

# Tao Su

N03, Ning Zhai  
Yau Mathematical Sciences Center  
Tsinghua University, 100084, Beijing  
✉ [taosu@mail.tsinghua.edu.cn](mailto:taosu@mail.tsinghua.edu.cn)  
<https://tao-su-math.github.io/>



## Education

- 2018 **PhD in math**, *UC Berkeley*.  
Advisors: Vivek Shende, and Richard E. Borcherds
- 2012 **B.S. in math and physics**, *Tsinghua University*.  
Fellowship in the Tsinghua Xuetang Talents Program

## Employment

- Jan.2021-present **Postdoc**, *YMSC, Beijing*.  
supported by the International Postdoctoral Exchange Fellowship (Talent-Introduction)
- Sep.2018-Aug.2020 **Postdoc**, *École Normale Supérieure, Paris*.  
supported by the ANR Microlocal Project

## Academic visits

- Sep.01-Nov.25,2020 *IHES, Paris, France*
- Jul.28-Aug.04,2019 *IBS-CGP, South Korea*
- Jun.08-Jun.30,2019 *CRM, Montreal, Canada*
- Nov.25-Dec.09,2018 *RIMS, Kyoto, Japan*
- Oct.04-Oct.06,2018 *Fourier Institute, Grenoble, France*

## Research interests

- Microlocal sheaf theory, Categorical aspects of symplectic geometry, Algebraic geometry, and Mathematical physics.
- Lately, I've been working on projects around: Legendrian knots and constructible sheaves, Hodge theory of character varieties and  $P=W$ , and mirror symmetry.

## Publications and Preprints

- Dual boundary complexes of Betti moduli spaces over the two sphere with one irregular singularity, arXiv:2109.01645. Submitted.
- Augmentations are sheaves for Legendrian graphs, with Byung Hee An, Youngjin Bae, arXiv:1912.10782. (to appear in Journal of Symplectic Geometry)
- Augmentations and ruling polynomials for Legendrian graphs, with Byung Hee An, Youngjin Bae, arXiv:1911.11563. (to appear in Algebraic & Geometric Topology)

- A Hodge-theoretic study of augmentation varieties associated to Legendrian knots/tangles, Ph.D thesis, ProQuest 2018.
- Ruling polynomials and augmentations for Legendrian tangles, arXiv:1707.04948.

## Honors and Awards

- 2021 International Postdoctoral Exchange Fellowship, China Postdoc Science Foundation
- 2017 Graduate Division Summer Grant, UC Berkeley
- 2015 Graduate Division Summer Grant, UC Berkeley
- 2009-2012 Fellowship in the Tsinghua Xuetao Talents Program, Tsinghua University
- 2011 S.-T. Yau College Students Mathematics Contests:
  - (All-around Competition) Bronze medal
  - (Geometry and Topology) Bronze medal
  - (Algebra, Number Theory, and Combinatorics) Bronze medal
  - (Group competition) Silver medal

## Professional Services

- Tutoring Friend scholar for Qiuzhen college, Tsinghua university, Apr. 2021-present.
- Organized Derived Algebraic Geometry learning seminar, YMSC, Spring 2021.
- Referee for Symmetry, Integrality and Geometry: Methods and Applications.

## Teaching experience

- Fall 2021 TA for Geometric Representation Theory II, Tsinghua university.
- Spring 2018 GSI for Math 113, Introduction to Abstract Algebra, UC Berkeley.
- Fall 2017 GSI for Math 16B, Analytic Geometry and Calculus, UC Berkeley.
- Fall 2016 GSI for Math 16B, Analytic Geometry and Calculus, UC Berkeley.
- Spring 2016 GSI for Math 16B, Analytic Geometry and Calculus, UC Berkeley.
- Fall 2015 GSI for Math 16B, Analytic Geometry and Calculus, UC Berkeley.
- Spring 2015 GSI for Math 54, Linear Algebra and Differential Equations, UC Berkeley.
- Fall 2014 GSI for Math 54, Linear Algebra and Differential Equations, UC Berkeley.
- Spring 2014 GSI for Math 16B, Analytic Geometry and Calculus, UC Berkeley.
- Fall 2013 GSI for Math 1B, Calculus, UC Berkeley.

## Invited talks

- Dec.17,2021 Tsinghua Algebraic Geometry workshop, YMSC, Beijing.
- Dec.14,2021 Symplectic Geometry and Mathematical Physics seminar, BICMR, Beijing.
- Nov.29,2021 GeoTop seminar, YMSC, Beijing.
- Nov.10,2021 Geometry and Topology seminar, AMSS, Chinese Academy of Sciences, Beijing.
- Oct.13,2021 Geometry and Topology seminar, Chern Institute of Mathematics, Tianjin.
- Oct.12,2021 Geometry and Topology seminar, Chern Institute of Mathematics, Tianjin.
- Sep.24,2021 Geometric representation seminar, YMSC, Beijing.
- Mar.24,2021 Moscow-Beijing topology seminar, Zoom talk.
- Jul.31,2019 Director's seminar, IBS-CGP, South Korea.
- Jun.27,2019 Conference on Homological algebra, Microlocal analysis, and Symplectic geometry, CRM, Montreal.

Jan.19,2019 Conference on Number theory, Algebra, Combinatorics, IAS of HIT, Haerbin, China.  
 Nov.30,2018 Symplectic seminar, RIMS, Kyoto.  
 Nov.9,2018 Symplectic seminar, ENS, Paris.  
 Oct.5,2018 Topology seminar, Fourier Institute, Grenoble.  
 May 24,2018 Student geometry/topology seminar, UC Davis.  
 Mar.6,2018 EGN postdoc and student seminar, MSRI.  
 Dec.5,2017 3-manifold Seminar, UC Berkeley.  
 Jun.28,2017 AIM square meeting “Sheaf theory and Legendrian knots”, San Jose.

## Learning seminar talks

### At YMSC, Beijing:

Jun. 2021 Cotangent complexes and representability for derived stacks, DAG seminar.  
 May 2021 Examples of derived schemes and derived algebraic stacks, DAG seminar.  
 May 2021 Derived schemes and derived algebraic stacks, DAG seminar.  
 May 2021 The  $(\infty, 1)$ -topos of derived stacks, DAG seminar.  
 Apr. 2021 Morphisms of derived affine schemes, DAG seminar.  
 Apr. 2021 Cotangent complexes for derived affine schemes, DAG seminar.  
 Apr. 2021 The homotopy theory of derived affine schemes, DAG seminar.  
 Mar. 2021 Introduction to model categories, DAG seminar.  
 Mar. 2021 Simplicial sets and related structures, DAG seminar.  
 Mar. 2021 Motivation and introduction, DAG seminar.

### At UC Berkeley:

May 2018 Local Euler obstruction and Behrend function, final talk in ‘virtual classes in AG’.  
 Nov. 2017 Points-count and E-polynomials of algebraic varieties, Student AG Seminar.  
 Oct. 2017 Categorification of HOMFLY-PT polynomials via Soergel bimodules, GRASP Seminar.  
 May 2017 Mathematical aspects of Verlinde algebras (with K.Donoghue), CFT final talk.  
 Apr. 2017 Atiyah-Bott fixed-point theorem and Weyl character formula, K-theory seminar.  
 Mar. 2017 Equivariant K-theory and localization, K-theory seminar.  
 Nov. 2016 Legendrian knots II: Relative contact homology, GRT Seminar.  
 Nov. 2016 Legendrian knots I: Classical theory, GRT Seminar.  
 Oct. 2016 Constructible sheaves from Legendrian knots, Student Symplectic Seminar.  
 Oct. 2016 Categorification of the Jones polynomial, Student Differential Geometry/Low Dimensional Topology (SDG/LDT) Seminar.  
 Fall 2015 Moduli of sheaves on complex surfaces, Berkeley-Tokyo summer school ‘Geometry and Mathematical physics’, IPMU.  
 Sept. 2016 3D Dijkgraaf-Witten theory, GRASP seminar.  
 Spring 2016 Ruling polynomials and Augmentations of Legendrian links, SDG/LDT seminar.  
 Spring 2015 Classical BV-BFV extension of BF theory, Quantum gauge theories final talk.  
 Spring 2015 Complex topological K-theory, SDG/LDT seminar.  
 Spring 2013 Classical Yang-Mills theory, Riemannian geometry final talk.  
 Spring 2013 Chern classes, SDG/LDT seminar.

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## Conferences/Workshops attended

- Dec. 2021. Tsinghua Algebraic Geometry Workshop, YMSC, Beijing.
- Feb. 2020 Quiver varieties, character varieties and DT invariants, IHP, Paris.
- Feb. 2020 Perverse sheaves in enumerative geometry, HCM, Bonn.
- Jan. 2020 Geometry and Representation theory, IHP, Paris.
- Sep. 2019 Stability Conditions in Representation Theory, HCM, Bonn.
- Aug. 2019 Fukaya Category and Homological Mirror Symmetry, BICMR, Peking U., Beijing.
- Jul. 2019 IAS/PCMI program: Quantum Field Theory and Manifold Invariants, PCMI, Utah.
- Jun. 2019 Homological Algebra, Microlocal Analysis, and Symplectic Geometry, CRM, Montreal.
- Jun. 2019 New perspectives in Gromov-Witten theory, IMJ-PRG, Paris.
- May 2019 Graduate summer school on the Mathematics and Physics of Hitchin Systems, SCGP.
- May 2019 Current trends on spectral data for Higgs bundles V, SCGP.
- Feb. 2019 Winter School on Enumerative Geometry and Modular Forms, Goethe U., Frankfurt.
- Feb. 2019 Intro. Workshop: DAG, Birational Geometry and Moduli Spaces, MSRI.
- Jan. 2019 Conference on Number theory, Algebra, Combinatorics, IAS of HIT, Haerbin, China.
- Dec. 2018 D-modules, quantum geometry, and related topics, RIMS, Kyoto.
- Jul. 2018 Summer School on Geometric Representation Theory, IST Austria.
- Jun. 2018 Geometric Representation Theory and Gauge Theory, CIME, Cetraro, Italy.
- Apr. 2018 Categorification in mathematical physics, SCGP.
- Mar. 2018 Mirror symmetry and enumerative geometry, UC Berkeley.
- Mar. 2018 Structures in enumerative geometry, MSRI.
- Mar. 2018 Western algebraic geometry symposium, San Francisco State U.
- Feb. 2018 Riemann-Hilbert correspondences, U. of Padova, Italy.
- Jan. 2018 Introductory workshop: Enumerative geometry beyond numbers, MSRI.
- Aug. 2017 Interactions between Representation theory and Algebraic geometry, U. of Chicago.
- Aug. 2017 Hodge theory, Moduli and Representation theory, Stony Brook U.
- Jul. 2017 Enumerative geometry, Mirror symmetry, and Physics, UIUC.
- Jul. 2017 Soergel bimodules, MSRI.
- Jun. 2017 Sheaf theory and Legendrian knots, AIM square meeting.
- Apr. 2017 Gauge theory and Low dimensional topology, SCGP.
- Nov. 2016 Hall algebras, Enumerative invariants and Gauge theories, Fields Institute.
- Jul. 2016 Knot homologies, Hilbert schemes and Cherednik algebras, U. of Oregon.
- Jun. 2016 Higgs bundles, branes and quantization, SCGP.
- Mar. 2016 Cluster algebras and Wall-Crossing, MSRI.
- Mar. 2016 Mirror Symmetry and Wall-Crossing, Berkeley.
- Jul. 2015 Geometry and Mathematical physics, IPMU.
- Apr. 2015 Berkeley Math-Physics meeting, Berkeley.
- Jul. 2014 Graduate workshop on moduli of curves, SCGP.
- Aug. 2013 Summer school in Complex geometry, Rutgers U.