Python. Currently, I am working with Vincent Delecroix and Bradley Zykoski on *Computing the Multiscale Boundary I. Real Linear Subvarieties of Abelian and Quadratic Differentials*, where we contribute new features to the package **veerer**. We aim to compute compute all boundary strata of a real linear subvariety in the multi-scale compactification of the moduli space, given a tangent space of the subvariety. This work involves constructing veering triangulations with boundaries and Strebel graphs. We construct blow-ups along the facets of the Delaunay cells and establish their connection to the boundary strata of the multi-scale compactification.

Talks

Sep 25, 2025	**Fifth GALS meeting**, *Institut Henri Poincaré (IHP)*, Paris, France.
Aug 25, 2025	**Seminar**, *School of Mathematics, Sun Yat-sen University*, Guangzhou, China.
Aug 15, 2025	**Dynamical Systems Seminar**, *Shanghai Institute for Mathematics and Interdisciplinary Sciences*, Shanghai, China.
Jul 29, 2025	**Seminar**, *Chern Institute of Mathematics*, Tianjin, China.
Jul 17, 2025	**The 5th Korea-France Conference in Mathematics**, *Institut de Mathématique de Bordeaux*, Bordeaux, France.
Jun 27, 2025	**Séminaire de Géométrie**, *Institut de Mathématique de Bordeaux*, Bordeaux, France.
Nov 08, 2024	**Séminaire de Systèmes Dynamiques**, *Institut de mathématiques de Toulouse*, Toulouse, France.
Nov 07, 2024	**Groupe de travail**, *Institut de mathématiques de Toulouse*, Toulouse, France.
Oct 04, 2024	**Geometry Topoloy Grad and Postdoc Seminar**, *University of Toronto*, online.
Sep 10, 2024	**Riemann Surfaces: Random, Flat, and Hyperbolic Geometry**, *MFO*, (Lightning talk), Oberwolfach, Germany.
Oct 17, 2023	**Cours de Géométrie Algébrique et Géométrie Complexe de la fédération MARGAUx**, *Le Laboratoire de Mathématiques et Applications, Université de Poitiers Poitiers*, (Short talk), Poitiers, France.
Jun 08, 2023	**Student Seminar**, *YMSC, Tsinghua University*, Beijing, China.
Mar 16, 2023	**Reading group on mapping class groups**, *Institut de mathématiques de Bordeaux*, Bordeaux, France.

Visiting

Aug, 2025, School of Mathematics, Sun Yat-sen University (1 week)

Jul, 2025, Chern Institute of Mathematics (1 week)

Jun, 2023, YMSC, Tsinghua University (3 weeks)

Organization

Mar, 2024	Co-organization of the School on flat surfaces and interactions, Le Teich

Jan - May, 2023	Co-organization of the Reading group on mapping class groups, Bordeaux

Conference Participation

Sep, 2025	Fifth GALS meeting, IHP, Paris
Jul, 2025	The 5th Korea-France Conference in Mathematics, IMB, Bordeaux
Nov,2024	Riemann Surfaces: Random, Flat, and Hyperbolic Geometry, MFO, Oberwolfach
Jun, 2024	New Frontiers in Parabolic Dynamics and Renormalization, Department of Mathematics, University of Bologna, Bologna
Jun, 2024	Rencontre GALS, Institut Camille Jordan, Lyon
Mar, 2024	School on flat surfaces and interactions, Le Teich
Jan, 2024	Sage Days 125: combinatorics, number theory, dynamical systems and geometry, Le Teich
Jan, 2024	Research School - Hodege Theory and o-minimality, CIRM, Marseille
Dec,2023	Renormalization and Visualization in Geometry, Dynamics and Number Theory, CIRM, Marseille
Nov, 2023	The floor to the junior researcher of Plato's network Insitut Fourier, Grenoble
Oct, 2023	Cours de Géométrie Algébrique et Géométrie Complexe de la fédération MARGAUx, Université de Poitiers, Poitiers
Oct, 2023	Probability and Geometry in, on and of non-Euclidian spaces, CIRM, Marseille
Jul, 2023	Renormalization and Visualization for packing, billiard and surfaces, CIRM, Marseille
Feb, 2023	Sage Days 117: combinatorics, number theory, dynamical systems and geometry, Le Teich
Sep, 2022	Combinatorics, Dynamics and Geometry on Moduli Spaces, CIRM, Marseille
May, 2022	Structures on Surfaces, CIRM, Marseille
Apr, 2022	Mini-rencontre ANR MoDiff, LaBRI, Université de Bordeaux, Bordeaux
Jun, 2021	CMI-HIMR Dynamics and Geometry Online Summer School, University of Bristol

Languages

Chinese	native
English	fluent
French	basic