

# Daniel Platt

daniel.platt.berlin@gmail.com  
www.dplatt.de

## Education

Sep 2017–Mar 2022	Ph.D., Mathematics, Imperial College London
Oct 2014–Apr 2017	MSc, Mathematics, Humboldt University Berlin
Oct 2011–Jan 2015	BSc, Mathematics, Humboldt University Berlin

## Work Experience

Since Sep 2023	Chapman-Schmidt Fellow, Imperial College London
Nov 2021–Aug 2023	Research Associate, King’s College London

## Publications

Authors are listed in the order they appear in the publication. † marks equal contribution.

### Journal Articles

1. Vom Berg<sup>†</sup>, G. L. W., Röhr<sup>†</sup>, V., **Platt, D.** & Blankertz, B. A New Canonical Log-Euclidean Kernel for Symmetric Positive Definite Matrices for EEG Analysis. *IEEE Transactions on Biomedical Engineering*. <https://ieeexplore.ieee.org/document/10735221> (to appear).
2. Ewert<sup>†</sup>, C., Magruder<sup>†</sup>, S., Maiboroda<sup>†</sup>, V., Shen<sup>†</sup>, Y., Singh<sup>†</sup>, P. & **Platt, D.** Group-invariant machine learning on the Kreuzer-Skarke dataset. *Physics Letters B* **858**, 138996. <https://doi.org/10.1016/j.physletb.2024.138996> (2024).
3. Festi<sup>†</sup>, D., Nijgh<sup>†</sup>, W. & **Platt<sup>†</sup>, D.** K3 surfaces with two involutions and low Picard number. *Geom. Dedicata* **218**, Paper No. 55, 28. ISSN: 0046-5755,1572-9168. <https://doi.org/10.1007/s10711-024-00900-8> (2024).
4. **Platt<sup>†</sup>, D.**  $G_2$ -instantons on Resolutions of  $G_2$ -orbifolds. *Communications in Mathematical Physics* **405**, 81. ISSN: 1432-0916. <https://doi.org/10.1007/s00220-024-04947-2> (Mar. 2024).
5. Dwivedi<sup>†</sup>, S., **Platt<sup>†</sup>, D.** & Walpuski<sup>†</sup>, T. Associative submanifolds in Joyce’s generalised Kummer constructions. *Comm. Math. Phys.* **401**, 2327–2353. ISSN: 0010-3616,1432-0916. <https://doi.org/10.1007/s00220-023-04716-7> (2023).

### Peer-reviewed Conference Proceedings

6. Aslan<sup>†</sup>, B., **Platt<sup>†</sup>, D.** & Sheard<sup>†</sup>, D. Group invariant machine learning by fundamental domain projections in *NeurIPS Workshop on Symmetry and Geometry in Neural Representations* (2023), 181–218.

## Preprints

7. Festi<sup>†</sup>, D., Platt<sup>†</sup>, D., Singhal<sup>†</sup>, R. & Tanaka<sup>†</sup>, Y. *Examples of real stable bundles on K3 surfaces* 2025. arXiv: [2503.02937](https://arxiv.org/abs/2503.02937) [math.AG]. <https://arxiv.org/abs/2503.02937>.
8. Albertini<sup>†</sup>, E., **Platt<sup>†</sup>, D.** & Wiseman<sup>†</sup>, T. *Towards a uniqueness theorem for static black holes in Kaluza-Klein theory with small circle size* 2024. arXiv: [2410.20967](https://arxiv.org/abs/2410.20967) [hep-th]. <https://arxiv.org/abs/2410.20967>.
9. Douglas<sup>†</sup>, M. R., **Platt<sup>†</sup>, D.** & Qi<sup>†</sup>, Y. *Harmonic 1-forms on real loci of Calabi-Yau manifolds* 2024. arXiv: [2405.19402](https://arxiv.org/abs/2405.19402) [math.DG]. <https://arxiv.org/abs/2405.19402>.
10. Galdeano<sup>†</sup>, M., **Platt<sup>†</sup>, D.**, Tanaka<sup>†</sup>, Y. & Wang<sup>†</sup>, L. *Spin(7)-instantons on Joyce's first examples of compact Spin(7)-manifolds* 2023. arXiv: [2310.03451](https://arxiv.org/abs/2310.03451) [math.DG]. <https://arxiv.org/abs/2310.03451>.
11. **Platt<sup>†</sup>, D.** *Improved Estimates for  $G_2$ -structures on the Generalised Kummer Construction* 2022. arXiv: [2011.00482](https://arxiv.org/abs/2011.00482) [math.DG]. <https://arxiv.org/abs/2011.00482>.

## Invited Talks

1. *Solving PDEs with Newton's method*. Chinese University of Hong Kong, Shenzhen. Dec. 2024.
2. *An introduction to group invariant machine learning*. I-X, Imperial College London. Nov. 2024.
3. *Machine learning for differential geometry*. I-X, Imperial College London. Nov. 2024.
4. *New examples of  $G_2$ -instantons*. Mathematics Inspired by String Theory workshop, Chinese University of Hong Kong. Oct. 2024.
5. *Numerical approximations of harmonic 1-forms on real loci of Calabi-Yau manifolds*. Humboldt University Berlin Gauge Theory Research Seminar. July 2024.
6. *New Spin(7)-instantons on compact manifolds*. Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics (Durham, North Carolina). May 2024.
7. *New Spin(7)-instantons on compact manifolds*. Special Riemannian geometries in dimensions 6,7,8 (Université de Montréal). Apr. 2024.
8. *Numerical approximations of harmonic 1-forms on real loci of Calabi-Yau manifolds*. Loughborough University Geometry Seminar. Mar. 2024.
9. *Group invariant machine learning on pure maths datasets*. University of Hong Kong Geometry Seminar. Feb. 2024.
10. *New examples of Spin(7)-instantons on compact manifolds*. University of Leeds Geometry Seminar. Nov. 2023.
11. *Numerically verified proofs*. Faculty of Natural Sciences Postdoc Showcase, Imperial College London. Nov. 2023.
12.  *$G_2$ -instantons on resolutions of  $G_2$ -orbifolds*. University of Kyoto Geometry and Topology Seminar. Oct. 2023.
13. *K3 surfaces with two involutions and low Picard number*. University of Kyoto Algebraic Geometry Seminar. Oct. 2023.
14.  *$G_2$ -instantons on the Generalised Kummer Construction*. Rutgers University Gauge Theory Seminar. Sept. 2023.

15. *Approximations of harmonic 1-forms on real loci of Calabi-Yau 3-folds*. Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics: Progress and Open Problems (Stony Brook University, New York). Sept. 2023.
16. *K3 surfaces with low Picard number*. Workshop BRIDGES: Specials geometries and gauge theories (Pau, France). June 2023.
17. *K3 surfaces with low Picard number*. Geometry Seminar at Università degli studi di Milano. June 2023.
18. *An example of a  $G_2$ -instanton on a resolution of  $(K3 \times T^3)/\mathbb{Z}_2^2$  coming from a stable bundle*. Spinorial and Octonionic Aspects of  $G_2$  and  $\text{Spin}(7)$  Geometry (Banff Research Station). May 2023.
19. *An explicit example of a  $G_2$ -instanton on a resolution of  $(K3 \times T^3)/\mathbb{Z}_2^2$  coming from a stable bundle*. Gauge Seminar at Humboldt University Berlin. May 2023.
20. *Group invariant machine learning by fundamental domain projections*. University of Nottingham Online Machine Learning Seminar. May 2023.
21. *K3 surfaces with low Picard number*. Geometry Seminar at Humboldt University Berlin. May 2023.
22. *Perturbing an approximate solution to a PDE in geometry obtained with computer aid*. King's College London Analysis Seminar. Apr. 2023.
23. *A Numerically Verifiable Proof for M-theory Compactifications (Poster)*. Kings and Queens of Gravity. Mar. 2023.
24. *An application of numerical techniques to rigorous proof in special holonomy*. Computational Differential Geometry and its Applications in Physics, Simons Center for Geometry and Physics. Nov. 2022.
25. *Associatives in the generalised Kummer construction*. University of Waterloo Geometry Seminar. Oct. 2022.
26. *Associatives in the generalised Kummer construction*. Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics: Progress and Open Problems 2022 (Stony Brook University, New York). Sept. 2022.
27.  *$G_2$ -instantons*. Geometric Analysis: Past, Present and Future 5 (online). Apr. 2022.
28. *Associatives in the generalised Kummer construction*. King's College London Geometry Seminar. Apr. 2022.
29. *An example of a  $G_2$ -instanton over  $(K3 \times T^3)/\mathbb{Z}_2^2$* . Junior Special Geometers Meeting (King's College London). Jan. 2022.
30.  *$G_2$ -instantons on resolutions of  $G_2$ -orbifolds*. Louisiana State University Geometry Seminar. Nov. 2021.
31. *New estimates for  $G_2$ -structures on resolutions of orbifolds*. Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics: Progress and Open Problems 2021 (Stony Brook University, New York). Sept. 2021.
32. *Gluing Constructions in Gauge Theory*. Oxford-London Gauge Assembly (online). June 2021.
33. *Convolutions on manifolds and applications to geometric deep learning*. King's College London/University College London Junior Geometry Seminar. May 2021.

34. *Elliptic Operators on Non-Compact Manifolds*. Imperial College London Junior Geometry Seminar. Mar. 2021.
35. *Group Invariant Machine Learning through Near-Isometries (Poster)*. Imperial College Data Science Virtual Poster Competition. Dec. 2020.
36. *Gluing of ASD-instantons*. Brussels-London Geometry Research Network Lecture Series on Gauge Theory (online). Nov. 2020.
37.  *$G_2$ -instantons and Joyce-Karigiannis manifolds*. LMBA workshop “Special Geometries and Gauge Theory” (online). June 2020.
38.  *$G_2$ -instantons and Joyce-Karigiannis manifolds*. CMO BIRS workshop “G2 Geometry and Related Topics” (Oaxaca). June 2020.
39. *Introduction to gauge theory*. Imperial College Junior Geometry Seminar. Dec. 2018.
40. *Cohomogeneity one actions on symmetric spaces*. King’s College London/University College London Junior Geometry Seminar. May 2018.
41. *The Tractor construction, conformal geodesics, and applications to conformal compactifications*. Potsdam University Geometry Seminar. Feb. 2017.

## Teaching

Spring 2025	Lecturer, Complex Manifolds, Imperial College London
Spring 2024	Tutor, Year 1 tutorial, Imperial College London
Fall 2023/24	Tutor, Year 1 tutorial, Imperial College London
Spring 2021	Tutor, Pure Mathematics, University College London
Fall 2020/21	Tutor, Pure Mathematics, University College London
Spring 2020	Tutor, Advanced Machine Learning, Imperial College London
Fall 2019/20	Tutor, Machine Learning, Imperial College London
Spring 2019	Tutor, Pure Mathematics, University College London
Fall 2018/19	Tutor, Lie Groups and Lie Algebras, King’s College London
Fall 2018/19	Tutor, Pure Mathematics, University College London
Fall 2017/18	Grader, Topology I, Humboldt University Berlin
Spring 2017	Grader, Algebra and Number Theory, Humboldt University Berlin
Fall 2016/17	Grader, Elementary Geometry, Humboldt University Berlin
Spring 2016	Grader, Linear Algebra, Humboldt University Berlin
Spring 2015	Tutor, Mathematics for Chemists II, Technical University Berlin
Fall 2014/15	Tutor, Mathematics for Chemists I, Technical University Berlin
Spring 2014	Tutor, Mathematics for Chemists II, Technical University Berlin

## Awards & Honors

- 2024 Workshop funding for London Geometry and Machine Learning Summer School. Heilbronn Institute for Mathematical Research (£5000), Schmidt Sciences (30500 USD), London School of Number Theory and Geometry (£2000), Deepmind (£2000), G-Research (£4000), International Journal for Artificial Intelligence (£850), Roche (£2000), Epic Games (£2000).

- 2023 Postdoctoral fellowship. Schmidt Sciences (£195000).
- 2023 Workshop funding for British Isles Graduate Workshop IV. Foundation Compositio (2000 EUR), London Mathematical Society (£2500), London School of Number Theory and Geometry (£4000), Simons Foundation (£3000).
- 2022 Early Career Fellowship. London Mathematical Society (£4200).
- 2021 Workshop funding for London Geometry and Machine Learning Summer School. Arabesque AI (£1000), Autodesk (£1000), Bosch (£1000), EigenTechnologies (£1000), Gather (£800), Google (£1000), Foundation Compositio Mathematica (2000 EUR), Institute of mathematics and its applications (£1200), London School of Number Theory and Geometry (£3000), Relation Therapeutics (£1000), Speechmatics (£1000), XTX Markets (£1000).
- 2019 Workshop funding for British Isles Graduate Workshop III. Heilbronn Institute for Mathematical Research (£3000), London School of Number Theory and Geometry (£5000), Simons Foundation (£3000), University College London (£500).
- 2017 PhD maintenance and fees scholarship. London School of Number Theory and Geometry.
- 2014 Undergraduate scholarship. German National Academic Foundation (62500 EUR).

## Academic Advising

### Individual

- 2024-2025 Frank She. Imperial College London, MSc project

### Group

- 2024 Nathan Burn, Arham Deep, Ishaan Sing, David Wu, Zihan Zhang. Imperial College London second year undergraduate project
- 2022 Christian Ewert, Sumner Magruder, Vera Maiboroda, Yueyang Shen, Pragya Singh. Summer school project for *London Geometry and Machine Learning*, results published in Physics Letters B

## Service

### Conference organisation

- 2024 London Geometry and Machine Learning Workshop. Summer school featuring small group mentored projects
- 2023 British Isles Graduate Workshop: Geometric flows and related topics. Summer school for PhD students
- 2022-2023 KCL Geometry Seminar. Weekly seminar
- 2022 Junior Special Geometers Meeting. 3-day conference on special geometries
- 2021 London Geometry and Machine Learning Workshop. Summer school featuring small group mentored projects

- 2020 Lecture Series on Gauge Theory with support from the London Mathematical Society. Series of five online lectures by PhD students for beginning PhD students
- 2020 Geometry and Machine Learning with Applications to Biomedical Engineering. Workshop for PhD students with tutorials and research talks
- 2020 Oxford-London Gauge Assembly. Workshop for PhD students
- 2019 British Isles Graduate Workshop “Gauge Theory with a View to Higher Dimensions”. Summer school for PhD students
- 2018–2020 KCL/UCL Junior Geometry Seminar. Weekly seminar

### **Editor**

- Since 2022 International Journal of Data Science in the Mathematical Sciences

### **Reviewer**

- 2024 Empirical Methods in Natural Language Processing
- 2022-2024 Conference on Neural Information Processing Systems (reviewer for workshop "Neurereps")
- 2022 Annual Meeting of the Association for Computational Linguistics

### **Committees**

- 2024 Research Space Committee, Imperial College London
- 2022-2023 Research Staff Committee, King’s College London

### **Outreach**

- 2024 London Maths Outreach, Volunteer Manager.
- 2018-2020 London Maths Outreach, Founder. Directing 25 volunteers to deliver weekly maths sessions.
- 2018-2019 Royal Institution Masterclass, Speaker. Deliver 3-hour long interactive classes for groups of 50-70 students.
- 2018-2019 The Brilliant Club Tutor. Deliver 6-week long classes for students in small groups.
- 2016-2017 Kiron Higher Education for Refugees, Curriculum Design Volunteer. Course design for Computer Science online study programme.
- 2011-2017 Mathematical Students Association Berlin, Teacher. Teaching weekly maths outreach sessions.

### **Other Experience**

- 2020 12-weeks AI Research Intern (Arabesque AI)
- 2012-2014 Chess Club Chairmain (Chess Club Tempelhof)
- 2010-2011 Civil Service (Zukunft Bauen e.V.)

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