Anthony Ashmore

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Academic positions

Sorbonne Université, Paris, France — 2022 to 2023
Marie Curie Global Fellow

University of Chicago, Chicago, USA — 2020 to 2022
Marie Curie Global Fellow

University of Pennsylvania, Philadelphia, USA — 2019 to 2020
Postdoctoral Research Fellow

University of Oxford, Oxford, UK — 2016 to 2019
Junior Research Fellow, Merton College

Education

Imperial College London, London, UK — Sep 2012 to Nov 2016
PhD, Theoretical Physics

- "Generalised geometry for supersymmetric flux backgrounds" with Prof. Daniel Waldram

Princeton University, Princeton, New Jersey, US — Sep 2011 to Aug 2012
MA, Physics

- Enrolled as PhD student; studies interrupted to return to UK

University of Oxford, Oxford, UK — Sep 2007 to June 2011
MPhys (Hons), Physics, First Class

- MPhys project: "Topics in gauge theories, geometry and string theory" with Prof. Yang-Hui He

Publications

[1] "Calabi-Yau Metrics, Energy Functionals and Machine-Learning", A. Ashmore, L. Calmon, Y.-H. He, and B. A. Ovrut [arXiv:2112.10872 [hep-th]].

[2] "Exactly Marginal Deformations and their Supergravity Duals", A. Ashmore, M. Petrini, E. Tasker, and D. Waldram [arXiv:2112.08375 [hep-th]].

[3] "Machine Learning Line Bundle Connections", A. Ashmore, R. Deen, Y.-H. He, and B. A. Ovrut [arXiv:2110.12483 [hep-th]].

[4] "Topological G_2 and Spin(7) strings at 1-loop from double complexes", A. Ashmore, A. Coimbra, C. Strickland-Constable, E. E. Svanes, and D. Tennyson [arXiv:2108.09310 [hep-th]].

[5] "Calabi-Yau CFTs and Random Matrices", N. Afkhami-Jeddi, A. Ashmore, and C. Cordova [arXiv:2107.11461 [hep-th]].

[6] "Hidden Sectors from Multiple Line Bundles for the $B - L$ MSSM", A. Ashmore, S. Dumitru, and B. A. Ovrut [arXiv:2106.09087 [hep-th]].

[7] "Moduli-dependent KK towers and the swampland distance conjecture on the quintic Calabi-Yau manifold", A. Ashmore and F. Ruehle, *Phys. Rev. D* **103** 10, (2021) 106028, [arXiv:2103.07472 [hep-th]].

[8] "Explicit soft supersymmetry breaking in the heterotic M-theory B − L MSSM", A. Ashmore, S. Dumitru, and B. A. Ovrut, *JHEP* **08** (2021) 033, [arXiv:2012.11029 [hep-th]].

[9] "Eigenvalues and eigenforms on Calabi-Yau threefolds", A. Ashmore [arXiv:2011.13929 [hep-th]].

[10] "Line Bundle Hidden Sectors for Strongly Coupled Heterotic Standard Models", A. Ashmore, S. Dumitru, and B. A. Ovrut, *Fortsch. Phys.* **69** 7, (2021) , [arXiv:2003.05455 [hep-th]].

[11] "Heterotic backgrounds via generalised geometry: moment maps and moduli", A. Ashmore, C. Strickland-Constable, D. Tennyson, and D. Waldram, *JHEP* **11** (2020) 071, [arXiv:1912.09981 [hep-th]].

[12] "Machine Learning Calabi–Yau Metrics", A. Ashmore, Y.-H. He, and B. A. Ovrut, *Fortsch. Phys.* **68** 9, (2020) 2000068, [arXiv:1910.08605 [hep-th]].

[13] "Generalising G_2 geometry: involutivity, moment maps and moduli", A. Ashmore, C. Strickland-Constable, D. Tennyson, and D. Waldram, *JHEP* **01** (2021) 158, [arXiv:1910.04795 [hep-th]].

[14] "Marginal deformations of 3d $\mathcal{N} = 2$ CFTs from AdS_4 backgrounds in generalised geometry", A. Ashmore, *JHEP* **12** (2018) 060, [arXiv:1809.03503 [hep-th]].

[15] "Finite deformations from a heterotic superpotential: holomorphic Chern–Simons and an L_∞ algebra", A. Ashmore, X. de la Ossa, R. Minasian, C. Strickland-Constable, and E. E. Svanes, *JHEP* **10** (2018) 179, [arXiv:1806.08367 [hep-th]].

[16] "Exactly marginal deformations from exceptional generalised geometry", A. Ashmore, M. Gabella, M. Graña, M. Petrini, and D. Waldram, *JHEP* **01** (2017) 124, [arXiv:1605.05730 [hep-th]].

[17] "The exceptional generalised geometry of supersymmetric AdS flux backgrounds", A. Ashmore, M. Petrini, and D. Waldram, *JHEP* **12** (2016) 146, [arXiv:1602.02158 [hep-th]].

[18] "Exceptional Calabi–Yau spaces: the geometry of $\mathcal{N} = 2$ backgrounds with flux", A. Ashmore and D. Waldram, *Fortsch. Phys.* **65** 1, (2017) 1600109, [arXiv:1510.00022 [hep-th]].

[19] A. Ashmore and Y.-H. He, "Calabi–Yau three-folds: Poincaré polynomials and fractals" in *Strings, gauge fields, and the geometry behind: The legacy of Maximilian Kreuzer*, pp. 173–186. (2011) . [arXiv:1110.1612 [hep-th]].

[20] "Numerical analysis of space charge effects in electron bunches at laser-driven plasma accelerators", A. Ashmore, R. Bartolini, and N. Delerue, *Central Eur. J. Phys.* **9** (2011) 980–985, [arXiv:1008.4823 [physics.acc-ph]].

Grants and Funding

Marie Curie Individual Fellowship: €260,000 — 2020 to 2023
Global Fellowship for three-year research programme at the University of Chicago and Sorbonne Université

Grant for Short Term Scientific Mission: €1,150 — Jan 2016
Awarded by COST Action MP1210, for visit to LPTHE at UPMC, Paris

EPSRC Prize Studentship — 2012 to 2016
Awarded for PhD study, one of seven university wide

Teaching and Mentoring Experience

Tutor, Merton College, Oxford — Spring 2019
Third-year undergraduate tutorials on General Relativity and Cosmology

Lecturer, Mathematical Institute, Oxford — Autumn 2018
Course lecturer and assessor for General Relativity I graduate course

Tutor, Merton College, Oxford — Autumn 2018
Second-year undergraduate tutorials on Mathematical Methods

College mentor, Merton College, Oxford — Autumn 2017 to present
College subject mentor providing supplementary academic support to undergraduates

Class tutor, Mathematical Institute, Oxford — Autumn 2017 to Summer 2018

Intercollegiate classes for General Relativity I and General Relativity II graduate courses

Tutorial assistant, Imperial College London 2012 to 2015

First- and second-year undergraduate tutorials covering classical mechanics, quantum mechanics, thermodynamics, statistical mechanics and nuclear physics

Awards and Prizes

Departmental Teaching Award, Mathematical Institute, Oxford 2019

Awarded for lecturing of General Relativity I graduate course

Professional Activities and Academic Service

Seminar organiser 2021 to present

Organiser for Particle Theory Seminar series at University of Chicago

External examiner Aug 2021

External examiner for masters thesis at University of Stavanger, Norway

Outreach Oct 2020

High-school talk for Women in Math Honor Society students on string theory and uses of mathematics

Reviewer 2018 to present

Referee for Annales Henri Poincaré, Journal of Symbolic Computation, and Symmetry, Integrability and Geometry: Methods and Applications

Undergraduate interviews, Merton College, University of Oxford Dec 2018

Interviewer and assessor for undergraduate applicants in physics

Workshop organiser, South East Mathematical Physics Seminars Jul 2018

Organiser of the 12th meeting of the South East Mathematical Physics Seminar

General interest talk, Merton College, University of Oxford Jun 2018

Presentation on string theory and my work for a general audience

Oxford string theory website, University of Oxford 2018 to 2019

Web administrator for string theory group website

Library committee, Merton College, University of Oxford 2018 to 2019

Committee member on matters relating to the college library and archives, including approving annual budget and publication rights

Gardens committee, Merton College, University of Oxford 2017 to 2019

Committee member on matters relating to the maintenance and amenity of the college gardens and grounds

Outreach 2014 to present

Interviewed for podcasts discussing black holes and symmetries in nature

Conference Presentations

"Calabi–Yau Metrics, CFTs and Random Matrices" Dec 2021

Plenary talk, String Data 2021, University of Cape Town, South Africa

"Calabi–Yau metrics: what are they good for?" Aug 2021

Plenary talk, Nankai Symposium, Nankai University, Tianjin

"Numerical metrics and the swampland distance conjecture" July 2021

Plenary talk, String Pheno 2021, Virtual

Discussion session on numerical metrics May 2021

Simons Collaboration on Special Holonomy in Geometry, Analysis and Physics, Virtual

"Moduli and obstructions from a heterotic superpotential" Sep 2018

String Theory, Geometry and String Model Building, Mainz

"Moduli and obstructions of $N = 1$ heterotic backgrounds" July 2018

String Pheno 2018, Warsaw

"Generalising Calabi–Yau for generic flux backgrounds" Feb 2017
22nd European String Workshop – COST MP1210 Conference, University of Milano–Bicocca

"Marginal deformations from generalised geometry" Feb 2017
Strings, Cosmology and Gravity Student Conference, Institut Henri Poincaré

"Generalised geometry and supersymmetric flux backgrounds" Mar 2015
The Particle Physics and Cosmology of Supersymmetry and String Theory, DESY Hamburg

"Supergravity backgrounds and generalised geometry" Nov 2014
London Student Triangle, Imperial College London

"The geometry of supersymmetric AdS backgrounds" Nov 2013
Strings, Cosmology and Gravity Student Conference, Max Planck Institute for Physics, Munich

Invited Seminars

"Calabi–Yau Metrics, CFTs and Random Matrices" Oct 2021
String Theory Seminar at Imperial College London

"Calabi–Yau Metrics, CFTs and Random Matrices" Sept 2021
Joint Geometry Fields and Strings Seminar at University of New England

"Calabi-Yau metrics: what are they good for?" May 2021
String Theory Seminar at University of Vienna

"Calabi-Yau metrics: what are they good for?" May 2021
High-Energy Theory Seminar at University of Liverpool

"Calabi-Yau metrics: what are they good for?" Apr 2021
String Theory Seminar at Virginia Tech

"Calabi-Yau metrics, machine learning, and the spectrum of the Laplace operator" Feb 2021
High-Energy Theory Seminar at KEK Theory Center

"Moduli of general $N = 1$ heterotic backgrounds" Oct 2018
Mathematical Physics Seminar at University of Surrey

"Moduli of general $N = 1$ heterotic backgrounds" Apr 2018
String Theory Seminar at Enrico Fermi Institute, University of Chicago

"Marginal deformations from generalised geometry" Feb 2018
Edinburgh Mathematical Physics Group Seminar at ICMS, University of Edinburgh

"Generalising Calabi–Yau for generic flux backgrounds" Jan 2016
String Theory Seminar at Queen Mary University of London

"Generalising Calabi–Yau for generic flux backgrounds" Nov 2015
String Theory Seminar at LMU Munich

"Generalising Calabi–Yau for generic flux backgrounds" Nov 2015
Paris String Theory Seminar at Ecole Normale Supérieure

"Generalising Calabi–Yau for generic flux backgrounds" Oct 2015
String Theory Seminar at Mathematics Department, University of Oxford

Academic Visits

University of Chicago Aug 2018
Two week visit to the Enrico Fermi Institute

University of Chicago Mar 2018
One week visit to the Enrico Fermi Institute

Université Pierre et Marie Curie, Paris Nov 2017

Visit to LPTHE at UPMC, Paris
Université Pierre et Marie Curie, Paris — Jan 2016
Short Term Scientific Mission at LPTHE
UPMC, Paris and CEA, Saclay — Mar 2015
One week visit shared between LPTHE, Paris and the Institut de Physique Théorique (IPhT), Saclay
University of California, Berkeley — Jan 2015
Two week visit at the Center for Theoretical Physics, University of Berkeley

Conferences Attended

Integrability, Dualities and Deformations, *Virtual*	Aug 2021
Nankai Symposium on Mathematical Dialogues, *Virtual*	Aug 2021
String Pheno 2021, *Virtual*	Jul 2021
Strings 2021, *Virtual*	Jul 2021
String Math 2021, *Virtual*	Jul 2021
Simons Collaboration on Special Holonomy in Geometry, Analysis and Physics, *Virtual*	May 2021
String Theory, Geometry and String Model Building, *Mainz*	Sep 2018
String Pheno 2018, *Warsaw*	Jul 2018
Strings, Geometry and Black Holes, *London*	Apr 2018
String Geometry, Supersymmetric Theories and Dualities, *Surrey*	Jul 2017
22nd European String Workshop – COST MP1210 Conference, *Milan*	Feb 2017
Strings, Cosmology and Gravity Student Conference, *Paris*	Feb 2017
String Math 2016, *Paris*	Jun 2016
Particle Physics and Cosmology of Supersymmetry and String Theory, *Hamburg*	Mar 2015
Strings 2014, *Princeton*	Jun 2014
Prospects in Theoretical Physics, *Princeton*	Jun 2014
Mathematics of String Theory, *London*	Jun 2014
Particle Physics and Cosmology of Supersymmetry and String Theory, *New York*	Mar 2014
Strings, Cosmology and Gravity Student Conference, *Munich*	Nov 2013
New Developments in Gravity, Cosmology and Strings, *Munich*	Mar 2013
Exact Methods in Gauge/String Theories, *Princeton*	Nov 2011

References

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