CURRICULUM VITAE

CHRISTIAN BÖHNING

General information

Date of birth:	September 27, 1978
Place of birth:	Rotenburg/Wümme, Germany
Citizenship:	German

Research interests

Algebraic geometry, representation and invariant theory, derived category methods in birational geometry

Education

Habilitation	Mathematics, University of Göttingen, December 2009, thesis "The rationality problem in invariant theory"
Doctoral thesis (PhD)	Mathematics, summa cum laude, University of Bayreuth, July 2005; thesis "Derived categories of coherent sheaves on rational homogeneous manifolds", advisor Prof. Dr. Fabrizio Catanese
Diplom	Mathematics (physics as second subject), University of Göttingen, November 2001; thesis "Canonical surfaces in $\mathbb{P}^4$ and Gorenstein algebras in codimension 2", advisor Prof. Dr. Fabrizio Catanese
Abitur	Domgymnasium Verden, June 1997

Positions

September 2015 – now	Associate Professor at the University of Warwick, Coventry, England
October 2011–September 2015	Heisenberg fellow (senior research fellow) of the German Research Foundation (DFG)
April 2010 – September 2011	Acting Professor at the University of Hamburg
October 2005– March 2010	assistant (wissenschaftlicher Assistent) at the University of Göttingen
November 2001–September 2005	teaching fellow (wissenschaftlicher Mitarbeiter) at the University of Bayreuth

Academic mentors with special importance for scientific development

Prof. Dr. Fedor Bogomolov (Courant Institute of Mathematical Sciences, NYU, New York), Prof. Dr. Fabrizio Catanese (Bayreuth), Prof. Dr. Yuri Tschinkel (Courant Institute of Mathematical Sciences, NYU, New York)

Awards and prizes

2011	Preis des Stiftungsrates der Stiftung Universität Göttingen 2010 in der Kategorie "Herausragende Nachwuchspublikation" (prize of the University of Göttingen in the category "outstanding young researcher's publication")
1997	Bundessieger Bundeswettbewerb Mathematik (winner federal German math competition)
1996	winner of competition "Alte Sprachen-Antike Kultur" (German Liberal Arts/ ancient languages competition); reception into the Studienstiftung des deutschen Volkes
1995	participant of the program "Center for Talented Youth" of Johns Hopkins University, Franklin & Marshall College/Pennsylvania, through accomplishment in Bundeswettbewerb Mathematik

Scholarships, funding and grants

October 2011 – September 2015 :	Heisenberg Grant BO 3699/1-1 of the German Research Foundation (DFG); positive interim review in June 2014, granting an extension by another two years starting from October 2014 (amounts granted for the first three years: 4553 Euro/month for 21 months in Germany, 5668 Euro/month for 12 months in the USA, 5296 Euro/month for 3 months in the UK, plus potential extra allowances on request; for the following two years: 4450 Euro/month for 16 months in Germany, 5722 Euro/month for 8 months in the USA)
1998-2001:	Scholarship of the Studienstiftung des deutschen Volkes

Selected conferences, invited talks and research stays

- Oberwolfach workshop, Subgroups of Cremona groups, Oberwolfach, July 2018; talk
- University of Essen, May 2018; talk
- Courant Institute of Mathematical Sciences, New York, March/April 2018; research stay
- Conference on Birational Geometry, Simons Foundation, New York City, August 2017; talk
- Edge Days: Birkar's boundedness and Cremona groups, University of Edinburgh, June 2017; talk
- University of Oxford, Clay workshop Algebraic Geometry Old and New, September 2016; talk

- University of Toulouse, New methods in birational geometry, June-July 2016
- University of Edinburgh, Edge Days, June 2016; talk
- University of Edinburgh, British Algebraic Geometry Conference, April 2016; talk
- Courant Institute of Mathematical Sciences, New York, March–April 2016; research stay
- University of Cardiff, February 2016; talk
- École Normale Supérieure, Paris, seminar "Variétés rationnelles", December 2015; talk
- Imperial College London, COW seminar November 2015; talk
- Courant Institute of Mathematical Sciences, February–May 2015; research stay and talks
- University of Liverpool, November 2014; talk
- Workshop "McKay Correspondence, Orbifolds and Quivers", University of Warwick, September 2014; talk
- Conference "Frontiers of Rationality", Spitzbergen July 2014; talk
- University of Nottingham, June 2014; talk
- Courant Institute of Mathematical Sciences, February-April 2014; research stay and talks
- Oxford University, February 2014; talk
- University of Marburg, February 2014; talk
- Algebraic Geometry and Moduli seminar, ETH Zürich, December 2013; talk
- Research seminar Algebraic Geometry Leibniz-Universität Hannover, November 2013; talk
- NoGAGS (Northern German Algebraic Geometry Seminar), Humboldt Universität Berlin, November 2013; talk
- Symposium on Mathematics Universität Basel, October 2013; talk
- Conference Classification of Algebraic Varieties and related topics, September 2013, Cetraro, Italy; talk
- Complex Algebraic Geometry, Oberwolfach Workshop, May 2013
- Workshop on matrix factorizations, ESI Vienna, May 2013
- Technische Universität Chemnitz, May 2013; talk
- Courant Institute of Mathematical Sciences, February-April 2013; research stay and talks
- Seminar Algebraische Geometrie, Universität Bayreuth, November 2012; talk
- School (and Workshop) on Invariant Theory and Projective Geometry, Trento, September 2012, talk
- Higher School of Economics, Laboratory of Algebraic Geometry, Moscow August 2012, research stay and talk
- Conference Birational Geometry and Derived Categories, Vienna August 2012, talk
- Courant Institute of Mathematical Sciences, March-May 2012, research stay and talk
- Johann Wolfgang Goethe-Universität Frankfurt, November 2011; talk
- Complex Algebraic Geometry, Oberwolfach Workshop, September/October 2011, talk
- DMV annual meeting Cologne, September 2011, talk in section "Algebraische Geometrie und Komplexe Analysis"
- Conferences Derived Categories in Algebraic Geometry & In Honor of F. Bogomolov, Moscow September 2011, research stay and talk
- Workshop Instantonen und Rationalität von Modulräumen, November/December 2010, Berlin, talk
- Conference Perspectives on Algebraic Varieties, Levico Terme, September 2010, talk
- University of Vienna, August 2010, research stay and talk
- Oberwolfach Workshop Moduli Spaces in Algebraic Geometry, January 2010, talk
- Scuola Normale Superiore, Centro Di Giorgi, Pisa, October 2009, research stay
- IHES, Paris, April 2009, research stay
- Courant Institute of Mathematical Sciences, NYU, New York, February 2008, research stay and talk

Publications

Published and accepted articles:

- (joint Auel, A., Pirutka, A.), *Stable rationality of quadric and cubic surface bundle fourfolds*, European Journal of Mathematics (2018), https://doi.org/10.1007/s40879-018-0233-1

- (joint Graf v. Bothmer, H.-Chr.), *Degenerations of Gushel-Mukai fourfolds, with a view towards irrationality proofs*, European Journal of Mathematics (2018), https://doi.org/10.1007/s40879-018-0227-z

- (joint Graf v. Bothmer, H.-Chr.), *On stable rationality of some conic bundles and moduli spaces of Prym curves*, accepted for publication in Comm. Math. Helvetici, preprint (2016) arXiv:1605.03029v2 [math.AG]

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.), *On the dynamical degrees of reflections on cubic fourfolds*, International Math. Research Notices, rnw311, (2017) https://doi.org/10.1093/imrn/rnw311

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.), *Some properties of dynamical degrees with a view towards cubic fourfolds*, Research in the Mathematical Sciences **3**:23 (2016), DOI: 10.1186/s40687-016-0071-z

- (joint Bogomolov, F. & Graf v. Bothmer, H.-Chr.), *Birationally isotrivial fiber spaces*, European Journal of Mathematics, Volume **2**, Issue 1, (2016), 45–54

- (joint Graf v. Bothmer, H.-Chr., Katzarkov, L. & Sosna, P.), *Determinantal Barlow surfaces and phantom categories*, Journal of the European Math. Soc. **17**, Issue 7, (2015) 1569–1592

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.), *On the Jordan-Hölder property for geometric derived categories*, Advances in Mathematics, Volume **256** (2014), 479–492

- (joint Bogomolov, F.), *On uniformly rational varieties*, in: Topology, Geometry, Integrable Systems, and Mathematical Physics, Novikov's Seminar 2012–2014, American Mathematical Society Translations, Series 2, Volume **234**, AMS (2014), 33–48

- (joint Bogomolov, F.), *Stable cohomology of alternating groups*, Central European Journal of Mathematics (2014), Volume **12**, Issue 2, 212–228

- (joint Bogomolov, F.) *Isoclinism and stable cohomology of wreath products*, in "Birational geometry, rational curves, and arithmetic", Simons Symposia, Springer (2013), 57–77

- (joint Auel, A. & Graf v. Bothmer, H.-Chr.) *The transcendental lattice of the sextic Fermat surface*, Mathematical Research Letters, Volume **20** Number 6, (2013), 1017–1031

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.) *On the derived category of the classical Godeaux surface*, Advances in Mathematics Vol. **243** (2013), 203–231

- (joint Bogomolov, F. & Graf v. Bothmer, H.-Chr.) *Linear bounds for levels of stable rationality*, Central European Journal of Mathematics (2012), Volume **10**, Issue 2, pp 466–520

- (joint Graf v. Bothmer, H.-Chr.) *On the rationality of the moduli space of Lüroth quartics*, Mathematische Annalen, Volume **353**, Number 4 (2012), 1273–1281

- (Graf v. Bothmer, H.-Chr. & Casnati, G.) *Birational properties of some moduli spaces related to tetragonal curves of genus 7*, Int. Math. Res. Notices, Volume 2012, Issue 22, (2012) 5219–5245

- (joint Bogomolov, F. & Graf v. Bothmer, H.-Chr.) *Rationality of quotients by linear actions of affine groups*, Science of China Series A: August 2011 Vol. **54** No. 8, 1521–1532

- *Some recent progress on the rationality problem in invariant theory*, Oberwolfach Reports, Report No. 02/2010, DOI: 10.4171/OWR/2010/02, "Moduli Spaces in Algebraic Geometry"

- (joint Graf v. Bothmer, H.-Chr.) *A Clebsch-Gordan formula for* $\mathrm{SL}_3(\mathbb{C})$ *and applications to rationality*, Advances in Mathematics **224** (2010) 246–259

- (joint Graf v. Bothmer, H.-Chr.) *The rationality of the moduli spaces of plane curves of sufficiently large degree*, Invent. Math. **179** (2010), no. 1, 159–173

- (joint Graf v. Bothmer, H.-Chr. & Kröker, Jakob) *Rationality of moduli spaces of plane curves of small degree*, Experiment. Math. **18** (2009), no. 4, 499–508

- *The rationality of the moduli space of curves of genus* 3 *after P. Katsylo*, in: *Cohomological and Geometric Approaches to Rationality Problems: New Perspectives*, F. Bogomolov and Y. Tschinkel eds., Progress in Mathematics **282**, (2009)

- *Gorenstein algebras in codimension* 2 *and Koszul modules*, Communications in Algebra, Volume **36**, Issue 6 June 2008 , pages 2014 - 2022

- *Canonical surfaces in* $\mathbb{P}^4$ *with* $p_g = p_a = 5$ *and* $K^2 = 11$, Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur. Rend. Lincei (9) Mat. Appl. 18 (2007), no. 1, 39–57

- *Derived categories of coherent sheaves on rational homogeneous manifolds*, Doc. Math. **11** (2006), 261-331

- *L. Szpiro's conjecture on Gorenstein algebras in codimension 2*, Journal of Algebra **288**, no. 2 (2005), p. 545-555

- *Canonical surfaces in* $\mathbb{P}^4$ *and Gorenstein algebras in codimension* 2, Oberwolfach Reports, vol.1, no.1, report no. 9/2004 (2004), p. 443–445

Monographs:

- *The rationality problem in invariant theory*, monograph in preparation, accepted for publication in Progress in Mathematics, Birkhäuser, approx. 200 pp., parts available at arXiv:0904.0899v1

Preprints, yet unpublished:

- (joint Auel, A., Bigazzi, A., Graf v. Bothmer, H.-Chr.), *Universal triviality of the Chow group of 0-cycles and the Brauer group*, (2018), arXiv:1806.02676 [math.AG]

- (joint Auel, A., Bigazzi, A., Graf v. Bothmer, H.-Chr.), *Unramified Brauer groups of conic bundle threefolds in characteristic two*, (2018), arXiv:1806.02668 [math.AG]

- (joint Auel, A., Graf v. Bothmer, H.-Chr., Pirutka, A.), *Conic bundles with nontrivial unramified Brauer group over threefolds*, (2016) arXiv:1610.04995v2 [math.AG]

- (joint Bogomolov, F.), *Essential dimension, stable cohomological dimension, and stable cohomology of finite Heisenberg groups*, (2014), available at arXiv:1405:1394

Five most important articles:

- (joint Graf v. Bothmer, H.-Chr.) *The rationality of the moduli spaces of plane curves of sufficiently large degree*, Invent. Math. **179** (2010), no. 1, 159–173

- (joint Graf v. Bothmer, H.-Chr.) *A Clebsch-Gordan formula for* $\mathrm{SL}_3(\mathbb{C})$ *and applications to rationality*, Advances in Mathematics **224** (2010) 246–259

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.) *On the derived category of the classical Godeaux surface*, Advances in Mathematics Vol. **243** (2013), 203–231

- (joint Graf v. Bothmer, H.-Chr. & Sosna, P.), *On the Jordan-Hölder property for geometric derived categories*, Advances in Mathematics, Volume **256** (2014), 479–492

- (joint Graf v. Bothmer, H.-Chr., Katzarkov, L. & Sosna, P.) *Determinantal Barlow surfaces and phantom categories*, Journal of the European Math. Soc. **17**, Issue 7, (2015) 1569–1592

Refereeing (selected)

Algebraic Geometry (Foundation Compositio Mathematica) Mathematische Annalen
Compositio Mathematica
Journal of Algebraic Geometry
Crelle's Journal
Central European Journal of Mathematics
Manuscripta Mathematica

Students, examination of PhD theses

Master's students

- Jack Copsey (MMath, Warwick; thesis: A-infinity structures, 2015-2016)
- Howard Tai (MMath, Warwick; thesis: Chatelet's Theorem, 2015-2016)
- Conor Finnegan (MSc, Warwick; thesis: representations of the general linear group and Young tableaux combinatorics, 2015-2016)
- Matt Turner (MMath, Warwick; thesis: Classification of Krull valuations on 2-dimensional rational function fields and their geometric interpretations, 2017-2018)
- Siyuan Ma (MMath, Warwick; prospective topic: the symbolic method of Aronhold-Clebsch and geometric interpretations of invariants, 2018-)
- Max Goldsworthy (MMath, Warwick; prospective topic: Harnack's problem and its generalisations in real algebraic geometry; 2018-)

PhD students

- Alessandro Bigazzi (Warwick; prospective topic: conic bundles and the degeneration method; 2016-)
- Jake Patel (Warwick; prospective thesis topic: models for and rationality of generically free Spin$\mathbb{C}$-quotients, 2018-)

Examination of PhD theses
Internal examiner

- Eduardo Dias (Warwick; advisor Miles Reid; thesis: Algebraic Covers, 2016)
- Enrico Fatighenti (Warwick; advisor Miles Reid; thesis: Hodge Theory in Grassmannians, 2017)
- Paolo Tripoli (Warwick; advisor Diane Maclagan; thesis: Chow Hypersurfaces and Realizability Problems inTropical Geometry, 2017)

External examiner

- Yitzhak Kornbluth (NYU; advisor: Fedor Bogomolov; thesis topic: Rationality properties of some generically free group quotients, 2015)
- Daniel Evans (Liverpool; advisor Aleksandr Pukhlikov; thesis: Birationally Rigid Complete Intersections, 2018)

Other

- Theresa Backsmann (Bachelor degree, Hamburg; thesis "Krümmungsinvarianten bezüglich verschiedener Transformationsgruppen in der Differentialgeometrie" (curvature invariants w.r.t. different transformation groups in differential geometry), 2011)

Current address

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