

Arend Bayer

University Address

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Citizenship

German

Research interests

Stability conditions in derived categories
Enumerative invariants in derived categories
Gromov-Witten invariants of stacks, Frobenius manifolds

Education

- 2006 Received Ph.D. from the *University of Bonn, Germany*
Thesis on “Semisimple quantum cohomology, deformations of stability conditions and the derived category”
- 2004–2006 *Max-Planck-Institut für Mathematik, Bonn, Germany*
Graduate studies under supervision of Yuri I. Manin
- 2000–2003 Student at *University of Bonn, Germany*
Diploma thesis “Semisimple Quantum Cohomology and Frobenius manifolds”,
written under the supervision of Yuri I. Manin
- 1998–1999 *University of Cambridge, England*
Certificate of Advanced Study in Mathematics (“Part III”), with distinction
Essay on “Mirror symmetry for the elliptic curve”,
written under supervision of Alessio Corti
- 1997–1998 Student at *University of Heidelberg, Germany*, Vordiplom
- 1996–1997 Alternative national service in Sindelfingen, Germany
- 1996 Abitur in Sindelfingen, Germany

Employment

- Since Fall 2009 Assistant Professor (Tenure Track) at University of Connecticut
- Spring 2009 Postdoctoral fellowship at the MSRI, Berkeley
- 2006–2008 Post-Doc at the University of Utah
- 2004–2006 PhD position at the Max-Planck-Institut, Bonn, Germany
- 2001–2002 Teaching assistant at Bonn university

Teaching experience

- Spring 2010 Applied Linear Algebra (2210Q) and Algebraic Geometry 2 (5031)
- Fall 2009 Multivariable Calculus (2110Q) and Probability (3160Q)
- 2006–2008 Instructor at University of Utah for:
 - Calculus 2 (Fall 2006), Calculus 1 (Spring 2007, 2 sections),
 - Real Analysis (First-year graduate course, Fall 2007)
 - Quantitative Analysis (“Business Calculus”, Spring 2008, 2 sections)
 - Topics in Algebraic geometry (Fall 2008)
- 2002–2004 Weekly tutoring at a school for mathematics tutoring of high school students
- 2001–2002 Teaching assistant for “Lineare Algebra 1, 2”, “Analysis 3” at Bonn university
- 1997–2006 Coach for the German team at the International Mathematical Olympiad

Publications

- Arend Bayer and Emanuele Macrì. The space of stability conditions on the local \mathbb{P}^2 . arXiv:0912.
- Arend Bayer. Polynomial Bridgeland stability conditions and the large volume limit. *Geom. Topol.* 13 (2009), 4:2389–2425. arXiv:0712.1083.
- Arend Bayer and Charles Cadman. Quantum cohomology of $[\mathbb{C}^N/\mu_r]$, 2007. To appear in *Compositio Math.* arXiv:0705.2158.
- Arend Bayer and Yuri I. Manin. Stability Conditions, Wall-crossing and weighted Gromov-Witten Invariants, 2006. *Mosc. Math. J.*, 9 (2009), 1. arXiv:math.AG/0607580.
- Arend Bayer. Semisimple quantum cohomology and blowups. *Int. Math. Res. Not.*, (40):2069–2083, 2004. math.AG/0403260.
- Arend Bayer and Yuri I. Manin. (Semi)simple exercises in quantum cohomology. In *The Fano Conference*, pages 143–173. Univ. Torino, Turin, 2004. math.AG/0103164.

Awards

- PI of Personal NSF grant “Wall-Crossing for Moduli Spaces of Bridgeland-Stable Objects, Birational Geometry and Gromov-Witten Theory” (DMS 0801356), 7/2008–6/2011

PI of Conference NSF grant “SM: Collaborative Proposal. AGNES - Algebraic Geometry Northeastern Series” (DMS 0963782)

Lecture series at summer schools

Summer School on Mathematical String Theory 2010, Virginia Tech, June/July 2010: Lecture series on stability conditions for derived categories.

Rencontres mathématiques de Glanon, June/July 2008, Glanon (France): Lecture series on derived categories and stability conditions

VIGRE Mini-Course on Derived Categories, University of Utah, June 2007: Three-part lecture series on “Bridgeland stability conditions”

Invited talks

Categorical Methods in Geometry and Gauge Theory (CMGGT), Chern Institute, Tianjin, China, August 2010: “PT/DT-correspondence for orbifolds”

Vector Bundles on Algebraic Curves (VBAC), Lisbon, June 2010: “PT/DT-correspondence for orbifolds”

Math-Physics seminar at University of Pennsylvania, March 2010: “Stability conditions for the local projective plane”

Algebraic Geometry seminar at University of Utah, March 2010: “Stability conditions for the local projective plane”

Algebraic Geometry seminar at Colorado State University, Colorado, March 2010: “Stability conditions for the local projective plane”

Algebraic Geometry seminar at Princeton University, February 2010: “Stability conditions for the local projective plane”

Moduli spaces in algebraic geometry, Mathematisches Forschungsinstitut Oberwolfach, January 2010: “Stability conditions for the local projective plane”

Working group on Wall-crossing at UBC, Vancouver, Canada, November 2009: “Using Joyce’s Lie algebra morphism”

Algebraic Geometry seminar at UBC, Vancouver, Canada, November 2009: “Stability conditions for the local projective plane”

Algebraic Geometry seminar at the Hongkong University of Science and Technology, June 2009: Two talks on “Introduction to Bridgeland stability conditions, and the local \mathbb{P}^2 ” and “Wall-crossing for stability conditions and generalized Donaldson-Thomas invariants”

Algebraic geometry Northeastern Series (AGNES), workshop at Stony Brook, October 2009: “The space of stability conditions on the local \mathbb{P}^2 ”

- Algebraic geometry seminar at Caltech*, April 2009: “The space of stability conditions on the local \mathbb{P}^2 ”
- Algebraic geometry seminar at Duke University*, April 2009: “The space of stability conditions on the local \mathbb{P}^2 ”
- Postdoc-Seminar of the algebraic geometry program at MSRI*, January 2009: Two talks on “Introduction to Bridgeland stability conditions”
- WAGS (Western algebraic geometry seminar)*, Fall 2008 at *University of Utah*, “Stability conditions in the derived category and Donaldson-Thomas type invariants on Calabi-Yau threefolds”
- Oberseminar Darstellungstheorie at University of Bonn, Germany*, June 2008: “Polynomial stability conditions and Donaldson-Thomas invariants”
- Conference on Gromov-Witten theory and related topics at KIAS, Seoul, Korea*, June 2008: “Polynomial Bridgeland stability conditions and wall-crossing”
- Algebraic Geometry Seminar at University of Illinois, Urbana-Champaign*, April 2008: “Polynomial Bridgeland stability conditions and wall-crossing”
- Algebraic Geometry Seminar at Brown University*, March 2008: “Polynomial stability conditions”
- Algebraic Geometry Seminar at Princeton University*, February 2008: “Polynomial Bridgeland stability conditions and wall-crossing”
- CMS Winter Meeting, Section on Algebraic stacks*, London (Ontario), December 2007: “Quantum Cohomology of $[\mathbb{C}^N/\mu_r]$ ”
- Algebraic Geometry Seminar at University of British Columbia, Vancouver*, October 2007: “Polynomial Bridgeland stability conditions and the large volume limit”
- Working group on Donaldson-Thomas invariants at UBC, Vancouver, October 2007: “PT/DT-correspondence as a wall-crossing in polynomial stability conditions”
- AMS Summer Research Conference on *Derived Categories in Mathematics and Physics*, Snowbird, Utah, June 2007: “Large volume limit of Bridgeland stability conditions”
- Algebraic Geometry Seminar at University of Michigan, Ann Arbor*, March 2007: “ r -th root construction, weighted stable maps and orbifold quantum cohomology”
- Seminar Algebraische Geometrie at Freie Universität Berlin, Berlin (Germany)*, May 2006: “Semisimple Quantum Cohomology and Frobenius Manifolds”

Service

Co-Organizer of the Fall 2010 AGNES meeting at University of Connecticut, September 2010.

Member of the organizing committee of the new workshop series *AGNES - Algebraic Geometry Northeastern Series*, <http://www.agneshome.org/>.

Co-organizer of *Western algebraic geometry seminar (WAGS)*, Fall 2008 meeting, November 2008 at University of Utah.

Organizer of the Algebraic Geometry Seminar at the University of Utah in Fall 2007–Fall 2008.

Co-organizer of several meetings of the “Kleine Arbeitsgemeinschaft algebraische Geometrie und Zahlentheorie” (<http://www.math.uni-bonn.de/people/mad/ag/>): *Deformation theory and stacks*, 2001; *Degenerations of Hodge structures*, 2004; *Equivalences between derived categories of coherent sheaves*, 2004.

Refereeing

Honors

Fellow of the “German National Merit Foundation” (Studienstiftung des deutschen Volkes) 1997–2002

Stipend of the university exchange between Heidelberg and Cambridge (England) 1998–1999

Prizes at the International Mathematics Olympiad 1994–1996 (Gold, Silver, Gold) and the International Physics Olympiad 1995–1996 (Silver, Gold)

Recent Conferences

Classical algebraic geometry, Workshop at the Mathematisches Forschungsinstitut Oberwolfach, June 2010

VBAC 2010 (Vector bundles on algebraic curves): “New Invariants and Stability Conditions”, Lisbon, June 2010

Algebraic Geometry Northeastern Series (AGNES) conferences: Fall 2009 (Stony Brook), Spring 2010 (UMass Amherst, April 2010)

VBAC 2009 (Vector bundles on algebraic curves): “Derived Categories and the Langland’s Program”, Berlin, June 2009

Conferences and workshops at the special program in algebraic geometry at MSRI, Berkeley, January 2009–May 2009.

Conference on *Gromov-Witten theory and related topics* at KIAS, Seoul, Korea, June 2008.

Conference on *Aspects of Moduli*, Pisa, Italy, June 2008.

Workshop on “Recent Progress on the Moduli Space of Curves” at the Banff International Research Station (BIRS), March 2008.

CAMS Winter meeting, London (Ontario), December 2007.

Western algebraic geometry conference (WAGS): Fall 2006 (University of Utah), Spring 2007 (University of Washington), Fall 2007 (Colorado State University), Fall 2008 (University of Utah)

AMS Summer Research Conference “Derived Categories in Mathematics and Physics”, Snowbird, Utah, June 2007.

VIGRE Mini-Course on “Derived Categories”, University of Utah, June 2007.

Workshop on “D-bundles and Integrable Hierarchies”, University of Michigan, Ann Arbor, May 2007.

Joint MAA/AMS meeting, New Orleans, January 2007.

AMS Sectional, University of Utah, October 2006.

EMS Summer school “Arithmetic and geometry around quantization”, Istanbul, July 2006.