

# Curriculum Vitae

Wanmin Liu

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## Employment

- 2019/01 – current:    Researcher  
                         Department of Mathematics  
                         Uppsala University, Sweden  
                         <https://www.math.uu.se/>
- 2015/12 – 2018/11:    Research Fellow (Postdoc)  
                         IBS Center for Geometry and Physics  
                         Pohang, Republic of Korea  
                         <https://cgp.ibs.re.kr>
- 2014/09 – 2015/06:    Research Assistant on a part-time basis  
                         Department of Mathematics  
                         Hong Kong University of Science and Technology (HKUST)

## Education

- 2015:    Ph.D., Hong Kong University of Science and Technology, Hong Kong  
                 Major in Algebraic Geometry, Mathematics  
                 Thesis: Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces  
                 Advisor: Wei-Ping Li
- 2007:    M.S., Lanzhou University, China  
                 Major in Partial Differential Equations, Mathematics  
                 Thesis: Infinitely many solutions for two noncooperative  $p(x)$ -Laplacian  
                                 elliptic systems.  
                 Advisor: Xian-Ling Fan
- 2004:    B.S., Lanzhou University, China  
                 Major in Mathematics  
                 Thesis: An exact inequality involving Luxemburg norm and conjugate-Orlicz  
                                 norm in  $L^{p(x)}(\Omega)$

## Research Interests

Algebraic Geometry:    Bridgeland stability conditions, moduli spaces, birational geometry,  
                                 derived and triangulated categories, counting invariants and wall-crossing.

## Publications

- 2019 ———, Song Yang, Xun Yu, *Classification of full exceptional collections of line bundles on three blow-ups of  $\mathbb{P}^3$* , Journal of the Korean Mathematical Society, Vol. 56, No. 2 (2019), 387-419. (See also [arXiv:1810.06367](https://arxiv.org/abs/1810.06367), and a previous version, titled by *On exceptional collections of line bundles of maximal length on the blow-ups of  $\mathbb{P}^3$* , at [CGP17025](https://arxiv.org/abs/1702.01705).)
- 2018 ———, *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces*, Kyoto Journal of Mathematics, Vol. 58, No. 3 (2018), 595-621. (See also [arXiv:1501.06397](https://arxiv.org/abs/1501.06397)).
- 2015 ———, *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces*, Ph.D. Thesis, HKUST.

## Preprints

- 2020 Yu-Wei Fan, Chunyi Li, —, Yu Qiu, *Contractibility of space of stability conditions on the projective plane via global dimension function*, preprint, arXiv:2001.11984.
- 2019 —, Jason Lo, Cristian Martinez, *Fourier-Mukai transforms and stable sheaves on Weierstrass elliptic surfaces*, preprint, arXiv:1910.02477.
- 2019 Mu-Lin Li, —, *A note on limits of Kähler manifolds under deformation*, submitted, 2019 Apr.

### Scientific/Academic Honours and Grants

- 2018 IBS-CGP Research Incentive. (IBS-CGP Award)
- 2018 IBS-CGP Research Grant.
- 2017 IBS-CGP Research Grant.
- 2016 IBS-CGP Research Grant.
- 2015 UGC Research Travel Grant, RTG14/15.SC049, HKUST.
- 2011 The Din-Yu Hsieh Teaching Award (*Best Teaching Assistant*) of the Department of Mathematics of HKUST.
- 2007 – 2011 Postgraduate Studentships, HKUST, - Doctorate.
- 2004 – 2007 Postgraduate Studentships, Lanzhou University, - Masters.

### Selected Seminars and Presentations

- 2020 Jan. Uppsala University, Uppsala, Sweden. Geometry and Topology Seminar: *Contractibility of space of stability conditions on projective plane via global dimension function*.
- 2019 Dec. National Research University Higher School of Economics, Moscow, Russia. Algebraic Geometry Seminar: *Global dimension function, contractibility and inducing for stability conditions on  $\mathbb{P}^2$* .
- July Uppsala University, Uppsala, Sweden. StringMath 2019, Gong Show talk: *Fourier-Mukai transforms of slope stable torsion-free sheaves on Weierstrass elliptic surfaces*.
- June National Research University Higher School of Economics, Moscow, Russia. Who is Who in Mirror Symmetry: *Fourier-Mukai transforms of slope stable torsion-free sheaves on Weierstrass elliptic surfaces*.
- May Stockholm University, Stockholm, Sweden. KTH & SU Algebra and Geometry Seminar: *Fourier-Mukai transforms of slope stable torsion-free sheaves on Weierstrass elliptic surfaces*.
- Jan. Uppsala University, Uppsala, Sweden. Geometry and Topology Seminar: *Bridgeland stability conditions and applications, I, II*.
- 2018 Oct. University of Science and Technology of China, Hefei, China. Geometry and Mathematical Physics Seminar: *How to use Bridgeland stability wall-crossings to study birational geometry of moduli spaces?*.
- Sept Hunan University, Changsha, China. Algebraic Seminar: *Classification of full exceptional collections of line bundles on some Fano 3folds and on some projective bundles*.
- May IBS Center for Geometry and Physics, Pohang, South Korea. CGP Seminar: *Classification of full exceptional collections of line bundles on some Fano 3folds and on some projective bundles*.
- Apr. KTH Royal Institute of Technology, Stockholm, Sweden. KTH & SU Derived Algebraic Geometry Seminar: *Bridgeland stability conditions*.
- Apr. Uppsala University, Uppsala, Sweden. Geometry and Topology Seminar: *Classification of full exceptional collections of line bundles on three blow-ups of  $\mathbb{P}^3$  and on some projective bundles*.
- Apr. Chalmers University of Technology, Gothenburg, Sweden. Seminar in Algebraic Geometry and Number Theory: *Classification of full exceptional collections of line bundles on three blow-ups of  $\mathbb{P}^3$* .

- Apr. KAIST, Daejeon, South Korea. Algebraic Geometry Seminar: *On exceptional collections of line bundles of maximal length on the blow-ups of  $\mathbb{P}^3$ .*
- Feb. IBS Center for Geometry and Physics, Pohang, South Korea. Frontiers of algebraic surfaces: *Walls for Bridgeland stability on fibered surface with a section.*
- 2017 Oct. Stockholm University, Stockholm, Sweden. KTH & SU Algebra and Geometry Seminar: *On exceptional collections of line bundles of maximal length on the blow-ups of  $\mathbb{P}^3$ .*
- Aug. Hunan University, Changsha, China. Algebraic Seminar: *How to use Bridgeland stability wall-crossings to study birational geometry of moduli spaces?*
- July Yonsei University, Seoul, South Korea. Yonsei Algebraic Seminars: *How to use Bridgeland stability wall-crossings to study birational geometry of moduli spaces?*
- July IBS Center for Geometry and Physics, Pohang, South Korea. IBS-CGP Derived Seminar: *Maps in the Homotopy Category of dg-Categories*, notes.
- June Seoul National University, Seoul, South Korea. Workshop on Moduli theory and Derived category: *On exceptional collections of line bundles of maximal length on the blow-ups of  $\mathbb{P}^3$ .*
- Feb. CUHK, Hong Kong. Lecture Series in Algebraic Geometry: *Bridgeland Stability Conditions (I), (II), (III)* (6 hours mini-course).
- 2016 Sep. Korea Institute for Advanced Study, Seoul, South Korea. I-Seminar: *Bridgeland stability conditions and wall-crossing.*
- Aug. Yau Mathematical Sciences Center, Tsinghua University, Beijing, China. Algebraic Geometry Seminar: *On Bayer-Macri's line bundle theory over Bridgeland moduli space.*
- May Korea Institute for Advanced Study, Damyang Resort, South Korea. Workshop on rational curves and moduli: *Two facets of birational geometries of moduli space of sheaves over surface* (Two talks).
- Apr. POSTECH, Pohang, South Korea. T-Seminar: *Two facets of birational geometries of moduli space of sheaves over surface.*
- Mar. KIAS, Seoul, South Korea. Algebraic Geometry Seminar: *Two facets of birational geometries of moduli space of sheaves over surface I and II* (Two talks).
- 2015 Nov. Hong Kong University of Science and Technology, Hong Kong. HKUST Seminar on Geometry: *Lectures on Bayer-Macri's Nef Line Bundle Theory* (Two lectures).
- Mar. Chinese University of Hong Kong, Hong Kong. CUHK/UM Joint International Workshop in Geometry: *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces.*
- Mar. IBS Center for Geometry and Physics, Pohang, South Korea. *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces.*
- Feb. University of Stavanger, Stavanger, Norway. The Stavanger Algebraic Geometry Seminar: *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces.*
- Feb. KTH Royal Institute of Technology, Stockholm, Sweden. KTH & SU Algebra and Geometry Seminar: *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces.*
- 2014 Nov. The University of Hong Kong, Hong Kong. Geometry Seminar: *Perverse coherent sheaves on blow-ups.*
- Mar. HKUST, Hong Kong. HKUST PhD Student Seminar: *Some Bridgeland stability conditions on an elliptic K3 surface with a section.*
- 2013 Apr. HKUST, Hong Kong. HKUST Department Seminar on Pure Mathematics: *Perverse coherent sheaves on blow-ups* (Three lectures).
- Feb. HKUST, Hong Kong. HKUST PhD Student Seminar: *Bridgeland moduli space on  $\mathbb{P}^2$  and wall-crossing.*
- 2012 Apr. HKUST, Hong Kong. HKUST PhD Student Seminar: *Wall-chamber structures on the Bridgeland stability conditions on surfaces.*

- 2011 Sept HKUST, Hong Kong. HKUST PhD Student Seminar: *Notes on Bridgeland stability conditions on surfaces*.
- 2010 May HKUST, Hong Kong. HKUST PhD Student Seminar: *Moduli spaces of framed sheaves*.
- 2009 June HKUST, Hong Kong. HKUST PhD Student Seminar: *Grothendieck's Quot-scheme*.

### co-Organizer

- 2018 Nov **Workshop on Moduli theory & Derived category**, IBS-CGP, Pohang, South Korea.  
[https://cgp.ibs.re.kr/conferences/Workshop\\_on\\_Moduli\\_theory\\_and\\_Derived\\_category/](https://cgp.ibs.re.kr/conferences/Workshop_on_Moduli_theory_and_Derived_category/)

### Teaching Activities

#### Regular Courses

- 2019 Fall Differential Geometry (of Curves and Surfaces), undergraduate course, Uppsala University.

#### Mini-Courses

- 2017 Feb. Lecture Series in Algebraic Geometry: *Bridgeland Stability Conditions (I), (II), (III)* (6 hours mini-course), the Institute of Mathematical Sciences, CUHK.
- 2015 Nov. Lecture Series in Algebraic Geometry: *Lectures on Bayer-Macri's Nef Line Bundle Theory* (Two lectures, 4 hours), HKUST.

Teaching assistant at Hong Kong University of Science and Technology (All courses were taught in English.)

- 2011 Spring Ordinary Differential Equation
- 2010 Fall Differential Geometry (I won the Best Teaching Assistant Award of the Math Dept of HKUST in 2011 for this course.)
- 2009 Fall Concept in Math
- 2009 Fall Linear Algebra
- 2009 Spring Analysis
- 2008 Fall Differential Geometry
- 2008 Spring Complex Analysis

Teaching assistant at Lanzhou University (All courses were taught in Chinese.)

- 2004 Fall Functional Analysis
- 2004 Spring Differential Geometry

### Services

Reviewer of *Zentralblatt MATH* and *AMS Mathematical Reviews*

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*Updated: February 5, 2020*