

AREND BAYER

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EDUCATION

PhD	2006
MPI für Mathematik, Bonn, Germany	
· Supervised by Yu. I. Manin.	
· Quantum cohomology, on exceptional collections, and on polynomial stability conditions.	
Diploma	2003
University of Bonn, Germany	
· Diploma thesis supervised by Yu. I. Manin.	
Master of Advanced Study (“Part III”)	1999
University of Cambridge	

EMPLOYMENT

University of Edinburgh	2012–
Lecturer, Reader, Professor of Algebraic Geometry (since 2017)	
University of Connecticut	2009–12
Assistant Professor (Tenure Track)	
MSRI, Berkeley	Spring 2009
Post-doctoral fellow	
University of Utah	2006–2009
Post-Doc	

AWARDS

Invited speaker at the International Congress of Mathematicians (ICM)	2022
Fellow of the Royal Society Edinburgh (Scotland’s national academy)	2022
ERC Consolidator grant “Wall-Crossing and Algebraic Geometry”	2019–2024
Research Professorship, MSRI	Spring 2019
CoI of EPSRC Programme Grant “Enhancing Representation Theory, Noncommutative Algebra and Geometry”	2019–2025
Whittaker prize of the Edinburgh Mathematical Society	2016
Whitehead prize of the London Mathematical Society	2016
University of Cambridge Adams prize in Mathematics	2015
ERC starting grant “Wall-Crossing and Birational Geometry”	2013–2019
Personal NSF grants	2008–2011 and 2011–2014
Visiting Fellowship, Isaac Newton Institute Cambridge, UK	Spring 2011
Postdoctoral fellowship at the MSRI, Berkeley	Spring 2009

ADVISING

PhD students

- Rebecca Tramel. Next: post-doc at UI Urbana-Champaign. 2011–15
- Soheyly Feyzbaksh. Now: now Royal Society URF at Imperial College. 2014–18
- Sjoerd Beentjes. Now: Chancellor's Fellow at Edinburgh 2014–18
- Fatemeh Rezaee. Now: UKRI Fellow at University of Cambridge 2016–20
- Augustinas Jacovskis. Next: post-doc at University of Luxembourg 2019–23
- Hannah Dell 2020–??
- Tzu-Yang Chou 2021–??

Post-docs

- Chunyi Li. Now: Royal Society URF, University of Warwick. 2014–17
- Matthew Woolf. Next: post-doc at UI Chicago. 2015–16
- Alice Rizzardo. Now: Senior Lecturer, University of Liverpool. 2016–17
- Seun-Jo Jung 2016–17
- Diletta Martinelli. Now: Assistant Professor, University of Amsterdam. 2016–18
- Laura Pertusi Autumn 2018
- Giulia Gugiatti. Now: post-doc at ICTP, Trieste. 2020–21
- Naoki Koseki. Now: Lecturer, University of Liverpool. 2019–22
- Shizhou Zhang 2019–22
- Qingyuan Jiang. Now: Tenure track, Hong Kong UST. 2019–23
- Fei Xie. Now: post-doc at MPI Bonn, Germany. 2020–23

EDITORIAL ROLES, REVIEWING.

- Section Editor, *Bulletin/Journal of the LMS* 2023–??
- Editorial Advisor, *Bulletin/Journal/Proceedings/Transactions of the LMS* 2014–23
- Editor, *Moduli* 2023–??
- Editor, *Selecta Mathematica* 2017–??
- Editor, *Proceedings of the Royal Society of Edinburgh Sect. A* 2015–19

Frequent quick opinions (JAMS, Inventiones, Duke, Compositio, Crelle, Algebraic Geometry, Journal of Algebraic Geometry, Commentarii Mathematici Helvetici, Geometry & Topology, IMRN, Algebra & Number Theory, Advances, ...)

Reviewer for grant application: ERC, NSF (also as panelist), NSA, FRS-FNRS (Belgium), Royal Society (UK), DFG (Germany), CONICYT (Chile), UKRI (UK), Fondazione Cariplo (Italy), Romanian National Research Council.

Member of EPSRC Peer Review College (regular grant reviews), EPSRC panelist (twice).

EPSRC panel chair (2023).

Tenure evaluations/external hiring evaluations (U. Michigan, Penn State, U South Carolina, Tel Aviv, Notre Dame, Imperial College)

INVITED LECTURE SERIES

- School on *Derived categories, stability conditions and hyperkähler varieties*, U. Michigan. August 2022
- Workshop on *Bridgeland stability conditions*, Warwick. December 2019
- School on *Moduli and Stability*, Hannover. July 2019
- Workshop on *Stability conditions*, UI Chicago. December 2018
- Senior participant, including lecture series, at *Géométrie Algébrique en Liberté* (GAeL), Bath. 2017
- School on *Moduli Spaces, Mirror Symmetry and Enumerative Geometry*6, ICTP Trieste August 2016
- Summer School on *Stability conditions and geometric applications*, Nordfjordeid. June 2016

Hausdorff school <i>Derived categories</i> , Bonn	April 2016
CNRS program <i>Géométrie Algébrique / Géométrie complexe</i> meeting, Luminy	November 2015
<i>Triangulated categories in Algebra, Geometry and Topology</i> , Warsaw.	June 2014
<i>Minicourses on stability</i> , Coimbra.	April 2014
<i>Graduate Student Workshop on Moduli Spaces and Bridgeland Stability</i> , UI Chicago.	March 2014
Lectures on “Stability conditions and birational geometry”, Freiburg.	November 2012
<i>Summer School on Mathematical String Theory 2010</i> , Virginia Tech	June 2010
<i>Rencontres mathématiques de Glanon</i> , Glanon (France)	June 2008
<i>VIGRE Mini-Course on Derived Categories</i> , University of Utah	June 2007

RECENT INVITED TALKS

<i>GLEN meeting</i> , Liverpool	September 2023
<i>Derived Categories, Moduli Spaces, and Counting Invariants</i> , Imperial College	July 2023
<i>Algebraic Geometry seminar</i> , Warwick	June 2023
<i>Colloquium</i> , FU Berlin	November 2022
<i>Derived categories, stability conditions and hyperkähler varieties</i> , U. Michigan	August 2022
<i>VBAC 2022: Moduli Spaces and Vector Bundles</i> , University of Warwick	July 2022
<i>Section on Algebraic and Complex Geometry</i> , International Congress of Mathematics	July 2022
<i>Algebraic Geometry in honour of Claire Voisin</i> , Institut Henri Poincaré, Paris	May 2022
<i>Manin 85</i> , MPI Bonn	March 2022
Online seminar talks: Stanford, Stonybrook, Steklov Institute Moscow, ETH Zürich	2020–21
<i>Moduli spaces, Birational Geometry and derived aspects</i> , MFO Oberwolfach	June 2020
<i>Derived Categories and Geometry in finite characteristic</i> , Banach Center Warsaw	July 2019
<i>Birational Geometry and Moduli spaces program seminar</i> , MSRI Berkeley	May 2019
<i>Algebraic Geometry seminar</i> , Columbia University	April 2019
<i>Moduli Spaces: Birational Geometry and Wall-Crossing</i> , BIRS, Banff, Canada	October 2018
<i>Arithmetic and Geometry of cubic hypersurfaces</i> , University of Hannover	August 2018
<i>Belgian-Dutch algebraic geometry day</i> , Leuven	June 2018
Seminar/colloquia talks: Oxford, Leicester, Sheffield	May 2018
Oberwolfach workshop <i>Algebraic Geometry</i>	September 2017
<i>British Algebraic Geometry (BrAG) meeting</i> , University of Cambridge	September 2017
<i>Abel Symposium</i> , Svolvær Norway	August 2017
<i>Cycles and Moduli</i> , ETH Zürich	March 2017
Joint talk: <i>Derived categories and Chow groups of hyperkähler and Calabi-Yau varieties</i> , Simons Center and <i>Algebraic Geometry Seminar</i> , University of Stony Brook	September 2016
<i>Algebraic Geometry Satellite conference 7th European Congress of Math.</i> , Hannover	July 2016
<i>Homological Mirror Geometry</i> , BIRS (Banff)	March 2016
<i>Algebra Seminar</i> , University of Sheffield	December 2015
<i>Derived Categories and Moduli spaces</i> , Stavanger	September 2015
<i>AMS Summer Institute Algebraic Geometry</i> , University of Utah	July 2015
<i>Fourier-Mukai transforms, 35 years on</i> , VBAC, Warwick	June 2015
Morning speaker at <i>The 4th Joint British Mathematical Colloquium & British Applied Mathematics Colloquium</i> , Cambridge	April 2015
<i>Simons Symposium Symposium on Geometry over non-closed fields</i> , Puerto Rico	March 2015
<i>Workshop on Algebraic Geometry</i> , MFO Oberwolfach	March 2015

TEACHING

Due to my ERC and EPSRC grants, and a period of parental leave, I had no teaching obligation since 12/2013. During that time, I volunteered for the following roles related to teaching (in addition to mentoring PhD students):

- Undergraduate final year project supervision (2014, 2015, 2018, 2019, 2020, 2021)
- Reading courses for 1st year PhD students (2015, 2019)
- Teaching organisation: As convenor of the *Post-doc working party* (2014–15) I led the introduction of a new framework for post-doc teaching within the School of Maths. This included improved support and feedback for their teaching, and allowed them to take on more responsibility and build a track record in teaching.

Courses taught

Edinburgh: Course organizer and joint lecturer “Calculus and its applications” 2012–13.

Tutoring in workshops

Connecticut: 3 courses per year, including: 2009–12

Honors’ Calculus II, Geometry, Applied Linear Algebra, Multivariable Calculus, Probability.

Graduate courses: Geometry of derived categories, Algebraic Geometry 1 & 2, Intro to Geometry/Topology.

University of Utah: 3 courses per year, including: 2006–08

Calculus 1 & 2, Business Calculus

Graduate courses: Real Analysis, Topics in Algebraic geometry

Weekly tutoring at a school for mathematics tutoring of high school students 2002–2004

Teaching assistant (Lineare Algebra 1 & 2, Analysis 3) at University of Bonn 2001–02

Coaching for the German team at the International Mathematical Olympiad 1997–2006

ADMINISTRATIVE ROLES

Head of Theme *Structure and Symmetry*, School of Mathematics. 2023–

As Head of Theme I am direct “Line Manager” for 21 permanent academic staff in Algebra, Geometry and Mathematical Physics, responsible for day-to-day management and strategic planning within the theme, and part of a 10-person team responsible for the entire School of Mathematics.

Dignity & Respect Officer for the School of Mathematics 2021–23

First point of contact for any staff who feel treated inappropriately.

Convenor of Athena SWAN working group on work/life balance 2019

Deputy Director of Research for the School of Mathematics, *Ethics Officer* 2016–21

Convenor of the Post-Doc “Working Party” for the School of Mathematics 2014–2015

The WP reviewed all aspects of the School’s support for post-docs, and a large number of our recommendations were adopted by the School.

External member of hiring committee at KTH Stockholm 2021

Member of four hiring panels for Lecturer/Reader positions (2014, 2017, 2018, 2019) at University of Edinburgh 2013–

Member of over 10 hiring panels for post-doc positions.

External member of hiring committee at Heriot-Watt University, Edinburgh 2016

CONFERENCES CO-ORGANISED

Weekly online <i>Derived seminar</i>	2021
Session on Algebraic Geometry, British Mathematics Colloquium (BMC)	2021
Workshop <i>Derived Categories, Moduli Spaces and Deformation Theory</i> , Cetraro	June 2019
ICMS workshop “Constructions and Obstructions in Birational Geometry,” Edinburgh	November 2018
School and Conference <i>Moduli Spaces, Mirror Symmetry and Enumerative Geometry</i> , ICTP Trieste	August 2016
Second <i>British Algebraic Geometry</i> (BrAG) meeting, Edinburgh	April 2016
Concentration period and workshop on <i>Geometry from stability conditions</i> , Warwick	February 2015
First BrAG meeting, Warwick	September 2014
Fall 2010 AGNES meeting at University of Connecticut	September 2010
Co-founder of the biannual series <i>AGNES - Algebraic Geometry Northeastern Series</i>	2008–
<i>Western algebraic geometry seminar</i> (WAGS), University of Utah	November 2008

PUBLICATIONS

With H. Chen, Q. Jiang. *Brill-Noether theory of Hilbert schemes of points on surfaces*. arXiv:2304.12016, 13 pp. Accepted for publication in **IMRN**.

With A. Perry. *Kuznetsov's Fano threefold conjecture via K3 categories and enhanced group actions*. **J. Reine Angew. Math. (Crelle)**, 47 pp, 2023. arXiv:2202.04195, .

With E. Macrì. *The unreasonable effectiveness of wall-crossing in algebraic geometry*. arXiv:2201.03654, 24 pp. To appear in **Proceedings of the ICM 2022**.

With S. Beentjes, S. Feyzbakhsh, G. Hein, D. Martinelli, F. Rezaee, B. Schmidt. *The desingularization of the theta divisor of a cubic threefold as a moduli space*. arXiv:2011.12240, 26 pp. To appear in **Geometry & Topology**.

With M. Lahoz, E. Macrì, H. Nuer, A. Perry, P. Stellari. *Stability conditions in families*. **Publications IHES**, 169 pp, 2021. arXiv:1902.08184.

Complement of spherical objects on K3 surfaces. Appendix to “On entropy of spherical twists” by Genki Ouchi, **Proceedings AMS**, 2020. arXiv:1705.01001.

With C. Li. *Brill-Noether theory for curves on generic abelian surfaces*. **Pure Appl. Math. Q.** (Special Issue in Honor of Yuri Manin), 28 pp, 2017. arXiv:1704.03546.

With M. Lahoz, E. Macrì, P. Stellari. *Stability conditions on Kuznetsov components*. **Annales Scientifiques de l'ENS**, 54 pp, 2023. arXiv:1703.10839.

A short proof of the deformation property of Bridgeland stability conditions. **Math. Annalen**, 17 pp, 2019. arXiv:16060.02169.

Wall-crossing implies Brill-Noether. Applications of stability conditions on surfaces. Proceedings of the AMS Summer Institute on Algebraic Geometry, Salt Lake City 2015 (*Proc. Sympos. Pure Math.*, AMS), 25 pp, 2018. arXiv:1604.08261.

With A. Craw and Z. Zhang. *Nef divisors for moduli spaces of complexes with compact support*. **Selecta Mathematica**, 55 pp, 2017. arXiv:1602.00863.

With E. Macrì, P. Stellari. *The space of stability conditions on abelian threefolds, and on some Calabi-Yau threefolds*. **Inventiones mathematicae**, 65 pp, 2016. arXiv:1410.1585.

With Tom Bridgeland. *Derived automorphism groups of K3 surfaces of Picard rank 1*. **Duke Mathematical Journal**, 50 pp, 2017. arXiv:1310.8266.

With B. Hassett, Y. Tschinkel. *Mori cones of holomorphic symplectic varieties of K3 type*. **Annales Scientifiques de l'ENS**, 10 pp, 2015. arXiv:1307.2291.

With E. Macrì. *MMP for moduli of sheaves on K3s via wall-crossing: nef and movable cones, Lagrangian fibrations*. **Inventiones mathematicae**, 86 pp, 2014. arXiv:1301.6968.

With E. Macrì. *Projectivity and birational geometry of Bridgeland moduli spaces*. **Journal of the AMS**, 46 pp, 2014. arXiv:1203.4613.

With A. Bertram, E. Macrì, Y. Toda. *Bridgeland stability conditions on threefolds II: An application to Fujita's conjecture*. **Journal of Algebraic Geometry**, 18 pp, 2014. arXiv:1106.3430.

With E. Macrì, Y. Toda. *Bridgeland stability conditions on threefolds I: Bogomolov-Gieseker type inequalities*. **Journal of Algebraic Geometry**, 47 pp, 2014. arXiv:1103.5010.

With E. Macrì. *The space of stability conditions on the local projective plane*. **Duke Mathematical Journal**, 60 pp, 2011. arXiv:0912.0043.

Polynomial Bridgeland stability conditions and the large volume limit. **Geometry & Topology** 37 pp, 2009. arXiv:0712.1083.

With C. Cadman. *Quantum Cohomology of $[\mathbb{C}^N/\mu_r]$* . **Compositio Mathematica**, 32 pp, 2010. arXiv:0705.2158.

With Yuri I. Manin. *Stability Conditions, Wall-crossing and weighted Gromov-Witten Invariants*, 2006. **Moscow Mathematical Journal**, 9 (2009), 1. arXiv:math.AG/0607580.

Semisimple quantum cohomology and blowups. **IMRN**, 14 pp, 2004. arXiv:math.AG/0403260.

With Yuri I. Manin. *(Semi)simple exercises in quantum cohomology*. In **The Fano Conference**, 31 pp. Univ. Torino, Turin, 2004. arXiv:math.AG/0103164.

EXPOSITORY WRITING

Reading, and Writing, Referee Reports. **AMS Notices**, March 2019, “Early Career” section.

Transforming Modern Algebraic Geometry. Notes on the 2017 Shaw prize awarded to János Kollár and Claire Voisin. **Mathematics Today**, Institute of Mathematics & its applications, August 2017.

A tour to stability conditions. Available on my homepage <http://www.maths.ed.ac.uk/~abayer/>.