

ADA BORALEVI
CURRICULUM VITAE

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EDUCATION

- PhD, Università degli Studi di Firenze, July 2008.
Thesis in Algebraic Geometry
title: *Quiver representations and homogeneous vector bundles on flag manifolds*
Advisor: Prof. Giorgio Ottaviani.
- MA in Mathematics, University of California, Los Angeles (UCLA), June 2006.
- Degree in Mathematics, Università degli Studi di Firenze, September 2004.
Thesis in Algebraic Geometry
title: *The Horrocks-Mumford bundle and its restrictions to planes*
Supervisor: Prof. Giorgio Ottaviani.
- Semester attending the Diplôme d'Etudes Approfondies (DEA) "Méthodes Algébriques",
Université Paris VI, September 2003–February 2004

PRESENT POSITION

- September 2008-present: Visiting Assistant Professor, Texas A&M University (TAMU).

PUBLICATIONS

Refereed Journal Articles

- A. Boralevi and J. Buczyński, *Secants of Lagrangian Grassmannians*, to appear in *Annali di Matematica Pura ed Applicata*.
- A. Boralevi, *Sections of homogeneous vector bundles*, *Journal of Algebra* 323 (2010) 2301–2317.
- A. Boralevi and F. Prantil, *Effective results on Picard bundles via M -regularity*, *Le Matematiche* 43,1 (2008) 181–203.
- A. Boralevi, *The Horrocks-Mumford bundle restricted to planes*, *Collectanea Mathematica* 58,1 (2007) 101–117.

Refereed Proceedings

- A. Boralevi, *On simplicity and stability of tangent bundles of rational homogeneous varieties*, Proceedings of the 2008 Grenoble Summer School "Geometric Methods in Representation Theory", Séminaires et Congrès, Société Mathématique de France, 25 (2010), 273–295.

Manuscripts

- A. Boralevi, *A quiver version of the BGG resolution*, in preparation.
- A. Boralevi, *Moduli spaces of orthogonal bundles*, in preparation.
- A. Boralevi, C. Dionisi and D. Faenzi, *Vanishing theorems for twisted holomorphic forms*, in preparation.

RESEARCH INTERESTS

My research is in Algebraic Geometry and interactions with Representation Theory. I work on:

- (a) Holomorphic vector bundles over projective varieties. In particular, rank 2 vector bundles on \mathbb{P}^n , Hartshorne's conjecture. Stable bundles, semistable, prioritary. Monads, external algebras. Sizygies, minimal resolutions. Moduli spaces for prioritary bundles with fixed rank and Chern classes and relations with group actions. Connections with (b).
- (b) Homogeneous vector bundles over homogeneous varieties. Cohomology computations in the non-irreducible case and connections with quiver representations. Applications to (d) via Weyman's geometric method.
- (c) The BGG category \mathcal{O} , Verma modules and their relationship with differential operators between homogeneous vector bundles, the BGG resolution and its possible translation in the language of quiver representations, in connection with (b).
- (d) Secant varieties of homogeneous spaces, their equations and their dimension. Connections with the geometry of tensors and applications, mainly geometric approaches to questions arising in theoretical computer science, phylogenetics.

For further information, see my Research Statement available at <http://www.math.tamu.edu/~boralevi/>

INVITED TALKS TO CONFERENCES & RESEARCH SEMINARS

- *Secant varieties and the Waring problem & Secants of Lagrangian Grassmannians*, F.R.A.GME.N.T. Seminar, Colorado State at Fort Collins, Novembre 2010.
- *Homogeneous vector bundles and quivers*, Valley Geometry Seminar, UMass Amherst, October 2010.
- *Secants of Lagrangian Grassmannians*, Algebraic Geometry Seminar, TAMU, September 2010.
- *Secanti di Grassmanniane Lagrangiane*, Algebraic Geometry Seminar, Dipartimento "U.Dini", Florence, July 2010.
- *Coomologia di fibrati vettoriali omogenei e rappresentazioni di quivers*, Geometry Seminar, Università di Trieste, June 2009.
- *Quiver representations and the BGG resolution*, Algebraic Geometry Seminar, Dipartimento "U.Dini", Florence, June 2009.
- *Simplicity and stability of tangent bundles on rational homogeneous varieties*, Conference *GAeL XVII, Géométrie Algébrique en Liberté*, Leiden, June 2009.
- *Cohomology of homogeneous vector bundles via quiver representations*, GASC Seminar, Northeastern University, Boston, April 2009.
- *Simplicity and stability of tangent bundles on rational homogeneous varieties*, Algebraic Geometry Seminar, TAMU, March 2009.
- *Quivers and homogeneous vector bundles on flag manifolds*, Conference *Geometric Methods in Representation Theory*, Institut Fourier, Grenoble, June 2008.
- *Fibrati vettoriali omogenei su varietà di bandiera e rappresentazioni di quivers*, Conference *Giornate di Geometria Algebrica e argomenti correlati IX*, Levico Terme, May 2008.
- *Rappresentazioni di quivers e fibrati vettoriali omogenei*, Geometry Seminar, Dipartimento "U.Dini", Florence, May 2008.
- *Homogeneous vector bundles and quiver representations*, Conference *GAeL XVI, Géométrie Algébrique en Liberté*, Aranjuez, April 2008.
- *Rappresentazioni di quivers e fibrati vettoriali omogenei: il come, il dove ed il perchè di un'equivalenza di categorie*, Graduate Student Seminar *Colloquiando*, Dipartimento "U.Dini", Florence, March 2008.
- *Il fibrato di Horrocks-Mumford ristretto ai piani*, Algebraic Geometry Seminar, Dipartimento "U.Dini", Florence, October 2006.
- *Risoluzioni per le restrizioni del fibrato di Horrocks-Mumford ai piani*, Mini Conference *Progressi Recenti in Geometria Reale e Complessa*, Dipartimento "U.Dini", Florence, April 2005.

TEACHING

Instructor

- Calculus I - Math 151, TAMU, Fall 2009 & Spring 2010
 - A classic first calculus course for engineering majors (2 and 1 sections respectively).
- Linear Algebra - Math 304, TAMU, Spring 2009
 - A first abstract linear algebra course for engineering majors. with a view towards applications.
- Business Mathematics 1 - Math 141, TAMU, Fall 2008 & Fall 2010
 - A first mathematics course satisfying part of the mathematics/philosophy requirement in the core curriculum. Students form a very heterogeneous group with widely varying skills (2 sections each time).

Teaching Assistant

- Geometria per il CdL Ingegneria Meccanica, Università degli Studi di Firenze, Winter 2006
- Calculus of Several Variables - Math 32a, UCLA, Spring 2006
- Introduction to Topology - Math 121, UCLA, Spring 2006

For further information, see my Teaching Statement available at <http://www.math.tamu.edu/~boralevi/>

SCHOLARSHIPS, CERTIFICATES, GRANTS

- University of Florence PhD Scholarship, January 2005–January 2008.
- Selected to participate and receive fundings to the joint program Firenze-UCLA organized by UCLA and Università degli Studi di Firenze for Graduate Study at the UCLA Mathematics Department, August 2005–June 2006.
- Erasmus Scholarship from the Università degli Studi di Firenze to attend a semester of graduate courses at the DEA Méthodes Algébriques, Université Paris VI, September 2003–February 2004.
- 2007-2008: part of the research project PRIN (Progetti di rilevante interesse nazionale) titled “Proprietà geometriche delle varietà reali e complesse”, Italian National Government Fundings. Director of the project Prof. Gentili.
- 2009-2010: part of the research project PRIN (Progetti di rilevante interesse nazionale) titled “Proprietà geometriche delle varietà reali e complesse”, Italian National Government Fundings. Director of the project Prof. Ancona.
- Certificate of Proficiency in English, University of Cambridge, UK, December 1998.

SERVICE

Professional

- Referee, Journal of Pure and Applied Algebra.
- Reviewer for the American Mathematical Society.

Departmental

- Co-organizer of Algebraic Geometry Seminar, Dipartimento “U.Dini”, Università degli Studi di Firenze (January 2005–June 2008).
- Co-organizer of Graduate Student Seminar *Colloquiando*, Dipartimento “U.Dini”, Università degli Studi di Firenze (March–June 2008).

PROFESSIONAL SOCIETIES

- Unione Matematica Italiana
- Gruppo Nazionale per le Strutture Algebriche, Geometriche e le loro Applicazioni (Istituto Nazionale di Alta Matematica)
- American Mathematical Society

PERSONAL INFORMATION

- **Citizenship:** Italian (Born: Florence, Italy)
- **Date of birth:** September 17th, 1981
- **Languages:** Italian (native speaker), English (excellent), French (excellent), German (elementary), Spanish (elementary)
- **Computer skills:** Maple, Macaulay2, LiE

CONFERENCES & SCHOOLS ATTENDED

I have constantly tried to supplement my education by attending numerous Schools and Conferences:

- *IMPANGA Summer school on Algebraic Geometry 2010*, Institute of Mathematics of the Polish Academy of Sciences, Bedlewo, Poland, July 2010.
- *Complex Algebraic Geometry*, Conference, Institut Henri Poincaré, Paris, France, June 2010.
- *Geometry of tensors and applications*, School (Prof. Landsberg, Prof. Ottaviani and Prof. Weyman), Nordfjordeid, Norway, June 2010.
- *Texas Algebraic Geometry Seminar TAGS 2010*, University of Texas at Austin, TX, May 2010.
- *Western Algebraic Geometry Seminar WAGS Fall 2009*, UCLA, CA, October 2009.
- *Degenerations, Projective Varieties and Interpolation Theory*, SMI School (Prof. Ciliberto and Prof. Miranda), Cortona, Italy, July 2009.
- *VBAC 2009, Vector Bundles on Algebraic Curves*, Conference, Berlin, Germany, June 2009.
- *GAeL XVII, Géométrie Algébrique en Liberté*, School (Prof. Farkas, Prof. Müller-Stach and Prof. Sottile), Leiden, Netherlands, June 2009.
- *Texas Algebraic Geometry Seminar TAGS 2009*, Texas A&M University, TX, May 2009.
- *41st Texas Geometry and Topology Conference*, University of Houston, TX, February 2009.
- *Classical Algebraic Geometry Today*, Workshop, MSRI, Berkeley, CA, January 2009.
- *40th Texas Geometry and Topology Conference*, University of Texas at Austin, TX, October 2008.
- *Geometry and Representation Theory of Tensors for Computer Science, Statistics, and other areas*, Workshop, AIM, Palo Alto, CA, July 2008.
- *Geometry and Representation Theory of Tensors for Computer Science, Statistics, and other areas*, School (Dr. Landsberg, Dr. Lim and Dr. Morton), MSRI, Berkeley, CA, July 2008.
- *Aspects of Moduli*, Conference, Centro De Giorgi, Pisa, Italy, June 2008.
- *GAeL XVI, Géométrie Algébrique en Liberté*, School (Prof. Demailly, Prof. Huybrechts and Prof. Vistoli), Aranjuez, Spain, April 2008.
- *Geometry of Special Varieties*, School and Workshop (Prof. Ciliberto and Prof. Russo), Trento, Italy, September 2007.
- *P.R.A.G.M.A.T.I.C. 2007, Fourier-Mukai transforms, generic vanishing and regularity*, School (Prof. Pareschi and Prof. Popa), Catania, Italy, July 2007.
- *Algebraic Geometry in Higher Dimensions*, Conference, Levico Terme, Italy, June 2007.
- *Interactions with Algebraic Geometry*, Conference, Firenze, Italy, May 2007.
- *Geometria proiettiva e birazionale delle varietà algebriche*, School (Prof. Ionescu, Prof. Mella and Prof. Ottaviani), Gargnano, Italy, April 2007.
- *Vector Bundles and Low Codimensional Subvarieties*, School and Workshop (Prof. Ellia and Prof. Miró-Roig), Trento, Italy, September 2006.
- *AGaFe 2005, Geometry of Algebraic Varieties*, Conference, Ferrara, Italy, June 2005.
- *Algebraic Geometry and Categories*, Conference in honour of Prof. A. Hirschowitz, Nice, France, June 2005.
- *Journées de Géométrie Algébrique*, Conference, Lille, France, May 2005.