Curriculum Vitae

Daniel HUYBRECHTS

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Place of birth: Berlin, Germany (GDR)

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Nationality: German
Marital status: married, 2 children
Date of birth: 9.11.1966

Education

1981-85	Heinrich-Hertz-Schule Berlin (GDR).
1985-90	Diplom Mathematics, Humboldt-University Berlin.
1990-92	PhD-student, Max-Planck-Institute for Mathematics Bonn and Humboldt-University Berlin.
1997	Habilitation. University Essen.

Academic employment

1992-94	Postdoc, Max-Planck-Institute for Mathematics Bonn.
1994-95	Postdoc, Institute for Advanced Study Princeton.
1995-96	Postdoc, Max-Planck-Institute for Mathematics Bonn.
1996-97	Assistant Professor, University Essen.
1997-98	Postdoc, École Normale Supérieure Paris. Marie-Curie Grant.
1998-02	Associate Professor, University Cologne.
2002-03	Professeur chargé de cours. École Polytechnique Paris.
2002-05	Professeur, Institut de Mathématiques de Jussieu, Paris 7.
2005-	Professor Bonn (C4/W3).

Visiting positions

Senior fellow. ITS-ETHZ. 2022.
GC Steward visiting fellow. Gonville and Caius College Cambridge. Lent 2020, hosted by Ivan Smith
Oxford, 2010-2011. EPSRC, hosted by Nigel Hitchin.
Imperial College London, 2007. Leverhulme, hosted by Richard Thomas.
Institut Henri Poincaré Paris, 2000. Special activity 'String theory'.
IHES Bures-sur Yvette, 1996, 2001.

Research interests

Algebraic and complex geometry, moduli spaces of sheaves and varieties, K3 surfaces, hyperkähler manifolds, cubic hypersurfaces, derived categories and Fourier–Mukai transforms, relation to mirror symmetry and string theory.

Editorial boards

Bulletin et Mémoirs de la SMF (2005-2013).
Crelle Journal für die reine und angewandte Mathematik (since 2013, managing editor since 2022).
Kyoto Journal of Mathematics (since 2009).
Inventiones mathematicae (since 2015).

Honors & offers

Compositio Prize 2021 (for the period 2017-2019)
Plenary speaker at the annual meeting of the DMV 2020.
Invited speaker at the International Congress of Mathematicians, Hyderabad 2010.
Member of the Academia Europaea. Elected 2017.
Heidelberg 2007, Oxford (Savilian Professor of Geometry) 2017.

Advisory boards & panels

Selection Committee of the MPI, Bonn (since 2006).
Scientific Advisory Board of the ESI, Vienna (2011-2018).
Review Panel, SwissMap (since 2015).
Conseil scientifique, INSMI, CNRS (2014-2018).
ERC grant panels (starting 2017/advanced 2019 & 2021).
Selection committee of the Institut Universitaire de France (junior 2019/senior 2020/junior 2021).
ICM 2022 sectional committee 'Algebraic and Complex Geometry' (core member).

Administrative service (selection)

Member of the Board of Directors (2007-2017, 2018), Vice-coordinator (2015-2017, 2018), HCM.
Director of Graduate Studies (BIGS) (2008-2010).
Head of Mathematical Institute (2013-2015).
Leader of Research Area of the Hausdorff Center for Mathematics (since 2007).
Spokesperson (Bonn) of the SFB/TR 45 Bonn (2007-2019).

Grant applications

ERC Synergy Grant HyperK (joint with Debarre, Macrì, Voisin). 2020-2026.
Collaborative Research Center (SFB/TR 45) 'Periods, moduli spaces and arithmetic of algebraic varieties' Bonn - Mainz - Essen: 2007-2011, 2011-2015, 2015-2019.
Hausdorff Center for Mathematics: Foundations, Models, Applications. 2006-2012, 2012-2018, 2019-.
Marie-Curie postdoctoral fellowship (ENS Paris) 1997-1999.

Organization of conferences, workshops, seminars (selection)

Oberwolfach Workshop. Algebraic Geometry 2015, 2017, 2020, 2022
Derived Category session. AMS Summer Institute in Algebraic Geometry. Utah (2015).
String-Math, Bonn 2012.
Advances in hyperkähler and holomorphic symplectic geometry, BIRS 2012.
Mirror symmetry, Bonn 2009.
SAG (weekly algebraic geometry seminar). Max-Planck Institute (since 2005).
Junior Trimester Program Algebraic Geometry. Hausdorff Institute. Bonn (2014).

Students

17 PhD students: M. Varesco (ongoing), Th. Beckmann (ongoing), I. Hellmann, E. Brakkee, U. Rieß, St. Schreieder, M. Kemeny, P. Sosna, H. Hartmann, H. Martinez, U. Schlickewei, E. Mistretta, S. Meinhardt, M. Chen, D. Ploog, M. Britze, M. Nieper-Wißkirchen.

Master/Diplom theses: 40; Bachelor theses: 36

Teaching experience (selection)

Courses (4 hours, 14 weeks each): Linear Algebra I-II; Analysis I-III, Complex geometry, Algebraic Geometry I-II, Galois theory, Commutative Algebra, Complex Analysis, Advanced topics in algebraic geometry (Lectures on K3 surfaces, Intersection theory and motives, Cubic hypersurfaces, Derived categories).

Students Seminars (2 hours, 14 weeks each): Complex geometry, Fourier–Mukai transforms, Quadratic forms, Hodge theory, Number theory, Classical algebraic geometry.

Publications

Books

1. *The geometry of cubic hypersurfaces*; Cambridge University Press. In preparation.
2. *Lectures on K3 surfaces*; Cambridge University Press, 500 pages (2016).
3. *The geometry of moduli spaces of sheaves*; Aspects of Mathematics E 31, Vieweg, 260 pages (1997). 2nd edition Cambridge University Press (2010). with M. Lehn
4. *Fourier–Mukai transforms in algebraic geometry*; Oxford Mathematical Monographs, 307 pages (2006).
5. *Complex geometry - an introduction*; Springer Universitext, 309 pages (2004).
6. *Calabi–Yau manifolds and related geometries*; Springer, 244 pages (2002). with D. Joyce, M. Gross

Articles

1. *Computing Riemann–Roch polynomials and classifying hyper-Kähler fourfolds* arXiv:2201.08152 with Olivier Debarre, Emanuele Macrì, Claire Voisin
2. *Dual fibrations.* pdf with Thorsten Beckmann
3. *Characteristic foliations* arXiv:2201.07624. with Farbizio Anella
4. *Nodal quintic surfaces and lines on cubic fourfolds*; arXiv:2108.10532.
5. *On type II degenerations of hyperkähler manifolds*; arXiv:2108.01587 to appear in MRL with Mirko Mauri
6. *Lagrangian fibrations*; 24 pages. arXiv:2108.10193 to appear in Milan J. Math. with Mirko Mauri
7. *Semipositive line bundles (Campana–Peternell–Oguiso and Verbitsky)*; with Fabrizio Anella pdf

8. *Maximal variation of curves on K3 surfaces*; submitted arXiv:2105.04787 to appear in Tunisian J. Math. WITH YAJNASENI DUTTA

9. *Brilliant families of K3 surfaces: Twistor spaces, Brauer groups, and Noether-Lefschetz loci*; arXiv:2012.04608. to appear in Annals de la Faculté des Sciences de Toulouse

10. *Complex multiplication in twistor spaces*; International Mathematics Research Notices, 2022, 3 (2022), 2095–2122.

11. *Lagrangian fibrations of hyperkähler fourfolds*; Journal IJM. 21 (2022), 921–932 WITH CHENYANG XU

12. *Hodge theory of cubic fourfolds, their Fano varieties, and associated K3 categories*; 30 pages. Birational Geometry of Hypersurfaces, Springer Lecture Notes della Unione Matematica Italiana, 267–295, 2019.

13. *Motives of isogenous K3 surfaces*; Commentarii Mathematici Helvetici 94 (2019), 445-458.

14. *Hochschild cohomology versus the Jacobian ring, and the Torelli theorem for cubic fourfolds*; Algebraic Geometry 6(1) (2019), 76–99. WITH J. RENNEMO

15. *Finiteness of polarized K3 surfaces and hyperkähler manifolds*; Annales Henri Lebesgue 1 (2018) 227–246.

16. *Motives of derived equivalent K3 surfaces*; Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg 88 (2018), 201–207.

17. *The K3 category of a cubic fourfold*; Compositio Mathematica 153 (2017), 586–620

18. *On derived categories of K3 surfaces and Mathieu groups*; Advanced Studies in Pure Math. 69 (Math. Soc. Japan) 2016

19. *Curves and cycles on K3 surfaces*; Algebraic Geometry 1 (2014), 69–106. (with an appendix by C. VOISIN)

20. *Stable maps and Chow groups*; Documenta mathematica 18 (2013), 507–517. WITH M. KEMENY

21. *Symplectic automorphisms of K3 surfaces of arbitrary order*; Math. Res. Lett. 19 (2012), 947–951.

22. *Stability conditions via spherical objects*; Math. Z. 271 (2012), no. 3-4, 1253–1270.

23. *A Global Torelli theorem for hyperkähler manifolds (after Verbitsky)*; Séminaire Bourbaki, Exp. No. 1040, Astérisque No. 348 (2012), 375–403.

24. *Chow groups and derived categories of K3 surfaces*; Current developments in algebraic geometry, 177–195, Math. Sci. Res. Inst. Publ., 59, Cambridge Univ. Press, Cambridge, 2012

25. *A note on the Bloch–Beilinson conjecture for K3 surfaces and spherical objects*; Pure Appl. Math. Q. 7 (2011), 1395–1405.

26. *Remarks on derived equivalences of Ricci-flat manifolds*; Math. Z. 267 (2011), 939–963. WITH M. NIEPER-WISSKIRCHEN

27. *Formal deformations and their categorical general fibre*; Comment. Math. Helv. 86 (2011), 41–71. WITH E. MACRI, P. STELLARI

28. *Deformation-obstruction theory for complexes via Atiyah and Kodaira–Spencer classes*; Math. Ann. 346 (2010), 545–569. WITH R. THOMAS

29. *Hyperkähler manifolds and sheaves*; Proceedings of the International Congress of Mathematicians. Volume II, 450–460, Hindustan Book Agency, New Delhi, 2010.

30. *Chow groups of K3 surfaces and spherical objects*; J. Eur. Math. Soc. (JEMS) 12 (2010), 1533–1551.

31. *Derived equivalences of K3 surfaces and orientation*; Duke Math. J. 149 (2009), 461–507. WITH E. MACRI, P. STELLARI.

32. *The global Torelli theorem: classical, derived, twisted*; Algebraic geometry–Seattle 2005. Part 1, 235–258, Proc. Sympos. Pure Math., 80, Part 1, Amer. Math. Soc., Providence, RI, 2009.

33. *Stability conditions for generic K3 categories*; Compos. Math. 144 (2008), 134–162. WITH E. MACRI, P. STELLARI.

34. *Derived and abelian equivalence of K3 surfaces*; J. Alg. Geom. 17 (2008), 375–400.

35. *Projectivity of Kähler manifolds–Kodaira's problem (after C. Voisin)*; Séminaire Bourbaki, Exp. No. 954, Astérisque No. 311 (2007), 55–73.

36. $\mathbb{P}^n$*-objects and autoequivalences of derived categories*; MRL 13 (2006), 87–98. WITH R. THOMAS.

37. *Proof of Caldararu's conjecture*; Adv. Stud. Pure Math. 45, Math. Soc. Japan, Tokyo (2006), 31–42. WITH P. STELLARI.

38. *Equivalences of twisted K3 surfaces*; Math. Ann. 332 (2005), 901–936. WITH P. STELLARI.

39. *Generalized Calabi-Yau structures, K3 surfaces, and B-fields*; Int. J. Math. 16 (2005), 13–36.

40. *Moduli spaces of hyperkähler manifolds and mirror symmetry*; Intersection theory and moduli, ICTP Lect. Notes, XIX, Abdus Salam Int. Cent. Theoret. Phys. Trieste (2004), 185–247.

41. *The Kähler cone of a compact hyperkähler manifold*; Math. Ann. 326 (2003), 499–513.

42. *The Brauer group of analytic K3 surfaces*; Int. Math. Res. Not. (2003), 2687–2698. WITH ST. SCHRÖER.

43. *Finiteness results for compact hyperkähler manifolds*; J. Reine Angew. Math. 558 (2003), 15–22.

44. *Product of harmonic forms and rational curves*; Documenta Math. 6 (2001), 227–239.

45. *Compact hyperkähler manifolds: Basic results*; Invent. Math. 135 (1999), 63–113.

46. *Birational symplectic manifolds and their deformations*; J. Diff. Geom. 45 (1997), 488–513.

47. *Hodge numbers of moduli spaces of stable sheaves on K3 surfaces*; Int. J. Math. 7 (1996), 359–372. WITH L. GÖTTSCHE.

48. *The tangent bundle of a Calabi–Yau manifold–Deformations and restrictions to rational curves*; Comm. Math. Phys. 171 (1995), 139–158.

49. *Framed modules and their moduli*; Int. J. Math. 6 (1995), 297–324. WITH M. LEHN.

50. *Stable pairs on curves and surfaces*; J. Alg. Geometry 4 (1995), 67–104. WITH M. LEHN.

51. *Complete Curves in moduli spaces of stable bundles on surfaces*; Math. Ann. 298 (1994), 67–78.