

# Thomas Walpuski

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## Education

- 2009–2013 **PhD**, *Imperial College London*, thesis advisor: Simon Donaldson.
- 2007–2009 **MSc**, *ETH Zürich*.
- 2005–2007 **BSc**, *ETH Zürich*.

## Academic Positions

- 2017–present **Assistant Professor (tenure-track)**, *Michigan State University*.
- 2015–2017 **C.L.E. Moore Instructor**, *Massachusetts Institute of Technology*.
- 2014 **Research Assistant Professor**, *Simons Center for Geometry and Physics*.
- 2013–2014 **Research Associate**, *Imperial College London*.

## Grants, Fellowships, and Prizes

- 2018–2020 **Alfred P. Sloan Research Fellowship**, \$65'000.
- 2017–2020 **NSF DMS-1754967**, *Gauge Theory on Manifolds with Special Holonomy*, PI, \$152'000.
- 2016–2017 **MIT–Brazil Seed Fund**, *Singular  $G_2$ -instantons over Twisted Connected Sums*, co-PI with Tomasz Mrowka and Henrique Sá Earp, \$15'000 from MIT and \$15'000 from FAPESP.
- 2009 **ETH Medal for outstanding master thesis**.
- 2009 **Willi Studer Prize for best diploma**.

## Research Interests

gauge theory, special holonomy, calibrated geometry, geometric analysis, algebraic geometry

## Publications

- A. Doan and T. Walpuski. *On the existence of harmonic  $Z_2$  spinors*. **Journal of Differential Geometry** (2018). arXiv: 1710.06781. to appear.
- A. Jacob, H. N. Sá Earp, and T. Walpuski. *Tangent cones of Hermitian Yang–Mills connections with isolated singularities*. **Mathematical Research Letters** (2018). arXiv: 1603.07702. to appear.
- A. Jacob and T. Walpuski. *Hermitian Yang–Mills metrics on reflexive sheaves over asymptotically cylindrical Kähler manifolds*. **Communications in Partial Differential Equations** (2018). arXiv: 1603.07702. to appear.
- D. A. Salamon and T. Walpuski. *Notes on the octonions*. **Proceedings of the 23rd Gökova Geometry–Topology Conference**. (2017). arXiv: 1005.2820.
- T. Walpuski.  *$G_2$ -instantons, associative submanifolds, and Fueter sections*. **Communications in Analysis and Geometry** 25.4 (2017). arXiv: 1205.5350.
- T. Walpuski. *A compactness theorem for Fueter sections*. **Commentarii Mathematici Helvetici** 92.4 (2017). arXiv: 1507.03258.

A. Degeratu and T. Walpuski. *Rigid HYM connections on tautological bundles over ALE crepant resolutions in dimension three.*

**Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)** 12.17 (2016). arXiv: 1207.6938.

T. Walpuski. *Spin(7)-instantons, Cayley submanifolds, and Fueter sections.*

**Communications in Mathematical Physics** 352.1 (2016). arXiv: 1409.6705.

A. Haydys and T. Walpuski. *A compactness theorem for the Seiberg–Witten equation with multiple spinors in dimension three.*

**Geometric and Functional Analysis** 25.6 (2015). arXiv: 1406.5683.

H. N. Sá Earp and T. Walpuski.  *$G_2$ -instantons over twisted connected sums.*

**Geometry and Topology** 19.3 (2015). arXiv: 1310.7933.

T. Walpuski.  *$G_2$ -instantons over twisted connected sums: an example.*

**Mathematical Research Letters** 23.2 (2015). arXiv: 1505.01080.

T. Walpuski.  *$G_2$ -instantons on generalised Kummer constructions.*

**Geometry and Topology** 17.4 (2013). arXiv: 1109.6609.

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## Preprints

A. Doan and T. Walpuski. *Castelnuovo’s bound and rigidity in almost complex geometry.* (2018). arXiv: 1809.04731.

A. Doan and T. Walpuski. *Equivariant Brill–Noether theory for elliptic operators and super-rigidity of  $J$ -holomorphic maps.* (2018). URL: <https://walpuski.com/Research/EquivariantBrillNoetherSuperRigidity.pdf>.

S. He and T. Walpuski. *Hecke modifications of Higgs bundles and the extended Bogomolny equation.* (2018). URL: <https://walpuski.com/Research/HeckeModificationsEBE.pdf>.

A. Doan and T. Walpuski. *Deformation theory of the blown-up Seiberg–Witten equation in dimension three.* (2017). arXiv: 1704.02954.

A. Doan and T. Walpuski. *On counting associative submanifolds and Seiberg–Witten monopoles.* (2017). arXiv: 1712.08383.

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## Invited Talks

### Conferences and Workshops

December 2018 **ICMAT, School and Workshop on Special Metrics and Gauge Theory.**

November 2018 **Rutgers University, Geometric Analysis Workshop.**

September 2018 **Simons Center for Geometry and Physics, Special Holonomy: Progress and Open Problems.**

June 2018 **ShanghaiTech, Symposium in Geometry and Differential Equations.**

January 2018 **Imperial College London, Gauge Theory and Special Holonomy.**

September 2017 **Simons Center for Geometry and Physics, Special Holonomy: Progress and Open Problems.**

August 2017 **Fields Institute,  $G_2$  Manifolds and Related Topics, workshop and mini-school.**

August 2017 **Isaac Newton Institute, Symplectic Geometry—Celebrating the work of Simon Donaldson.**

March 2017 **Institute for Pure and Applied Mathematics (IPAM), Gauge Theory and Categorification.**

December 2016 **Toyko Institute of Technology and Tokyo University of Science, Geometric Analysis in Geometry and Topology.**

September 2016 **Simons Center for Geometry and Physics, Special Holonomy in Geometry, Analysis and Physics.**

- June 2016 **Isaac Newton Institute**, *General Relativity: from Geometry to Amplitudes*.
- May/June 2016 **Gökova Geometry–Topology Conference**.
- November 2015 **Simons Center for Geometry and Physics**, *Riemannian Convergence Theory*.
- July 2015 **University of British Columbia**, *PIMS Symposium on the Geometry and Topology of Manifolds*.
- September 2014 **Simons Center for Geometry and Physics**,  $G_2$ –manifolds, month-long program.
- August 2014 **Riemann Center for Geometry and Physics, Leibniz Universität Hannover**, *Gauge Theories in Higher Dimensions*.
- June 2012 **King’s College London and University College London**,  $G_2$  Days.
- April 2012 **Banff International Research Station**, *Geometric Structures on Manifolds*.
- January 2011 **King’s College London**, *UK–Japan Winter School New Methods in Geometry*.

### Seminars

- November 2018 **University of Michigan**, *Geometry and Physics Seminar*.
- November 2018 **Notre Dame**, *Geometric Analysis Seminar*.
- November 2016 **Center of Mathematical Sciences and Applications, Harvard University**, *Mathematical Physics Seminar*.
- June 2016 **Universidad Complutense Madrid**, *Seminario de geometría y topología*.
- March 2016 **Fields Institute**, *Fields Geometric Analysis Colloquium*.
- November 2015 **Harvard University**, *Gauge Theory Seminar*.
- October 2015 **Harvard University**, *Differential Geometry*.
- October 2015 **Michigan State University**, *Topology Seminar*.
- October 2015 **California Institute of Technology**, *Geometry and Topology Seminar*.
- October 2015 **Massachusetts Institute of Technology**, *Geometry and Topology Seminar*.
- April 2015 **Harvard University**, *Differential Geometry Seminar*.
- April 2015 **Duke University**, *Geometry/Topology Seminar*.
- March 2015 **Waterloo University**, *Geometry and Topology Seminar*.
- November 2014 **Princeton University**, *Tian’s informal seminar*.
- June 2014 **Imperial College London**, *Geometry and Topology Seminar*.
- April 2014 **ETH Zürich**, *Symplectic Geometry Seminar*.
- March 2014 **Cambridge University**, *Differential Geometry Seminar*.
- December 2013 **EPF Lausanne**, *Hamiltonian Dynamics Seminar*.
- November 2013 **Leeds University**.
- November 2013 **Kyoto University**.
- October 2013 **Instituto de Matemática Pura e Aplicada (IMPA)**.
- September 2013 **Unicamp**.
- May 2013 **University of Bielefeld**.
- February 2012 **University of Freiburg**.
- January 2012 **Imperial College London**, *Geometry and Analysis Seminar*.

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## Teaching

### Michigan State University

- Fall 2018 MTH 993 Special Topics in Geometry: Riemannian Manifolds with Special Holonomy
- Spring 2018 MTH 993 Special Topics in Geometry: Spin Geometry
- Fall 2017 MTH 868 Geometry and Topology I

## Massachusetts Institute of Technology

- Spring 2017 18.901 Introduction to Topology  
Fall 2016 18.965 Geometry of Manifolds  
Spring 2016 18.152 Introduction to Partial Differential Equations  
Fall 2015 18.03 Differential Equations (recitations)  
Spring 2015 18.03 Differential Equations (recitations)

## Imperial College London

- Spring 2014 M4P54 Differential Topology  
Spring 2011 Mathematics for Electrical Engineers (tutorials)

## ETH Zürich

- Fall 2008 Analysis I (tutorials)  
Spring 2008 Linear Algebra II (tutorials)  
Fall 2007 Linear Algebra I (tutorials)  
Summer 2007 Analysis II (tutorials)  
Winter 2006/07 Analysis I (tutorials)

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## References

### **Simon Donaldson**

Simons Center for Geometry and Physics  
✉ [sdonaldson@scgp.stonybrook.edu](mailto:sdonaldson@scgp.stonybrook.edu)

### **Clifford Taubes**

Harvard University  
✉ [chtaubes@math.harvard.edu](mailto:chtaubes@math.harvard.edu)

### **Tomasz Mrowka**

Massachusetts Institute of Technology  
✉ [mrowka@math.mit.edu](mailto:mrowka@math.mit.edu)

### **Mark Haskins**

Imperial College London  
✉ [m.haskins@imperial.ac.uk](mailto:m.haskins@imperial.ac.uk)

### **Dietmar Salamon**

ETH Zürich  
✉ [dietmar.salamon@math.ethz.ch](mailto:dietmar.salamon@math.ethz.ch)

### **Jörn Dunkel (teaching)**

Massachusetts Institute of Technology  
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