Yu-Wei Fan

https://ywfan-math.github.io/ ⋄ ywfan@mail.tsinghua.edu.cn ⋄ yuweifanx@gmail.com

Education

Harvard University
Ph.D., Mathematics, 2014-2019

Advisor: Shing-Tung Yau
Thesis: Mirror Symmetry, Autoequivalences, and Bridgeland Stability Conditions

Employment

Tsinghua University
Assistant Professor (tenure track), 2021.12-present

University of California, Berkeley
Morrey Visiting Assistant Professor, 2019.08-2021.11

Awards and Grants

- ICCM Medal of Mathematics, Silver Medal, 2022 [1] [2]

- ICCM Best Thesis Award, Gold Medal, 2022

- AMS-Simons Travel Grant, 2019-2021

Publications and Preprints

- Asymptotic shifting numbers in triangulated categories.
  Advances in Mathematics, Vol. 428 (2023), 109163, with S. Filip.

- New rational cubic fourfolds arising from Cremona transformations.
  Algebraic Geometry, Vol. 10, No. 4 (2023), pp. 432–460. with K-W. Lai.

- Contractibility of space of stability conditions on the projective plane via global dimension function.
  Mathematical Research Letters, Vol. 30, No. 1 (2023), pp. 51–87. with C. Li, W. Liu, and Y. Qiu.

- Counting special Lagrangian classes and semistable Mukai vectors for K3 surfaces.
  Geometriae Dedicata, Vol. 217 (2023), 89, with J. S. Athreya and H. Lee.

- Attractor mechanisms of moduli spaces of Calabi-Yau 3-folds.
  Journal of Geometry and Physics, Vol. 185 (2023), 104724, with A. Kanazawa.

- Systolic inequalities for K3 surfaces via stability conditions.
  Mathematische Zeitschrift, Vol. 300 (2022), pp. 301–323.

- On pseudo-Anosov autoequivalences.
  Advances in Mathematics, Vol. 384 (2021), 107732, with S. Filip, F. Haiden, L. Katzarkov, and Y. Liu.

---

[1] Formally the *Morningside Awards*, which is awarded to exceptional mathematicians of Chinese descent under the age of 45 for their seminal achievements in mathematics and applied mathematics.
[2] Quote on the award: *"for his important contributions in the moduli space of Calabi–Yau manifolds and its dynamics"*

- Categorical polynomial entropy.
  Advances in Mathematics, Vol. 383 (2021), 107655, with L. Fu and G. Ouchi.

- Weil–Petersson geometry on the space of Bridgeland stability conditions.
  Communications in Analysis and Geometry, Vol. 29, No. 3 (2021), pp. 681–706, with A. Kanazawa and S.-T. Yau.

- Mirror of Atiyah flop in symplectic geometry and stability conditions.
  Advances in Theoretical and Mathematical Physics, Vol. 22, No. 5 (2018), pp. 1149–1207, with H. Hong, S.-C. Lau, and S.-T. Yau.

- Entropy of an autoequivalence on Calabi–Yau manifolds.
  Mathematical Research Letters, Vol. 25, No. 2 (2018), pp. 509–519.

- An invitation to categorical dynamical systems.
  Ergodic Theory and Dynamical Systems, Proceedings of the Workshops University of North Carolina at Chapel Hill 2021.

- Stokes matrices, character varieties, and braids.
  Proceedings of the 2020 ICCM Annual Meeting.

- Stokes matrices and exceptional isomorphisms.
  Mathematische Annalen, accepted, with J. P. Whang.

- Fourier-Mukai numbers of K3 categories of very general special cubic fourfolds.
  Israel Journal of Mathematics, accepted, with K.-W. Lai.

- Shifting numbers of abelian varieties via bounded t-structures.
  manuscripta mathematica, accepted.

- Nielsen realization problem for Bridgeland stability conditions on generic K3 surfaces.
  Submitted, with K.-W. Lai. arXiv:2302.12663

- On entropy of $\mathbb{P}$-twists.
  Preprint. arXiv:1801.10485

Selected Conference/Workshop Talks

- Conference on Geometry and Moduli, Zhejiang University, July 2024

- The 2023 Annual International Congress of Chinese Mathematicians, Shanghai, January 2024

- Algebraic Geometry Workshop, University of Science and Technology of China, November 2023

- International Congress of Basic Science, Beijing, July 2023

- Conference on Algebraic Geometry and Related Topics, Nanjing University, May 2023

- Homological Algebra of the Infrared, TSIMF Sanya, January 2023

- AMS Spring Eastern Sectional Meeting (Special Session on Mirror Symmetry and Enumerative Geometry), Brown University, March 2021

- ICCM annual meeting, University of Science and Technology of China, December 2020

- Hodge Theory and Rationality, Institute of the Mathematical Sciences of the Americas, Miami, October 2020

- Workshop on Birational Geometry, Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, June 2020 *(canceled due to COVID-19)*

- Moduli on Chestnut Hill, Boston College, March 2020

- Homological Mirror Symmetry and Topological Recursion, Miami, January 2020

- Homological Mirror Symmetry and Self Organized Criticalities, Institute of the Mathematical Sciences of the Americas, Miami, September 2019

- Aspects of Mirror Symmetry, Chiba University, July 2019

- PIMS Postdoctoral Training School on Stochastic Dynamics and Hodge Theory, University of Alberta, March 2019

- Holomorphic Differentials in Mathematics and Physics, Simons Center, February 2019

- AMS Grad Student Conference in geometry and topology, Brown University, April 2018

- BU–Keio Workshop, Boston University, June 2017

- RTG/FRG Mirror Symmetry Conference for Young Researchers, University of Michigan, May 2017

Selected Seminar Talks

- Morningside Center, Symplectic Geometry and Mathematical Physics Seminar, June 2024

- The Greater Bay Area Geometry and Mathematical Physics Seminar, April 2024

- Northeast Normal University, October 2022

- Capital Normal University, April 2022

- New Directions in Group Theory and Triangulated Categories, November 2021

- Geometric Group Theory in East Asia Webinar, October 2021

- IBS Center for Geometry and Physics, Symplectic Monday, June 2021

- Zhejiang University, June 2021

- University of British Columbia, Algebra and Algebraic Geometry seminar, February 2021

- Algebraic Geometry in East Asia Seminar, December 2020

- Symplectic Zoominar (CRM-Montreal, Princeton/IAS, Tel Aviv, Paris), November 2020

- UC Irvine, Differential Geometry Seminar, October 2020

- Rutgers University–Newark, Colloquium, October 2020

- National University of Singapore, Topology and Geometry Seminar, September 2020

- ICCM Math Physics Seminar, July 2020

- UC Santa Barbara, Seminar on Geometry and Arithmetic, May 2020

- Harvard University, CMSA Mathematical Physics Seminar, April 2020

- Kyoto University, Algebraic Geometry Seminar, January 2020

- Southeast University, Nanjing, China, December 2019

- UC Berkeley, Northern California Symplectic Geometry Seminar, November 2019

- MSRI, Learning seminar on stability conditions, November 2019

- National Taiwan University, NCTS Seminar in Algebraic Geometry, June 2019
- UMass Amherst, Valley Geometry Seminar, April 2019
- Harvard University, Differential Geometry Seminar, April 2019
- Boston College, NT & AG Seminar, January 2019
- Harvard University, Student/Postdoc Symplectic Geometry Seminar, October 2018
- Columbia University, Symplectic Geometry, Gauge Theory, and Categorification Seminar, September 2018
- Tsinghua University, Beijing, Geometric Representation Seminar, June 2018
- Kavli IPMU, Mathematics-String Seminar, May 2018
- TIMS, Taiwan, Algebraic Geometry Seminar, May 2018
- Brown University, Algebra and Algebraic Geometry Seminar, May 2018
- Kansas State University, M-seminar, April 2018
- Harvard University, Mirror Symmetry Seminar, March 2018
- Boston University, Geometry and Physics Seminar, February 2018
- University of Missouri, Geometry and Topology Seminar, November 2017
- Harvard University, CMSA Algebraic Geometry Seminar, September 2017
- Harvard University, CMSA Mathematical Physics Seminar, September 2017
- IHES, Séminaire Mathjeunes, June 2017
- University of Vienna, June 2017

Teaching

At Tsinghua University:
- Fall 2024: *Topics in Derived Categories* (graduate course)
- Spring 2024: *Algebra* 0 (undergraduate course)
- Fall 2023: *Ordinary Differential Equations* (undergraduate course)
- Spring 2023: *Mathematics from examples* (undergraduate course)
- Fall 2022: *Geometry and Symmetry* (undergraduate course)
- Spring 2022: *Categories and dynamical systems* (topic course)

At UC Berkeley:
- Fall 2021: *Honors Linear Algebra and Differential Equations* (undergraduate course)
- Spring 2021: *Introduction to Analysis* and *Introduction to Complex Analysis* (undergraduate courses)
- Fall 2020: *Honors Linear Algebra and Differential Equations* (undergraduate course)
- Spring 2020: *Introduction to Analysis* (undergraduate course)
- Fall 2019: *Honors Linear Algebra and Differential Equations* and *Introduction to Analysis* (undergraduate courses)

At Harvard University:

- Spring 2019: *Theoretical multivariable calculus and real analysis*, CA (undergraduate course)

- Fall 2018: *Symplectic Manifolds and Lagrangian Submanifolds*, CA (topic course)

- Fall 2017: *Multivariable Calculus* (undergraduate course)

- Fall 2016: *Multivariable Calculus*, Coach (undergraduate course)

Service

Conferences co-organized:
- Workshop on Mirror Symmetry and Stability, Harvard University, March 2019

Seminars (co-)organized:
- Geometry and Dynamics Seminar (Hybrid), 2023-present

- Seminar on Algebraic and Complex Dynamics (Online), 2022-2023

- Harvard University, Yau's student seminar, 2016-2017

- Harvard University, Trivial Notions Seminar, 2015-2016

Reviewing:
- Reviewer for *Duke Mathematical Journal*, *Journal of Differential Geometry*, *Advances in Mathematics*, *Algebraic Geometry*, *Bulletin of the London Mathematical Society*, *Mathematical Research Letters*, *Journal of the Mathematical Society of Japan*, *manuscripta mathematica*, *Geometriae Dedicata*, *Experimental Mathematics*

- Reviewer for MathSciNet and zbMATH