

Prof. Alexander F. Ritter
Associate Professor, University of Oxford

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Field of study:

Pure Mathematics → Geometry → Symplectic topology.

Interests: Symplectic and contact geometry, Floer homology,
Fukaya categories, mirror symmetry, symplectic field theory.

Mathematical Institute
Radcliffe Observatory Quarter
Woodstock Road
Oxford, OX2 6GG, U.K.

Current Employment

UNIVERSITY OF OXFORD

England

- ◇ **Associate Professor in Geometry**, Mathematical Institute, 01/2014- current. (Tenure awarded 12/2017.)
- ◇ **The Roger Penrose Fellow and Tutor in Mathematics**, Wadham College, Oxford, 12/2012- current.

Previous Employment

UNIVERSITY OF OXFORD

England

- ◇ University Lecturer in Geometry, Mathematical Institute, 12/2012-12/2013. Selection Committee: N.Hitchin, D.Joyce, U.Tillmann, A.Dancer, D.Huybrechts, A.Hodges, C.Sukumar.

Trinity College, UNIVERSITY OF CAMBRIDGE

England

- ◇ Junior Research Fellow of Trinity College, 10/2009- 09/2013.
- ◇ Member of the Isaac Newton Institute for Mathematical Sciences, 01/2011- 07/2011.

Education

M.I.T. (MASSACHUSETTS INSTITUTE OF TECHNOLOGY)

U.S.A.

- ◇ Ph.D. in Mathematics, June 2009. GPA 5.0/5.0.
Advisor: Prof. Paul Seidel.
Thesis: *The Novikov theory for symplectic cohomology and exact Lagrangian embeddings*.
Thesis defence committee: Paul Seidel, Tom Mrowka, Denis Auroux (March 2009).

UNIVERSITY OF CHICAGO

U.S.A.

- ◇ Master of Science, 2005. Top of class.
Director of Graduate Studies: Prof. Peter May.
GRE Mathematics Subject Test: 98 percentile.

Trinity College, UNIVERSITY OF CAMBRIDGE

England

- ◇ MA (Cantab), 2007 (BA/MA were incorporated in Oxford in 2014).
- ◇ MMath (Certificate of Advanced Study in Mathematics, “Cambridge Part III”), 2004. *Distinction*. Ranked 6th place out of approximately 200 students.
- ◇ B.A. with Honours in Mathematics, 2003. Director of Studies: Prof. Imre Leader. *First Class Honours* in each year.

Awards

- Junior Research Fellowship*, Trinity College. Stipendiary non-teaching postdoc position. 2009-2013
- EPDI*, awarded the fellowship of the European Postdoctoral Institute. 2009
- Research Fellowship* (2007-2008) and *Teaching Assistantship* (2008-2009), MIT. 2007-2009
- McCormick Fellowship*, offered to highest rated graduate applicants, University of Chicago. 2004-2006
- Rouse Ball Prize*, mathematics essay prize, Trinity College. 2003
- Heilbronn Prize* for outstanding academic performance, Trinity College. 2003
- Senior Scholarship* for outstanding academic performance, Trinity College. 2002 & 2003
- Junior Scholarship* for outstanding academic performance, Trinity College. 2001

List of Publications

- ◇ joint with Gabriele Benedetti, *Invariance of symplectic cohomology and twisted cotangent bundles over surfaces*, submitted 2018. Available on arXiv:1807.02086.
- ◇ joint with Mark McLean, *The McKay correspondence via Floer theory*, submitted 2018. Available on arXiv:1802.01534.
- ◇ joint with Ivan Smith, *The monotone wrapped Fukaya category and the open-closed string map*, **Selecta Mathematica**, Volume 23, 533–642, 2017.
- ◇ *Circle-actions, quantum cohomology, and the Fukaya category of Fano toric varieties*, **Geometry & Topology** 20, 1941–2052, 2016.
- ◇ *Floer theory for negative line bundles via Gromov-Witten invariants*, **Advances in Mathematics**, Volume 262, 1035–1106, 2014.
- ◇ *Topological quantum field theory structure on symplectic cohomology*, **Journal of Topology**, Volume 6, Number 2, 391–489, 2013.
- ◇ *Deformations of symplectic cohomology and exact Lagrangians in ALE spaces*, **Geometric And Functional Analysis (GAFA)**, Volume 20, Number 3, 779–816, 2010.
- ◇ *Novikov-symplectic cohomology and exact Lagrangian embeddings*, **Geometry & Topology** 13, 943–978, 2009.

Work in progress

- ◇ *Morse Homology, with a view towards Floer homology*. Book under contract with Cambridge University Press, to appear in the series: *Cambridge Studies in Advanced Mathematics*.
- ◇ joint with Gabriele Benedetti, *Villieu manifolds and symplectic cohomology of magnetic cotangent bundles*.
- ◇ joint with Mark McLean, *Work in Progress* (on the McKay correspondence).

Grants

Participating researcher in a large grant of the *Centre for Quantum Geometry of Moduli Spaces*, Aarhus, supporting exchange programs of students/postdocs with Berkeley, Caltech, IHES, Oxford.

Invited Talks (Selected)

Heidelberg, Germany, Symplectic Geometry Seminar, 2 talks, June 2017.
Cambridge, Differential Geometry and Topology Seminar, Feb 2017.
London, *18th UK-Japan Winter School in Maths: Singularities, Symmetries and Submanifolds*, Jan 2017.
Oxford, Geometry and Analysis Seminar, Oct 2016
Amsterdam, Mini-Workshop on Symplectic Geometry, Sep 2016 (jointly Amsterdam & Utrecht).
Oxford, Algebraic and Symplectic Geometry Seminar, May 2016.
Hamburg, Germany, Siebert's Research Seminar in Complex Geometry, Jan 2015.
Münster, Germany, Symplectic Geometry Seminar, Jan 2015.
ETH (Zürich), Geometry Seminar, May 2014.
Oxford University, Algebraic and Symplectic Geometry Seminar, Feb 2014.
Leeds, U.K., Yorkshire-Durham Geometry Day, 24 January 2014.
Paris VI Jussieu, Symplectic Seminar "Symplectix", Dec 2013.
Bochum, Germany, *Floer Lectures*, Floer Centre of Geometry, 19/20 April 2013. (Held annually)
Les Diablerets, Switzerland, Workshop on Symplectic Geometry, Jan 2013.
Oxford University, Geometry and Analysis Seminar, Nov 2012.
Pavia, Italy, "Giornate di Geometria" (Italian national conference in geometry), Mar 2012.
Bonn, Hausdorff Institute Seminar joint with Algebraic Geometry Seminar of Bonn, Nov 2011.
Rio de Janeiro (IMPA), Workshop on Conservative Dynamics and Sympl. Geometry, Aug 2011.
Cambridge University, Geometry Seminar (special 2-hour summer seminar), July 2011.
Strasbourg, Symplectic Geometry Seminar, Mar 2011.
Aberdeen (Scotland), Geometry Seminar, Mar 2011.
Oxford University, Algebraic and Symplectic Geometry Seminar, Oct 2010.
ETH (Zürich), Geometry Seminar, Mar 2010.

Cambridge University, Differential Geometry Seminar, Mar 2010.

Bruxelles, joint with **Köln** University, Seminar on Symplectic and Contact Geometry, Nov 2009.

Columbia University (New York), Symplectic Geometry and Gauge Theory Seminar, Mar 2009.

Paris (Institut Henri Poincaré), Seminar in Symplectic and Real Algebraic Geometry, Jul 2008.

Northwestern University (Chicago), Geometry/Physics Seminar, Mar 2008.

Workshops (Selected)

Oxford, *Modern Moduli Theory*, CMI Workshop, Clay Mathematics Institute, Sep 2017.

Oxford, *Modern Moduli Theory Graduate School*, Sep 2017.

UCL, *18th UK-Japan Winter School in Maths: Singularities, Symmetries and Submanifolds*, Jan 2017.

Amsterdam, Mini-Workshop on Symplectic Geometry, Sep 2016 (jointly Amsterdam & Utrecht).

Institut Mittag-Leffler, Sweden, research program *Symplectic geometry and topology*, Sep 2015.

Clay Mathematics Institute, Oxford, Conference on Symplectic Topology, Sep 2014.

Les Diablerets, Workshop on Symplectic Geometry, Contact Geometry and Interactions, Jan 2013.

Oxford, *Aspects of Topology*, organized by Prof. Ulrike Tillmann, Dec 2012.

Hamburg University, Workshop on Lagrangian Floer Homology (SFT V, Fukaya), Aug 2011.

IMPA, Rio de Janeiro, Workshop on Conservative Dynamics and Symplectic Geometry, Aug 2011.

Isaac Newton Institute, Cambridge, Moduli Spaces Workshop, Jan 2011 - July 2011.

Institut Henri Poincaré, Paris, Workshop on Symplectic and Contact Geometry, Jan 2010.

LMU University of Munich, Workshop on Homological Mirror Symmetry (SFT IV, Seidel), July 2009.

Humboldt University Berlin, Workshop on Gromov-Witten theory (SFT III, Givental), July 2008.

Institut Henri Poincaré, Paris, Summer School in Symplectic & Real Algebraic Geometry, July 2008.

MIT, Workshop on Mirror Symmetry and Symplectic Geometry, May 2008.

Université de Montréal (Canada), Workshop on Floer Theory and Symplectic Dynamics, May 2008.

Stanford University, New Perspectives and Challenges in Symplectic Field Theory, Aug 2007.

Clay Mathematics Institute (Cambridge, U.S.A.), Workshop on Symplectic Topology, Apr 2007.

Leipzig University, Workshop on Symplectic Field Theory (SFT II, Eliashberg), Aug 2006.

Oberwolfach Institute, Workshop, *Differentialgeometrie im Grossen*, Aug 2005.

Administrative activities

Editorial Work: Editor in geometry for *The Quarterly Journal of Mathematics*, Oxford University Press.

Conference Organizer: Clay Mathematics Institute conference *Symplectic Topology*, 29/9/2014-3/10/2014. Co-organizers: Dominic Joyce and Ivan Smith.

Departmental Administration, Seminars: Co-organizer *Geometry and Analysis Seminar* 2017-current (24 talks/year), Co-organizer *Algebraic and Symplectic Geometry Seminar* 2013-2017 (24 talks/year).

Departmental Administration/Exams: Good Practice Committee (2018-), Part C Examiner (2015-2018), PhD External Examiner for T.Sodoge (UCL, 2017), DPhil Internal Examiner for B.Volk (2014), Confirmation of Status for B.Volk (2014) and S.Kang (2017), Transfer of Status for S.Kang (2016) and Y.Wang (2017), Assessor for: C3.5 Lie groups (2013-2015), B3.2 Geometry of Surfaces (2015-2018), C3.4 Algebraic Geometry (2016-2018). Interviewer DPhil applicants (2014: 2 interviews, 2015: 7 int., 2016: 10 int., 2017: 4 int.).

College Administration: Wadham College Governing Body (2012-current), Tutorial Board (2012-current), Academic Panel (2014-2017), Graduate Liaison Committee (2013-2016), Remuneration Committee (2016-2019), Selection Committees for an Associate Professorship in MathPhys (2016) and for Stipendiary Lectureships in Mathematics (2014, 2016, 2018).

Oxford Admissions Interviewer: for Wadham College undergraduate mathematics.

Dec 2012: 20 interviews. *2013:* 22 int. *2014:* 27 int. *2015:* 28 int. *2016:* 38 int. *2017:* 34 int.

Cambridge Admissions Interviewer: for Trinity College undergraduate mathematics.

Dec 2009: 6 interviews. *Dec 2010:* 16 interviews. *Dec 2011:* 18 interviews.

Journal Referee for *Duke Mathematical Journal* (Duke University Press); *Mathematische Annalen* (Springer); *Selecta Mathematica* (Birkhäuser); *Journal of Symplectic Geometry* (International Press); *IMRN - International Mathematics Research Notices* (Oxford Univ. Press); *Bulletin of the LMS*.

Outreach activities

CMI-PROMYS International Alliance, Oxford Masterclasses in Geometry, Wadham College, Oxford, August 10-16, 2014. Organizer and lecturer (10 two-hour lectures). *Lectures on Geometry, Topology, and Penrose tilings.*

(Funded by the Clay Mathematics Institute, this program invited 19 European students, including 13 CMI-PROMYS Scholars, for a summer program designed to encourage ambitious high school students to explore the creative world of mathematics.)

Teaching Experience

Lecturer for Oxford courses:

2017/18: **Algebraic Geometry**, 16 Lectures. + 4 Hwk sessions (ca.30 students, ca.6 PhD students)

Geometry of Surfaces, 16 Lectures (ca. 20 students)

2016/17: **Algebraic Geometry**, 16 Lectures. (ca. 30 students)

Geometry of Surfaces, 16 Lectures + 6 Hwk sessions (ca. 25 students)

2015/16: **Algebraic Geometry**, 16 Lectures + 4 Hwk sessions. (ca. 25 students)

Geometry of Surfaces, 16 Lectures. (ca. 30 students)

2014/15: **Lie Groups**, 16 Lectures + 4 consultation sessions. (15 students)

Geometry of Surfaces, 16 Lectures + 6 Hwk sessions. (34 students)

2013/14: **Lie Groups**, 16 Lectures + 6 Hwk sessions + 4 Exam classes. (7 students)

Morse Homology, graduate course, 16 Lectures. (6 PhD students)

2012/13: **Lie Groups**, 16 Lectures + 7 Hwk sessions + 4 Exam classes. (6 students, 2 PhD students).

Lecturer, Morse Homology, examinable **Part III course, Cambridge University**, Lent 2011.

24 Lectures + 4 exercise cl. Audience: 15 MA students, 3 Postdocs, 1 Prof. I designed and graded exams.

Lecturer, Calculus, University of Chicago, Fall 2006, Winter 2007, Spring 2007. Ca. 90 lectures, 30 students. Course evaluation: 4.8/5.0. Nominated by students for *Physical Sciences Teaching Prize*.

Apprentice Instructor, Algebra, University of Chicago, 2005-2006. Taught 7 Lectures, 25 students.

Mentor: Robert Kottwitz. Nominated by the students for the *Physical Sciences Teaching Prize*.

Tutor in Oxford University. Usually 4 tutorial hours/student. Student numbers:

Michaelmas Term	2013	2014	2015	2016	2017	2018
1 st year Algebra	10	7	10	8	9	
2 nd year Algebra	8	10	7	7	9	
Hilary Term	2013	2014	2015	2016	2017	2018
1 st year Linear Algebra	8	10	7	10	8	9
Groups & Group Actions	8	10	7	10	8	9
Topology	10	5	4	4	2	4
Rings and Modules		3	7	4	4	5
Numerical Analysis					3	1
Trinity Term	2013	2014	2015	2016	2017	2018
Groups & Group Actions	8	10	7	10	8	9
Constructive Mathematics					9	
Group Theory	5	3	5		2	
Projective Geometry		1			1	
Introduction to Manifolds			5		2	

Supervisor in Cambridge University: (Tutorials of 4 hours/student)

Analysis, 13 students, Lent 2012.

Groups, 6 students, Michaelmas 2011.

Linear Algebra, 16 students, Michaelmas 2010.

Geometry & Groups, 16 students, Lent 2010.

Linear Algebra, 16 students, Michaelmas 2009.

Teaching Assistant at MIT: (20 hours/course of afternoon classes + 3 weekly office hours)

Multivariable Calculus, Fall 2008. Approx. 20 students.

Linear Algebra, Spring 2008. Approx. 20 students.

Teaching Workshops / Professional Development

MIT Teaching Workshop for mathematicians, MIT, Fall 2008. Organizer: Prof. Denis Auroux.

Training for admissions interviewing, Oxford Learning Institute, Tutored online course, Nov 2012.

Workshop on Effective DPhil Supervision, Oxford Learning Institute, University of Oxford, Feb 2016.

Research students

PhD research advisor, at Oxford

Todd Liebenschutz-Jones (Univ. of Oxford), Oct 2017-current.

Filip Zivanovic (Univ. of Belgrade), Oct 2016-current.

Nicholas Wilkins (Cambridge), Oct 2015-current.

Roland Grinis (Cambridge/Imperial) (joint DPhil with Prof. Joyce), Oct 2013-2017, graduated.

Masters dissertation supervisor, at Oxford

Jiasheng Teh, 2015/2016, *Floer Homology* (MTP Masters course).

Todd Liebenschutz-Jones, 2016/2017, *Moduli space of curves, and enumerative geometry*.

Research mentor

Project Laboratory in Mathematics, MIT, Spring 2009. Guided 9 undergraduate students in doing research projects, preparing oral and written presentations.

Languages

English, Fluent: 3 school years in Ireland, 12 years in English-speaking universities.

German, Fluent: native language.

Italian, Fluent: 9 school years in Italy, high-school diploma 100/100 at Liceo Marinelli, Udine.

French, Advanced: 7 years of courses at school, *DELFA1-A4* at the Alliance Française.

Greek (modern), Low Intermediate: 2016-current, courses at the Oxford University Language Centre.

References

Prof. Paul Seidel (seidel@math.mit.edu, Tel: +1 617 253 3773)

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Prof. Gabriel Paternain (G.P.Paternain@dpmmms.cam.ac.uk, Tel: +44 1223 337995)

Trinity College, Cambridge University, CB2 1TQ, U.K.

Prof. Ivan Smith (I.Smith@dpmmms.cam.ac.uk, Tel: +44 1223 764277)

DPMMS, Cambridge University, Wilberforce Road, Cambridge, CB3 0WB, U.K.

Prof. Claude Viterbo (Claude.Viterbo@ens.fr, Tel: +33 1 44 32 20 87)

École Normale Supérieure, 45, rue d'Ulm 75230 Paris Cedex 05, France.

Prof. Dietmar Salamon (salamon@math.ethz.ch, Tel: +41 44 632 3425)

ETH Zürich, ETH Main Building, Rämistrasse 101, Zürich, Switzerland.