

# Fei Si

The School of Mathematics and Statistics

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## Personal

From oct 2024, I will work at department of mathematics in Xi'an Jiaotong university as assistant professor. Before that I was a PhD student at Shanghai Center for Mathematical Sciences (SCMS) at Fudan university under supervision of Prof. Meng Chen and Prof. Zhiyuan Li. Then I was a postdoc at Beijing International Center for Mathematical Research (BICMR) at Peking university. My research interest is moduli theory in algebraic geometry and its related topics, currently focus on the following:

1. intersection theory on moduli space, especially for quasi-polarised  $K3$  surfaces;
2. birational geometry of moduli spaces of  $K3$  surfaces via geometric invariant theory, Hodge theory and K-stability;
3. the topology of moduli spaces of sheaves and relations to enumerative geometry.

## Publications and preprints

1. The cohomology of moduli space of cubic fourfolds I. Acta. Math. Sin.-English Ser. Volume 39, pages 773–798, (2023). (<https://link.springer.com/article/10.1007/s10114-022-1042-5>)
2. Compactifications of moduli space of  $K3$  surfaces of degree 6, with Francois Greer, Radu Laza, Zhiyuan Li, Zhiyu Tian, in preparation and will appear soon, draft available upon request.
3. Birational geometry of moduli spaces of del pezzo pairs(<https://arxiv.org/abs/2309.10467>), with Long Pan and Haoyu Wu.
4. K-Moduli spaces of del pezzo pairs (<https://arxiv.org/abs/2303.05651>), with Long Pan and Haoyu Wu.
5. Chow ring of moduli spaces of quasi-polarised  $K3$  surfaces in lower genus (<https://arxiv.org/abs/2401.12580>).
6. Asymptotic Behaviors of Moduli of One-dimensional Sheaves on Surfaces(<https://arxiv.org/abs/2406.11512>), with Feinuo Zhang.
7. Cohomological stabilization, perverse filtration and refined BPS invariant for del Pezzo surface(<https://arxiv.org/abs/2406.10004>), with Weite Pi, Junliang Shen and Feinuo Zhang.

## Talks

### *Invited Talks*

Compactifications of moduli spaces of  $K3$  surfaces of degree 6, East Asian Core Doctoral Forum on Mathematics 2020 January 14-17, 2020, Kavli IPMU, Tokyo.

Birational geometry of moduli space of low genus. When Number Theory meets Algebraic Geometry, USTC, HeFei, 2021.4.19-4.23

Cohomology of compact moduli spaces of cubic 4-folds. 2021.9.15, Algebraic geometry seminar at CAS

K-moduli spaces of del pezzo pairs. 2023.4.26, Algebraic geometry seminar at Beijing normal university

K-moduli spaces of del pezzo pairs. 2023.6.1 Online Nottingham algebraic geometry seminar.

Birational Geometry of Moduli Spaces of Del Pezzo Surface Pairs, 2023.10.17 AG seminar, MCM.

K-moduli spaces of del pezzo pairs. 2023.11.24, AG seminar, MSRC

Moduli of  $K_3$  surfaces and K-Moduli of Fano pairs, 2023.12.20, AG seminar, Xiamen university

Cohomology of moduli spaces of cubic 4-folds, 2023.12.27, Seminar on "Moduli Spaces and Related Topics", YMSC.

Some explicit K-moduli spaces I, II, 2024.4.29, 4.30, at ChongQing university

Cohomological aspect of moduli space of 1D sheaves on surfaces, 2024.10.15, Shanghai Institute for Mathematics and Interdisciplinary Sciences (SIMIS)

### *Seminar Talks*

Introduction to equivariant cohomology, 2018 Fall Program of Moduli Spaces and Varieties, Shanghai Center for Mathematical Sciences;

Gromov–Witten Learning Seminar: Descendent theory: local curves and toric 3-folds; 2018 Fall Program of Moduli Spaces and Varieties;

Gromov–Witten Learning Seminar: GW/DT correspondence for quintic 3-folds, 2018 Fall Program of Moduli Spaces and Varieties.

Maximal variation of curves on  $K_3$  surfaces, Reading workshop on curves on  $K_3$  at SCMS.

Birational geometry of moduli spaces of  $K_3$  surfaces. 2021.12.31, Postdoc Seminar at BICMR

Modular compactification for the moduli spaces of quasi-polarised  $K_3$  surfaces after Alexeev-Engel, 2024.3.5/2.12. Birational geometry reading seminar, Tsinghua university.

## Education

B.S. College of Mathematica and Statistics, ChongQing University, 2011–2015.

Ph.D. Mathematics, Shanghai Center for Mathematical Sciences, Fudan University, 2015–2021.

## Employment

2021.9-2024.8, Postdoc researcher at BICMR, Peking university

2024.10–, Assistant Professor, Xi'an jiaotong university

## Teaching Experience

TA, Analytic geometry, 2017 Fall.

TA, Abstract Algebra (Honored course), 2018 Spring.

Minicourse: Introduction to  $K3$  surfaces and their moduli spaces. 2022 Fall, BICMR.

Mentor for 3 + X Program for undergraduate seminar: complex algebraic surface. 2024 spring, Peking university.

Lecturer for exercise course of 2024 summer school " algebra and number theory" in Beijing, held by AMSS and PKU

## Language

Chinese (native ) and English (fluent).

## Conference

Algebraic Geometry Conference In honor of Arnaud Beauville's 70th birthday October 23 - 27, 2017 MCM, CAS, Beijing

Winter school on Hodge Modules and Higgs Bundle, SYSU Zhuhai, January 1 to 7, 2018

Tianyuan Advanced Seminar on the Moduli Spaces in Algebraic Geometry April 2 - 7, 2018 Shanghai Center for Mathematical Sciences

AMS-CMS Joint International Meeting, Special Session on Algebraic Geometry June 11 - 14, 2018 Fudan University, Shanghai

Modern Algebraic Geometry July 23 - 26, 2018 BICMR, PKU, Beijing

Fall Program on Moduli Spaces and Varieties September 10 - November 23, 2018 SCMS, Fudan University, Shanghai

Introductory Workshop: Derived Algebraic Geometry and Birational Geometry and Moduli Spaces January 28, 2019 - February 08, 2019 MSRI, California

Lecture Series in Algebraic Geometry, Morningside Center of Mathematics, Beijing August 26 – September 27, 2019

Beijing - Zürich Moduli Workshop, PKU, Beijing (9-12 September 2019)

Moduli of Higgs bundles, ETH Zürich, (20-23 January 2020)

AIM workshop: Moduli problems beyond geometric invariant theory, American Institute of Mathematics, San Jose, California (online), 25-29 January 2021.

Derived Categories, Moduli Spaces, and Counting Invariants, Imperial College London, July 3-7, 2023

Logs and stacks in birational geometry and moduli, 2024 LMS lectures at Imperial College London, July 1-5, 2024

Moduli and Dynamics, Hangzhou, Zhejiang university, July 7-12, 2024

Workshop on Hodge theory, Hefei, USTC. Aug 15-23, 2024.