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Employment

Since Oct 2022 Associate Professor, University College London

Sep 2019 - Sep 2022 Lecturer, University College London

Sep 2017 - Aug 2019 Assistant Professor (Lecturer), Heriot-Watt University

Aug 2013 - Aug 2017 James H. Simons Instructor, Stony Brook University

Education

2013 PhD in Pure Mathematics, Imperial College London

2009 MSc degree in Pure Mathematics, Université Pierre et Marie Curie, Paris 6

2007 BAs degree in Mathematics, Sapienza Università di Roma

Grants, fellowships and awards

Oct 2022 - Sep 2025: Royal Society University Research Fellowship Renewal URF/R/221030, PI, £532,220

Aug - Nov 2022: Research Membership in the Analytic and Geometric Aspects of Gauge Theory program, Mathematical Sciences Research Institute, Berkeley

Oct 2021 - Sep 2023: LMS Scheme 3 Grant Joint Research Groups, to support meetings of the Brussels–London Geometry Seminar, £3,000

Jul 2021 - Jun 2023: EPSRC New Horizons grant EP/V047698/1, PI, £252,682

Mar 2018 - Feb 2023: Royal Society Research Grant for Research Fellows RGF/R1/180086, PI, £100,070

Dec 2017 - Sep 2022: Royal Society Research Fellows Enhancement Award 2017 RGF/EA/180171, PI, £102,334

Oct 2017 - Sep 2022: Royal Society University Research Fellowship UF160155, PI, £448,166

Jun 2016 - Aug 2020: NSF grant DMS-1608143, PI until August 2017 then co-PI, \$151,048

Jan - May 2016: Postdoctoral Fellowship in Differential Geometry at the Mathematical Sciences Research Institute, Berkeley

Oct - Dec 2015: Riemann Fellowship, Riemann Center for Geometry and Physics at Leibniz Universität Hannover

Publications

Published papers

(with M. Haskins and J. Nordström) *Complete non-compact G_2 -manifolds from asymptotically conical Calabi–Yau 3-folds*, Duke Math. J. 170 (2021), no. 15, 3323–3416.

(with B. Acharya, M. Najjar and E. Svanes) *New G_2 -conifolds in M-theory and their field theory interpretation*, J. High Energ. Phys. 2021, 250 (2021).

(with M. Haskins and J. Nordström) *Infinitely many new families of complete cohomogeneity one G_2 -manifolds: G_2 analogues of the Taub-NUT and Eguchi-Hanson spaces*, J. Eur. Math. Soc. (JEMS) 23 (2021), no. 7, 2153–2220.

Complete non-compact $Spin_7$ -manifolds from self-dual Einstein 4-orbifolds, Geometry & Topology 25-1 (2021), 339–408.

ALF gravitational instantons and collapsing Ricci-flat metrics on the $K3$ surface, Journal of Diff. Geom. 112 (2019), no 1, 79–120.

Deformation theory of nearly Kähler manifolds, Journal of the London Math. Soc. 95 (2017), no 2, 586–612.

(with M. Haskins) *New G_2 -holonomy cones and exotic nearly Kähler structures on the 6-sphere and the product of two 3-spheres*, Ann. of Math. 185 (2017), no 1, 59–130.

A gluing construction for periodic monopoles, Int. Math. Res. Not. IMRN 2017, no. 24, 7504–7550.

Deformation theory of periodic monopoles (with singularities), Comm. Math. Phys. 341 (2016), no. 1, 351–390.

Preprints

(with R. Bielawski) *Hypertoric varieties, W-Hilbert schemes, and Coulomb branches*, 2023, arXiv:2304.08125.

(with C. Ross) *Calorons and constituent monopoles*, 2022, arXiv:2207.08705.

(with R. Bielawski) *Deformations of hyperkähler cones*, 2020, arXiv:2012.14895.

Surveys

Gravitational instantons and degenerations of Ricci-flat metrics on the K3 surface, in “Lectures and Surveys on G_2 Manifolds and Related Topics”, Fields Institute Communications, 84, eds. S. Karigiannis, J. Lotay and C. Leung, Springer, New York, 2020.

Invited talks

May 2023: Geometry, Algebra and Theoretical Physics Seminar, Imperial College London

April 2023: Supergravity, Generalized Geometry, and Ricci Flow, SCGP, Stony Brook

March 2023: Kings and Queens of Gravity, LMS

March 2023: Physics and Special Holonomy, KITP, Santa Barbara

December 2022: Colloquium for Pure Mathematics, University of Hamburg

November 2022: Analytic and Geometric Aspects of Gauge theory Program Seminar, MSRI/SLMath

September 2022: 6th Annual Meeting of the Simons Collaboration on Special Holonomy

July 2022: Geometry and physics of ALX metrics in gauge theory, AIM

June 2022: Differential Geometry and Geometric Analysis, Florence

March/April 2022: Geometry and Analysis on Non-Compact Manifolds, CIRM, Marseille

March 2022: Minisymposium on Geometric analysis and partial differential equations at the SIAM Conference on Analysis of Partial Differential Equations (PD22)

February 2022: Geometry and Analysis Seminar, Oxford

January 2022: Connections between String Theory and Special Holonomy, Oxford

November 2021: Geometry, Analysis and Mathematical Physics seminar, University of York

October 2021: Workshop on Special Geometries on Riemannian Manifolds, CRM, Montreal

August 2021: Workshop on Curvature and Global Shape, University of Münster

March 2021: Geometria em Lisboa, IST Lisbon

October 2020: Special Holonomy and Branes, AIM

October 2020: Differential Geometry and Geometric Analysis Seminar, Princeton University

May 2020: Strings, Geometry and Quantum Fields Seminar, Uppsala Universitet

November 2019: Geometry and Topology Seminar, Imperial College London

November 2019: Oberseminar Differentialgeometrie, University of Münster

July 2019: Geometric and analytic aspects of moduli spaces, Hannover

June 2019: 10th Northern Germany Differential Geometry Day, Hamburg

May 2019: Microlocal Methods in Analysis and Geometry, CIRM, Marseille

January 2019: KCL/UCL Geometry Seminar, University College London

November 2018: Séminaire d'Analyse et Géométrie, Institut de Mathématiques de Jussieu, Paris

October 2018: Analysis Seminar, University of Warwick

September 2018: 2nd Annual Meeting of the Simons Collaboration on Special Holonomy
 July 2018: Newcastle Complex Geometry Workshop, Newcastle University
 June 2018: 2nd Symposium in Geometry and Differential Equations, ShanghaiTech University
 May 2018: Edinburgh Mathematical Physics Seminar, Maxwell Institute
 May 2018: Seminario di Algebra e Geometria, Università La Sapienza di Roma
 May 2018: Seminario di Geometria, Università di Firenze
 May 2018: Pluripotential theory, geometric analysis and calibrated geometry, Università di Torino
 May 2018: Yorkshire-Durham Geometry Day, University of Leeds
 April 2018: The structure of collapsed special holonomy spaces, Duke University
 April 2018: Geometry/Topology Seminar, Stony Brook University
 February 2018: Géométrie: échanges et perspectives, Institut Henri Poincaré, Paris
 February 2018: Analysis Seminar, Newcastle University
 January 2018: Informal Geometry Workshop in “Paradiso”, Cogne (Italy)
 November 2017: Centre for Quantum Geometry of Moduli Spaces, Aarhus University
 October 2017: Analysis Seminar, University of Edinburgh
 October 2017: Geometry and Analysis Seminar, University of Oxford
 October 2017: Analysis Seminar, Heriot-Watt University
 September 2017: EDGE Seminar, University of Edinburgh
 September 2017: Special Holonomy: Progress and Open Problems 2017, SCGP, Stony Brook
 August 2017: The Analysis of Gauge-Theoretic Moduli Spaces, BIRS, Banff
 August 2017: Workshop on G2 manifolds and related topics, Fields Institute, Toronto
 July 2017: Gauge Theory and Special Geometry, Mathematical Congress of the Americas 2017
 March 2017: Geometry-Topology Seminar, University of Pennsylvania
 January 2017: Collapse, Adiabatic Limits and Special Holonomy, Imperial College London
 December 2016: Felix Klein Seminar, University of Notre Dame
 November 2016: Séminaire de géométrie et topologie, CIRGET, Montreal
 October 2016: Geometric Analysis Seminar, Rutgers University
 October 2016: Progressi Recenti in Geometria Reale e Complessa - X, CIRM, Levico Terme
 September 2016: Geometric Analysis Colloquium, Fields Institute, Toronto
 September 2016: Geometry/Topology Seminar, Stony Brook University
 September 2016: Simons Collaboration on Special Holonomy Inaugural Workshop, Stony Brook
 July 2016: General Relativity: from Geometry to Amplitudes, Newton Institute, Cambridge
 June 2016: Recent advances in complex differential geometry, CIMI, Toulouse
 June 2016: Analysis, geometry and topology of stratified spaces, CIRM, Marseille
 May 2016: Geometry-Topology Seminar, University of Maryland
 March 2016: Kähler geometry, Einstein metrics and generalizations, MSRI, Berkeley
 January 2016: Geometric Analysis Seminar, University of Oregon
 December 2015: Algebraic Geometry and Representation Theory in Rome, La Sapienza
 December 2015: Oberseminar Geometrie und Topologie, Universität Stuttgart
 December 2015: Geometry Seminar, University of Leeds
 November 2015: Seminar on Differential Geometry and Analysis, Leibniz Universität Hannover
 August 2015: Conference on Analysis and Geometry, USTC, Hefei
 July 2015: Gluing Technics in Complex Geometry, University of Bath
 March 2015: Geometry/Topology Seminar, Stony Brook University
 February 2015: Mini-Workshop: Singularities in G2-geometry, MFO, Oberwolfach

January 2015: Geometry/topology seminar, Duke University
December 2014: Geometry and Analysis Seminar, Columbia University
November 2014: Geometry and Topology Seminar, Waterloo University
September 2014: G_2 manifolds program, SCGP, Stony Brook
June 2014: Geometry and Topology Seminar, Imperial College London
October 2013: Geometry/Topology Seminar, Stony Brook University
January 2013: Geometry and Analysis Seminar, Imperial College London
November 2011: 2nd European Young and Mobile Workshop, University of Granada

Research supervision

Postdoc: Dr Calum Ross (started in July 2021)

PhD students: Nicoló Cavalleri (since Oct 2022), Enric Solé-Farre (since Oct 2022, co-supervised with Prof S. Donaldson), Alessio Di Lorenzo (since Oct 2020), Willem Salm (thesis submitted in April 2023), Jakob Stein (graduated in Sep 2022).

Aug-Nov 2022: postdoctoral mentor of Dr Max Zimet, Analytic and Geometric Aspects of Gauge Theory program, MSRI/SLMath, Berkeley

I have examined the PhD theses of Thomas Sharpe (KCL, February 2023), Wendelin Lutz (UCL, August 2022), Marco Usula (KU Leuven, July 2022), Benjamin Aslan (UCL, March 2022), Francesco Di Giovanni (UCL, August 2021), Udhav Fowdar (UCL, August 2020).

Since 2017 I have supervised research projects with beginning PhD students in the Centre for Doctoral Training MIGSAA (Edinburgh, Summer and Fall 2017) and the LSGNT (London, Spring 2020 and Spring 2022) and with undergraduate students (Summer 2018 and 2019 at Heriot-Watt University, Summer 2020 at Imperial College London).

Teaching

Since July 2021 I am a Fellow of the Higher Education Academy.

Undergraduate teaching

Fall 2021: supervision 4th year project (UCL)
Spring 2021: Analysis 2 tutorials (UCL)
Fall 2020: Analysis 1 tutorials (UCL)
Spring 2019: Geometry (Heriot-Watt)
Spring 2018 - Spring 2019: supervision of 3 4th year and 1 5th year undergraduate projects and of 1 MSc project (Heriot-Watt)
Spring 2017: Introduction to Linear Algebra, Analysis II (Stony Brook)
Fall 2016: Calculus II (Stony Brook)
Spring 2015: Differential Equations (Stony Brook)
Fall 2014: Multivariable Calculus (Stony Brook)

Spring 2014: Mathematical Thinking, Calculus C (Stony Brook)

Fall 2013: Calculus II (Stony Brook)

Autumn 2010 - Spring 2012: grader and teaching assistant for Analysis I, Geometry and Linear Algebra, Mathematics 2 for Chemical Engineering (Imperial College London)

Postgraduate research teaching

January-February 2023: Calibrated submanifolds, London Taught Course Centre

January-February 2022: Riemannian Holonomy groups, London Taught Course Centre

October-November 2020: Introduction to differential Geometry, London Taught Course Centre

February-March 2020: Riemannian Holonomy groups, London Taught Course Centre

January-March 2019: Manifolds, Scottish Mathematical Sciences Training Centre

July-August 2014: Non-compact hyperkähler manifolds, USTC, China

July 2014: exercise classes and tutoring for the LMS-CMI Research School “An invitation to Geometry and Topology via G_2 ”, Imperial College London

Professional service

Organisation

April-May 2023: co-organiser of the Paris-London Geometry Days 2023

September 2022: co-organiser of the Introductory workshop on Analytic and Geometric Aspects of Gauge Theory, MSRI/SLMath, Berkeley

Since January 2022: organiser of the UCL Geometry Seminar

September 2020 - March 2022: co-organiser of the B.O.W.L. (Brussels, Oxford, Warwick, London: Imperial, UCL, QMUL) on-line geometry seminar

Since January 2020: co-organiser of the Brussels-London Geometry Seminar

July 2018: organiser of 1-day workshop Gauge theory on nearly Kähler manifolds, Heriot-Watt

September 2014 - September 2015: organiser of the Reading Seminar in Geometric Analysis, Stony Brook University

March 2011: organiser of the workshop TCC Postgraduate Geometry Day, Imperial College London

April 2010 - March 2012: organiser of the Junior Geometry Seminar, Imperial College London

Editorial work and review

Since November 2021: member of the Editorial Board of the Annals of Global Analysis and Geometry

Since February 2021: reviewer for zbMATH Open

Since May 2019: member of the Editorial Board of the Proceedings of the Royal Society of Edinburgh Section A: Mathematics

Since January 2019: member of the Royal Society International Exchanges Panel

Since 2014 I have refereed papers for multiple journals, including the Journal of the American Mathematical Society, Inventiones Mathematicae, Publications de l'I.H.E.S., Acta Mathematica, Cambridge Journal of Mathematics, Journal of Differential Geometry, Geometry and Topology, International Mathematics Research Notices, Mathematische Annalen, Communications in Mathematical Physics.

Departmental service

May 2023: chair of the hiring panel for the postdoctoral position funded by my Royal Societ URF Renewal (UCL)

May-Jun 2022: member of the team preparing a workload model for the UCL Mathematics Department

Since January 2021: member of the admission committee of the London School of Geometry and Number Theory as the UCL Lead Geometry Selector

March 2021: chair of the hiring panel for the postdoctoral position funded by my EPSRC New Horizons grant (UCL)

February 2021: member of the hiring panel for two postdoctoral positions funded by the Simons Collaboration grant of Prof S. Salamon (King's College London)

Since Oct 2020: mentor of Dr Nikon Kurnosov (Clifford Fellow, UCL)

March 2020: member of the hiring panel for pure lectureships (UCL)

May 2018 - August 2019: Heriot-Watt point of contact for the Teaching Stream of non-academic training within the Maxwell Institute Graduate School

October 2017 - August 2019: member of the Research Committee of the School of Mathematical and Computer Sciences, Heriot-Watt University

October 2017 - January 2018: member of the Maxwell Institute Graduate School Working Party, Heriot-Watt University and University of Edinburgh

Spring - Autumn 2018: member of the team preparing the Athena-SWAN Silver Award submission of the School of Mathematical and Computer Sciences, Heriot-Watt University