

CURRICULUM VITAE

Benjamin Bakker

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Contact Information

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Personal Information

Born March 5, 1985 in Massachusetts, USA
U.S. Citizen

Education

Princeton University, Princeton, New Jersey
Ph.D. in Mathematics, 2010
Thesis: *Hodge polynomials of moduli spaces of stable pairs on K3 surfaces*
Advisor: Rahul Pandharipande

Harvard University, Cambridge, Massachusetts
A.B. in Mathematics and Physics, 2005
Senior thesis: *Toric varieties and mirror symmetry*
Senior thesis advisor: Shing-Tung Yau

Academic Positions

2016–present Assistant Professor, University of Georgia
2014–2016 wiss. Mitarb., Humboldt-Universität zu Berlin
2011–2014 NSF Postdoctoral Fellow
2010–2013 Courant Instructor, Courant Institute NYU

Research Interests

Algebraic geometry, hodge theory, moduli of curves, abelian varieties, and symplectic varieties, relations to arithmetic geometry and model theory, derived categories.

Awards and Honors

2019 Felix Klein Lectures, Hausdorff Center of Mathematics
2019-2024 NSF CAREER Grant
2017–2020 NSF Individual Research Grant
2011–2014 National Science Foundation Postdoctoral Fellowship
2006 Clay Mathematics Institute Summer School grant
2004 Phi Beta Kappa (Harvard University)
2004–2005 John Harvard Scholarship (Harvard University)
2003 Derek Bok Certificate for Distinction in Teaching (Harvard University)
2002 Detur Book Prize (Harvard University)
2000 Massachusetts AP State Scholar

Papers

- The global moduli theory of symplectic varieties,
with C. Lehn, 48 pages, submitted.
- o-minimal GAGA and a conjecture of Griffiths,
with Y. Brunenbarbe and J. Tsimerman, 31 pages, submitted.
- Tame topology of arithmetic quotients and algebraicity of Hodge loci,
with B. Klingler and J. Tsimerman, 21 pages, submitted.
- A global Torelli theorem for singular symplectic varieties,
with C. Lehn, 42 pages, submitted.
- The Ax–Schanuel conjecture for variations of Hodge structures,
with J. Tsimerman, *Invent. Math.*, 217(1):77-94, 2019.
- The Mercat conjecture for stable rank 2 vector bundles on generic curves,
with G. Farkas, *Amer. J. Math.* 140(5):1277-1295, 2018.
- The geometric torsion conjecture for abelian varieties with real multiplication,
with J. Tsimerman, *J. Differential Geom.* 109(3):379-409, 2018.
- The Kodaira dimension of complex hyperbolic manifolds with cusps,
with J. Tsimerman, *Compos. Math.* 154(3):549-564, 2018.
- A classification of Lagrangian planes in holomorphic symplectic varieties,
J. Inst. Math. Jussieu 16(4):859-877, 2017.
- p -torsion monodromy representations of elliptic curves over geometric function fields,
with J. Tsimerman, *Ann. of Math.* 184(3):709-744, 2016.
- On the Frey–Mazur conjecture over low genus curves, with J. Tsimerman,
arXiv preprint.
- Lagrangian 4-planes in holomorphic symplectic varieties of $K3^{[4]}$ -type,
with A. Jorza, *Cent. Eur. J. Math.* 12(7):952-975, 2014.
- Higher rank stable pairs on K3 surfaces,
with A. Jorza, *Commun. Number Theory Phys.* 6(4):805-847, (2012).
- Hodge polynomials of moduli spaces of stable pairs on K3 surfaces,
Ph.D. thesis, Princeton University, 2010.

Other Publications

- Recent advances in functional transcendence
with J. Tsimerman, to appear as a CRM Short Course.

Invited Conference Talks and Lecture Series

- September 2019 AGNES, BC
- September 2019 Hodge theory and o-minimality, Freiburg Universität
- June 2019 Symposium on Symplectic Varieties and Moduli Spaces, ETH
- May 2019 Felix Klein Lectures, Bonn Universität
- April 2019 Moduli in Budapest, Rényi Institute of Mathematics
- April 2019 o-minimal geometry and Hodge theory, ETH
- March 2019 Midwest Algebraic Geometry Graduate Conference, UIC
- February 2019 Hodge theory and birational geometry, CIRM
- September 2018 Workshop on Moduli Spaces and Related Problems, Shanghai
- June 2018 AMS-CMS Joint Meetings, Fudan University, Shanghai
- May 2018 Shimura varieties and hyperbolicity of moduli spaces, UQAM, Montreal
- October 2017 WAGS, UCLA

Invited Conference Talks and Lecture Series (continued)

May 2017	Geometry and Topology of Ball Quotients and Related Topics, Hunter College
April 2017	Mini-school on abelian and symplectic varieties, UNC Chapel Hill
August 2016	Geometry at the ANU, ANU
January 2016	German-Israeli Workshop in Algebraic and Tropical Geometry, Bar-Ilan University
December 2015	North German Algebraic Geometry Seminar, Freie Universität
October 2015	Symposium on Symplectic Varieties and Moduli Spaces, Kyoto University
February 2015	Geometry and arithmetic of hyperkähler manifolds, Leibniz-Universität
February 2015	Motivic invariants related to K3 and abelian geometries, Humboldt-Universität
October 2014	Current developments in moduli theory, Northeastern University
August 2014	Recent Developments in Algebraic and Arithmetic Geometry, Rényi Institute
November 2013	Holomorphic Symplectic Varieties, BICMR, Peking University
September 2013	Arithmetic and Geometry of Rational Curves, Rice University
October 2012	Hyperkähler Geometry, Stony Brook University
June 2011	Holomorphic Symplectic Varieties, Courant Institute

Invited Seminar Talks

October 2019	Colloquium, Washington University
October 2019	Algebraic geometry seminar, Washington University
October 2019	Algebraic geometry seminar, Brown University
May 2019	Algebraic geometry seminar, Max Planck Institut
April 2019	Algebraic geometry seminar, Jussieu
March 2019	Algebraic geometry seminar, NYU
February 2019	Colloquium, Stony Brook University
February 2019	Algebraic geometry seminar, Stony Brook University
December 2018	Number theory seminar, University of Wisconsin
November 2018	Algebraic geometry seminar, Duke University
May 2018	Algebraic geometry seminar, Rutgers University
April 2018	Algebraic geometry seminar, Northwestern University
April 2018	Algebraic geometry seminar, UIC
February 2018	Algebraic geometry seminar, UC Davis
January 2018	Algebraic geometry seminar, Boston College
December 2017	Geometry seminar, Temple University
December 2017	Algebra seminar, University of Pennsylvania
October 2017	Algebraic geometry seminar, Princeton University
April 2017	Algebra seminar, University of Kentucky
March 2017	Algebraic geometry seminar, Columbia University
February 2017	Algebraic geometry seminar, UCSD
January 2017	Algebraic geometry seminar, Stanford University
November 2016	Algebraic geometry seminar, Stony Brook University
October 2016	Colloquium, University of South Carolina
October 2016	Algebra and number theory seminar, Emory University
June 2016	Algebraic geometry seminar, University of Edinburgh
March 2016	Algebraic and Tropical Geometry, Yale University
March 2016	Colloquium, University of Georgia
February 2016	Colloquium, Rice University
February 2016	Algebraic geometry seminar, University of Hong Kong
January 2016	Colloquium, University of Washington
January 2016	Colloquium, University of Notre Dame
January 2016	Colloquium, UC Irvine
December 2015	Colloquium, University of Pennsylvania
November 2015	SFB Kolloquium, Universität Mainz
September 2015	Algebraic geometry seminar, Northeastern University
September 2015	Algebraic geometry seminar, Courant Institute NYU
June 2015	Algebraic geometry seminar, Leibniz-Universität Hannover

Invited Seminar Talks (continued)

January 2015	Number theory seminar, University of Toronto
January 2014	Algebraic geometry seminar, Max Planck Institut
November 2014	Algebraic geometry seminar, Humboldt-Universität Berlin
November 2014	Algebraic geometry seminar, ETH
October 2014	Algebraic geometry seminar, Columbia University
September 2014	Lie groups seminar, Yale University
September 2014	Algebra seminar, University of Pennsylvania
April 2014	Algebraic geometry preprint seminar, Columbia University
January 2014	Algebraic geometry seminar, Leibniz-Universität Hannover
January 2014	Algebraic geometry seminar, Humboldt-Universität Berlin
January 2014	Algebraic geometry seminar, University of Chicago
December 2013	Algebraic geometry seminar, Courant Institute NYU
December 2013	Algebraic geometry seminar, University of Michigan
November 2013	Number theory seminar, UIC
November 2013	Algebraic geometry seminar, UIUC
November 2013	Algebraic geometry seminar, University of Notre Dame
October 2013	Algebra seminar, University of Pennsylvania
May 2013	Algebraic geometry seminar, Courant Institute
April 2012	Algebraic geometry seminar, UMASS
January 2012	Algebraic geometry seminar, UCSD
January 2012	Algebraic geometry seminar, Caltech
October 2011	Algebraic geometry seminar, Courant Institute NYU
October 2011	Algebraic geometry seminar, Harvard/MIT
November 2010	Algebraic geometry seminar, Courant Institute
October 2010	Graduate student seminar, Princeton University
September 2010	Algebraic geometry seminar, Columbia University
March 2010	Moduli seminar, Princeton University

Teaching Experience

2016–present	Assistant Professor, UGA
	Calculus II (Math 2260)
	Differential equations (Math 2700)
	(Counter)examples in char. p geometry (Math 8330)
	Commutative Algebra (Math 8020)
	Topics in Hodge theory research group (Math 8850)
	Differential equations (Math 2700)
	Abelian Varieties (Math 8330)
	Modern Algebra and Geometry I (Math 4000)
	Graduate Modern Algebra and Geometry I (Math 6000)
2014–2016	Organizer of the college seminar at Humboldt-Universität zu Berlin
	Nonarchimedean analytic geometry and rational points
	Literature seminar
	Faltings' Theorem
	Derived equivalence of abelian varieties
2010–2014	Instructor at Courant Institute, NYU
	Undergraduate reading course on Elementary Number Theory
	Graduate Algebraic Number Theory (MATH-GA 2210)
	Elementary Number Theory (MATH-UA 248)
	Graduate Algebra I (MATH-GA 2130)
	Graduate reading course on Complex Algebraic Curves
	Graduate Algebraic Topology II (Math-GA 2320)
	Calculus (V63.0121)
2007	Instructor at Princeton University
	Calculus (Math 103)

Teaching Experience (continued)

- 2005–2010 Teaching Assistant at Princeton University
Numbers, Equations, and Proofs (Math 214)
Advanced Multivariable Calculus (Math 203)
Analysis in Several Variables (Math 218)
Ordinary Differential Equations (Math 303)
Calculus (Math 104)
Multivariable Calculus (Math 201)
Linear Algebra (Math 202)
- 2002–2005 Course Assistant at Harvard University
Multivariable Calculus (Math 21a/b)
Multivariable Calculus (Math 21a/b)
Honors Multivariable Calculus and Linear Algebra (Math 25a)
Multivariable Calculus (Math 21a/b)

Academic Services

- 2016–present Co-organizer of Algebraic Geometry seminar, UGA
2016–present Co-organizer of Postdoc seminar, UGA
2017–present Committee member for Ph.D. general examinations, UGA
2017 Co-organizer of Georgia Algebraic Geometry Symposium (GAGS), UGA
2014–2016 Organizer of College Seminar for IRTG, Humboldt-Universität
2013 Undergraduate reading course on elementary number theory, Courant Institute
2012–2013 Committee member for Ph.D. general examinations, Courant Institute
Committee member for Ph.D. defense, Courant Institute
2011–2012 Co-organizer of Joint Columbia-CUNY-NYU Number Theory seminar, Courant Institute
2011 Graduate reading course on plane algebraic curves, Courant Institute
2009–present Referee for: *Algebra Number Theory—Ann. Sci. Éc. Norm. Supér.—Geom. Top.—IMRN*
Invent. Math.—J. Differential Geom.—J. Éc. Polytech. Math.—J. Lond. Math. Soc.
J. Reine Angew. Math.—Math. Ann.—Res. Math. Sci.
NSF panelist

PhD students

UGA: Benjamin Tighe.

Languages

Fluent: English
Reading: French, German, Classical Greek

References

- **Rahul Pandharipande** (doctoral advisor)
ETH Zürich
rahul@math.ethz.ch
- **Burt Totaro**
UCLA
totaro@math.ucla.edu
- **Daniel Huybrechts**
Bonn Universität
huybrech@math.uni-bonn.de
- **Samuel Grushevsky**
Stony Brook University
sam@math.stonybrook.edu
- **Paul Pollack** (teaching reference)
UGA
pollack@uga.edu