

# 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 (with R.P. Thomas, E. Segal)  
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. (with E. Segal)
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. Relating derived equivalences for simplices of higher-dimensional flops  
**Adv. Stud. Pure Math.** (2023) 88: 305–330.
16. Root stacks and periodic decompositions (with A. Bodzenta)  
**Manuscripta Math.** (2024) 175: 53–73.
17. Stringy Kähler moduli, mutation and monodromy (with M. Wemyss)  
**J. Diff. Geom.** (2025) 129 (1): 115–164.
18. Derived symmetries for crepant contractions to hypersurfaces  
Preprint, arXiv:2409.19555.
19. Window categories for a simple 9-fold flop of Grassmannian type  
(with W. Hara, M. Kapustka, M. Rampazzo)  
Preprint, arXiv:2510.06184.
20. Higher-dimensional conifolds and hypergeometric systems (with Weilin Su 苏蔚琳)  
In preparation.
21. Quiver braid groups and exceptional surfaces in 3-folds (with Luyu Zheng 郑璐予)  
In preparation.

## Proceedings

22. Grassmannian twists, derived equivalences and brane transport  
**Proc. Symp. Pure Math.** (2015), Proc. String-Math 2012.
23. Contractions of 3-folds: deformations and invariants  
**Internat. J. Math.** (2016) 27 (7), special issue VBAC 2014.
24. Applications of noncommutative deformations  
**Proc. Kinoshita 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  
‘Non-commutative aspects of Hodge conjecture, minimality, and Torelli problems’  
Postdoctoral fellow, MPIM Bonn (2023–25)  
Postdoctoral fellow, HKUST, Hong Kong (2025–26)  
Assistant professor, CUHK Shenzhen (2026–)
- 2020–25 **Luyu Zheng** 郑璐予 toric geometry, braid groups, perverse sheaves  
‘Braid groups associated with exceptional surfaces in 3-folds’
- 2021– **Nantao Zhang** 张南涛 Bridgeland stability, birational and enumerative geometry  
‘Stability conditions on local Calabi–Yau fourfolds and on blowups’

## Masters students

- 2019– **Weilin Su** 苏蔚琳 categorification, hypergeometric systems, mirror symmetry  
‘Derived monodromy for the Appell  $F_4$  hypergeometric system’

## Mentoring

### *Junior faculty*

- 2023–25 **Beihui Yuan** 袁北翥 commutative algebra, Calabi–Yau geometry, algebraic splines

### *Postdocs*

- 2023–24 **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*

- 2025 Topics in complex algebraic geometry  
2025 Topics in algebraic geometry (homological mirror symmetry)  
2024 Theoretical mechanics  
2023 Topics in algebraic geometry (derived categories and toric 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 单芑)  
2019 Calculus 2  
2018 Derived functors in algebraic and birational geometry

- 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
- Jun–Jul 2020 Korean Institute of Advanced Study, Seoul
- Feb–Jun 2020 Kavli IPMU, University of Tokyo
- Jan–Apr 2014 Hausdorff Institute, Bonn
- Apr–Jul 2013 Schrödinger Institute, Vienna

## Selected talks

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|--|---|---|
| <b>2025</b><br>Cetraro, Italy<br>Wuhan U, China  | <b>2019 (continued)</b><br>BIRS Oaxaca, Mexico<br>CTU, Prague<br>Fudan U, Shanghai<br>Kyoto U<br>Liverpool U<br>Osaka U<br>Sydney U<br>SYSU, Guangzhou    | <b>2015</b><br>Nayoga U<br>Fields Institute, Toronto<br>Max Planck Inst, Bonn<br>Oberwolfach<br>Warwick U                                       |
| <b>2024</b><br>Fujiyoshida, Japan<br>Makerere U, Uganda<br>UBC, Vancouver<br>TSIMF Sanya, Hainan |   | <b>2014</b><br>Freie Universität, Berlin<br>BICMR, Beijing<br>Hamburg U<br>KIAS, Seoul<br>Sheffield U   |
| <b>2023</b><br>IMPAN, Warsaw<br>Kavli IPMU, Tokyo<br>Krakow, Poland<br>Max Planck Inst, Bonn     | <b>2018</b><br>Hokkaido U<br>Nayoga U<br>TSIMF Sanya, Hainan  | <b>2013</b><br>Cardiff U<br>Columbia U<br>Duke U<br>Edinburgh U<br>Imperial College London<br>Leeds U<br>Oxford U<br>Schrödinger Inst, Vienna   |
| <b>2022</b><br>Cambridge U<br>Oberwolfach<br>UCL, London   | <b>2017</b><br>Australian National U<br>Bath U<br>ICMS, Edinburgh U<br>Nayoga U<br>Osaka U<br>SISSA, Trieste  |   |
| <b>2021</b><br>BICMR, Peking U<br>Cardiff U<br>CMSA, Harvard U                                   | <b>2016</b><br>BIRS Banff<br>ECM, Berlin<br>Freie Universität, Berlin<br>Hanga Roa, Chile<br>Hong Kong U<br>Kinosaki Symposium<br>Kyoto U<br>METU, Ankara | <b>2012</b><br>ETH Zürich<br>Glasgow U<br>Hausdorff Institute, Bonn<br>Newcastle U<br>Steklov Inst, Moscow<br>Queen Mary, U London<br>Warwick U |
| <b>2020</b><br>IASM, Hangzhou<br>KAIST, Korea<br>KIAS, Seoul<br>Steklov Inst, Moscow             |   |   |
| <b>2019</b><br>Auckland U, New Zealand<br>Australian National U                                  |   |   |

## Service

### *Conference organization*

- Workshop ‘Homological algebra of the infrared’ at TSIMF, Sanya, organizer (2023)  
~20 speakers, including A. Bondal, M. Kapranov, Fields Medallist M. 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–)
- Events Hub organizer (2021–)
- Geometric representation theory seminar organizer (2021–)
- Colloquium committee (2019–21)

## 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)

## Previous employment

- 2006–7      Lead programmer, Bloomberg LP: financial research and development
- 2005        TEFL teacher, Kyoto, Japan

## Languages

- English (native)
- Japanese, Mandarin (advanced)