

Will Donovan

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Academic positions

2021– Yau MSC, Tsinghua University: Associate Professor
2018–21 Yau MSC, Tsinghua University: Assistant Professor
2014–18 Kavli IPMU, University of Tokyo: Postdoctoral Fellow
2011–14 University of Edinburgh: Research Assistant

Further affiliation

2021– Yanqi Lake BIMSA: Adjunct Associate Professor
2020– Kavli IPMU, University of Tokyo: Visiting Scientist

Education

2007–11 PhD Mathematics, Imperial College London
2003–4 MMath Mathematics, University of Cambridge (Part III)
2000–3 BA Mathematics, University of Cambridge

Publications

1. Grassmannian twists on the derived category via spherical functors
Proc. London Math. Soc. (2013) 107 (5): 1053–1090.
2. Window shifts, flop equivalences and Grassmannian twists (with E. Segal)
Compositio Math. (2014) 150 (6): 942–978.
3. Mixed braid group actions from deformations of surface singularities (with E. Segal)
Comm. Math. Phys. (2015) 335 (1): 497–543.
4. The Pfaffian-Grassmannian equivalence revisited (with N. Addington and E. Segal)
Alg. Geom., Foundation Compositio Math. (2015) 2 (3): 332–364.
5. Noncommutative deformations and flops (with M. Wemyss)
Duke Math. Jour. (2016) 165 (8): 1397–1474.
6. Moduli spaces of torsion sheaves on K3 surfaces (with N. Addington and C. Meachan)
J. London Math. Soc. (2016) 93 (3): 846–865.
7. Mukai flops and \mathbb{P} -twists (with N. Addington and C. Meachan)
J. Reine Angew. Math. (Crelle) (2019) 748: 227–240.
8. Contractions and deformations (with M. Wemyss)
Amer. J. Math. (2019) 141 (3): 563–592.

9. Twists and braids for general 3-fold flops (with M. Wemyss)
J. Eur. Math. Soc. (2019) 21 (6): 1641–1701.
10. Perverse schobers and wall crossing
Int. Math. Res. Notices (2019) 18: 5777–5810.
11. Noncommutative enhancements of contractions (with M. Wemyss)
Adv. Math. (2019) 344: 99–136.
12. Perverse schobers on Riemann surfaces: constructions and examples
Eur. J. Math. (2019) 5: 771–797.
13. Mirror symmetry for perverse schobers from birational geometry (with T. Kuwagaki 桑垣樹)
Comm. Math. Phys. (2021) 381: 453–490.
14. Stringy Kähler moduli for the Pfaffian-Grassmannian correspondence
SIGMA (2021) 17, 028.
15. Stringy Kähler moduli, mutation and monodromy (with M. Wemyss)
To appear **J. Diff. Geom.**, arXiv:1907.10891.
16. Relating derived equivalences for simplices of higher-dimensional flops
Adv. Stud. Pure Math. (2023) 88: 305–330.
17. Root stacks and periodic decompositions (with A. Bodzenta)
Manuscripta Math. (2024) 175: 53–73.
18. Derived symmetries for crepant contractions to hypersurfaces
Preprint, arXiv:2409.19555.
19. Higher-dimensional conifolds and hypergeometric systems (with Weilin Su 苏蔚琳)
In preparation.

Proceedings

20. Grassmannian twists, derived equivalences and brane transport
Proc. Symp. Pure Math. (2015), Proc. String-Math 2012.
21. Contractions of 3-folds: deformations and invariants
Internat. J. Math. (2016) 27 (7), special issue VBAC 2014.
22. Applications of noncommutative deformations
Proc. Kinokuniya Alg. Geom. Symp. (2016), available online.

Grants

- 2019– China central government **Thousand Talents Plan**
Value: 2.5 million yuan (~\$350k)
- 2016–18 Japan Soc. for Promotion of Science KAKENHI **Young Scientist B**
Value: 2.9 million yen (~\$25k)

Awards

- 2020 Yau MSC Ruolin 若琳 Research Excellence Award
- 2019 Yau MSC Outstanding Paper Award ‘Twists and braids for general 3-fold flops’

Doctoral students

2019–23	Xun Lin 林汛	derived categories, birational geometry, Hodge theory Postdoctoral fellow, MPIM Bonn (2023–)
2019–	Weilin Su 苏蔚琳	categorification, hypergeometric systems, mirror symmetry
2020–	Luyu Zheng 郑璐予	toric geometry, braid groups, perverse sheaves
2021–	Nantao Zhang 张南涛	enumerative geometry, derived geometry

Mentoring

Junior faculty

2023–	Beihui Yuan 袁北翥	commutative algebra, Calabi–Yau geometry, algebraic splines
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Postdocs

2023–	Qingjing Chen 陈晴靖	derived categories, Fano varieties, Bridgeland stability
2024–	Alicia Lamarche	derived categories, toric geometry, rationality
2024–	Aimeric Malter	mirror symmetry, toric geometry, categorical resolutions

Teaching

Yau MSC, Tsinghua University

2024	Theoretical mechanics
2023	Topics in algebraic geometry
2023	Calculus 2
2022	Theoretical mechanics
2022	Lie groups and Lie algebras
2021	Geometric representation theory 2 (with Penghui Li 李鹏辉)
2021	Derived functors in algebraic and birational geometry
2020	Calculus 1
2020	Mirror symmetry: categories and constructions
2019	Geometric representation theory 2 (with Peng Shan 单芃)
2019	Calculus 2
2018	Derived functors in algebraic and birational geometry

Yanqi Lake BIMSA

2023	Introduction to topos quantum theory
2022	Quiver approaches to machine learning
2022	Categorical and geometric aspects of quantum mechanics

Extended visits

Apr–May 2024	Sydney Mathematical Research Institute
Mar 2024	IMS, Chinese University of Hong Kong
Feb–Jun 2020	Kavli IPMU, University of Tokyo
Jan–Apr 2014	Hausdorff Institute, Bonn
Apr–Jul 2013	Schrödinger Institute, Vienna

Selected talks

2024

Fujiyoshida, Japan
Makerere U, Uganda
UBC, Vancouver

2023

IMPAN, Warsaw
Kavli IPMU, Tokyo
Krakow, Poland
Max Planck Inst, Bonn

2022

Cambridge U
Oberwolfach
UCL, London

2021

BICMR, Peking U
Cardiff U
CMSA, Harvard U

2020

IASM, Hangzhou
Kavli IPMU, Tokyo
KAIST, Korea
KIAS, Seoul
Steklov Inst, Moscow

2019

Auckland U, New Zealand
BIRS Oaxaca, Mexico
CTU, Prague

2019 (continued)

Fudan U, Shanghai
Kyoto U
Liverpool U
Osaka U
Sydney U
SYSU, Guangzhou

2018

Hokkaido U
Nayoga U
TSIMF Sanya, Hainan

2017

Australian National U
Bath U
ICMS, Edinburgh U
Nayoga U
Osaka U
SISSA, Trieste

2016

BIRS Banff
ECM, Berlin
Freie Universität, Berlin
Hanga Roa, Chile
Hong Kong U
Kinosaki Symposium
Kyoto U
METU, Ankara
Nayoga U

2015

Fields Institute, Toronto
Max Planck Inst, Bonn
Oberwolfach
Warwick U

2014

Freie Universität, Berlin
BICMR, Beijing
Hamburg U
KIAS, Seoul
Sheffield U

2013

Cardiff U
Columbia U
Duke U
Edinburgh U
Leeds U
Oxford U
Schrödinger Inst, Vienna

2012

ETH Zürich
Glasgow U
Hausdorff Institute, Bonn
Newcastle U
Steklov Inst, Moscow
Queen Mary, U London
Warwick U

Outreach

- Workshop series, for University of Tokyo ‘Soap bubbles and spacetime’ (2017–)
At 6 locations, including Tamarokuto Science Centre and Kavli IPMU
- Interviewed, for University of Tokyo ‘Discover Our People’ (2016)
- Talk: ‘The frontiers of symmetry: hidden geometry and tangled superstrings’
King’s College London Math School (2015)
Summerhall, Edinburgh, for International Year of Crystallography (2014)

Service

Conference organization

Workshop ‘Homological algebra of the infrared’ at TSIMF, Sanya, organizer (2023)

~20 international speakers, including Fields Medallist Maxim Kontsevich

Workshop ‘Categorified wall crossing’ at U California, Davis, mentor (2021)

Workshop ‘Derived categories’ at Hausdorff Institute, Bonn, organizer (2014)

Yau MSC, Tsinghua

Foreign affairs committee (2023–)

Tenure-track recruitment committee (2023–)

Geometric representation theory seminar organizer (2021–)

Colloquium committee (2019–21)

Previous employment

2006–7 Lead programmer, Bloomberg LP: financial research and development

2005 TEFL teacher, Kyoto, Japan

Languages

– English (native)

– Japanese, Mandarin (advanced)