

Curriculum Vitae

Wanmin Liu

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City: Stockholm

Employment

- 2021/09 – 2023/11: Teaching Assistant (part time)
Department of Mathematics
KTH Royal Institute of Technology, Sweden
<https://www.kth.se/profile/wanmin/>
- 2019/01 – 2020/12: 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>
- 2015/07 – 2015/11: Parental leave
- 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. PDF Link
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 $L^{p(x)}(\Omega)$. PDF Link
- 2021/23: Swedish language study, ABF Stockholm, Sweden
SVA 1 (2022/12), SVA 2 (2023/03), **SVA 3** (2023/05), approved;
SVA grund 2 (2022/05), SVA grund 3 (2022/07), SVA grund 4 (2022/10), approved;
Sfi C (2021/10) and D (2022/02), approved.
- 2024: (Jan – ongoing) Kompletterande pedagogisk utbildning för forskarutbildade (KPUFU), Stockholm University, Sweden

Research Interests

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

Publications

- 2023 Yu-Wei Fan, Chunyi Li, —, Yu Qiu, *Contractibility of space of stability conditions on the projective plane via global dimension function*, Mathematical Research Letters, Vol. **30**, No. 1 (2023), 51–87. arXiv:2001.11984.
- 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, 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.)
- 2018 —, *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces*, Kyoto Journal of Mathematics, Vol. **58**, No. 3 (2018), 595–621. arXiv:1501.06397.
- 2015 —, *Bayer-Macri decomposition on Bridgeland moduli spaces over surfaces*, Ph.D. Thesis, HKUST.
- 2013 Wang Lu, —, *Online publishing via pdf2htmlEX*, TUGboat, **34**(2013), no. 3, 313–324.
- 2006 Xian-Ling Fan, —, *An exact inequality involving Luxemburg norm and conjugate-Orlicz norm in $L^{p(x)}(\Omega)$* , Chinese Ann. Math. Ser. A, **27**(2006), no. 2, 177–188; English translation in *Chinese J. Contemp. Math.* **27**(2006), no. 2, 147–158.

Preprints

- 2024 Mu-Lin Li, —, *The limits of Kähler manifolds under holomorphic deformations*, 12 pages, arXiv:2406.14076, submitted.
- 2019 —, Jason Lo, Cristian Martinez, *Fourier-Mukai transforms and stable sheaves on Weierstrass elliptic surfaces*, 45 pages, arXiv:1910.02477, submitted.

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.

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/

Selected Seminars and Presentations

- 2024 June Institut Mittag-Leffler, Stockholm, Sweden. Kleindagarna Juni 2024. *Teaching Activity*. More about Kleindagarna.
- 2020 June University of Science and Technology of China, Hefei, China. Geometry and Mathematical Physics Seminar: *Contractibility of space of stability conditions on projective plane via global dimension function* (Online Talk).
- Jan. Uppsala University, Uppsala, Sweden. Geometry and Topology Seminar: *Contractibility of space of stability conditions on projective plane via global dimension function*.

- 2019 Dec. HSE University, 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 HSE University, 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*.
- July 2015 Summer Research Institute on Algebraic Geometry, University of Utah, Salt Lake City, USA. Poster presentation on *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*.

Teaching Activities

Regular Courses

- 2019 Fall Differential Geometry (of Curves and Surfaces), undergraduate course (50 hours lectures, 45 min oral exam to each students), Uppsala University. The full teaching material (with Course Plan, Lecture Notes, Homework and Oral Exam Plan and lots of images) is on my webpage:
<https://wanminliu.github.io/doc/DG/DG.html> - Lecture Notes on Differential Geometry of Curves and Surfaces, 232 pages, Uppsala University, 2019.

Supervise

- 2020 Spring supervise a undergraduate student: Patrik Deigård, *Liouville's equation on simply connected domains*, Bachelor Thesis (Kandidatarbete), 58 pages, Uppsala University, 2020 June, DiVA, id: diva2:1466472

Teaching in the High School

- 2024 Spring Kärrtorps gymnasium (VFU for ten weeks), Matematik 1, Matematik 3, Matematik 5 (Teaching in Swedish)

Substitute teacher at KTH

- 2023 Fall Single variable Calculus (SF1625), Lecture 12 to 15.
- 2023 Fall Analytical and Numerical Methods for Differential Equations (SF1682), Lecture 1 to Lecture 6.

Teaching assistant at KTH

- 2023 Fall Analys i en variabel (SF1673)
- 2023 Spring Flervariabelanalys (SF1626), Differentialekvationer (SF1633)
- 2022 Fall Linear Algebra (SF1624)
- 2022 Spring Multivariable Calculus (SF1626)
- 2021 Fall Basic course in Mathematics (SF1690), Multivariable Calculus (SF1686), Linear Algebra (SF1624)

Teaching assistant at Uppsala University

- 2020 Fall Linear Algebra II, undergraduate course, Uppsala University. (Teaching Assistant for Two groups, each group 20 hours online tutorial teaching, online cooperation with other TAs and lecturers on grading homework, midterm and final exams.)

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.)

- 2012 Fall Training to all new Teaching Assistants, Department of Mathematics, HKUST.
- 2012 Fall L^AT_EX Tutorial.
- 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 zbMATH Open (already written nine reviews). and AMS Mathematical Reviews (already written three reviews).

Updated: June 21, 2024