

Giulio Caviglia

- Research Interests** Commutative algebra and its interactions with combinatorics, computational algebra and algebraic geometry. Recent work involves Koszul Algebras, Castelnuovo-Mumford regularity, matroid theory, properties of initial ideals, gröbner bases, syzygies, Hilbert functions and Hilbert schemes.
- Education** UNIVERSITY OF KANSAS, Lawrence, KS, 2000-2004.
Ph.D. in Mathematics, August 2004.
Dissertation: *Koszul algebras, Castelnuovo-Mumford regularity and generic initial ideals*.
Advisor: Craig Huneke.
- UNIVERSITY OF GENOA, Genoa, Italy, 1995-2000.
Laurea *Summa cum Laude* in Mathematics, April 2000.
Thesis: *On a class of Gorenstein algebras that are Koszul* (in Italian).
Undergraduate advisors: Giuseppe Valla and Aldo Conca.
- Appointments** PURDUE UNIVERSITY, WEST LAFAYETTE, IN, 2007 - present.
Assistant Professor.
- UNIVERSITY OF CALIFORNIA, BERKELEY, CA, 2005-07.
Charles B. Morrey, Jr. Assistant Professor.
- MATHEMATICAL SCIENCES RESEARCH INSTITUTE (MSRI), Berkeley, CA, 2004-2005.
Postdoctoral Fellow.
- Membership** MATHEMATICAL SCIENCES RESEARCH INSTITUTE (MSRI), Berkeley, general membership for the Commutative Algebra program, Fall 2012.
- Awards** Simons Collaboration Grants for Mathematicians (2011-2016). *Syzygies and Hilbert functions* (35000\$)
Purdue PRF Summer Grant (2010).
US Junior Oberwolfach Fellow (April 14- April 25 2009) (sponsored by NSF).
PRF research grant 2009/2010 Melissa Lindsey (Ph.D Purdue 2011).
Graduate Dissertation Fellowship, University of Kansas, 2003-2004
U.G. Mitchell Graduate Scholarship, Mathematics, University of Kansas, 2001, 2002, 2003, 2004.
The John Bunce Memorial Award, Department of Mathematics, University of Kansas, fall 2003.
Fellowship from the *Istituto Nazionale di Alta Matematica*, “Francesco Severi” Rome, 2000-2003.
- Refereed Publications** *Characteristic-free bounds for the Castelnuovo-Mumford regularity* (with E. Sbarra), *Compositio Math.* **141** (2005), 1365–1373.
- A Theorem of Eakin and Sathaye and Green’s Hyperplane Restriction Theorem*, *Commutative algebra*, 1–5, *Lect. Notes Pure Appl. Math.* **244**, Chapman & Hall/CRC, Boca Raton, FL, 2006.
- Bounds on the Castelnuovo-Mumford regularity of tensor products*, *Proc. Amer. Math. Soc.* **135** (2007), 1949–1957.
- Some cases of the Eisenbud-Green-Harris conjecture* (with D. Maclagan), *Math. Res. Lett.* **15** (2008), no. 3, 427–433.

Some ideals with large projective dimension (with M. Kummini), Proc. Amer. Math. Soc. **136** (2008), no. 2, 505–509.

The pinched Veronese is Koszul, J. Algebraic Combin. **series 30** (2009), no. 4, 539–548.

Poset embeddings of Hilbert functions (with M. Kummini), to appear on Math. Z.

Koszul property of projections of the Veronese cubic surface (with A. Conca) to appear on Adv. in Math.

Work in progress and preprints *Sharp Upper Bounds of the Betti numbers for a given Hilbert polynomial* (with S. Murai), sub. to Algebra and Number Theory (October 2010).

A general hyperplane restriction theorem and applications to reductions of ideals, sub. to J. of Algebra (August 2012) .

A Lex Plus Power Theorem for Local Cohomology modules (with E. Sbarra), sub. to Adv. in Math. (Aug 2012).

Generic initial ideals with respect to weights (with E. Sbarra), sub. to J. of Commutative Algebra (volume in honor of Jürgen Herzog) (Aug 2012).

Zero-Generic initial ideals (with E. Sbarra), sub. to Adv. Applied Math. (Aug 2012).

Embedding of Hilbert functions and Betti numbers (with M. Kummini), preprint.

A class of Gorenstein algebras that are Koszul, preprint.

On Hilbert functions of general intersection of ideals (with S. Murai), preprint.

Length Embeddings and upper bounds for total Betti numbers (with M. Lindsey), preprint.

Some cases of the Lex-Plus-Power conjecture, in preparation.

Extremal Betti numbers and sparse filter regular sequences, in preparation.

Invited Lectures Series of 5 lectures on Generic Initial Ideals at the *School on Local Rings and Local Study of Algebraic Varieties* Trieste ICTP (Italy), May 24 - May 28, 2010.

Selected Invited Talks *Commutative Algebra and its interaction with Algebraic Geometry*, CIRM, Luminy (France), July 8-12 2013.

Representation Theory, Homological Algebra, and Free Resolutions, MSRI, Berkeley, February 11-17 2013.

MSRI Colloquium, Berkeley, Oct 18, 2012.

Commutative Algebra Seminar U.C. Berkeley, October 9, 2012.

Joint seminar: Algebra and Linguistics University of Genoa (Italy), July 9, 2012.

Algebra seminar, University of Pisa, (Italy), June 19, 2012.

Conference on Commutative Algebra and related topics, University Genoa (Italy), June 08-09 2012.

Mathematisches Institut colloquium, Universität Basel, Basel (Switzerland), May 31, 2012.

AMS Sectional Meeting, Univ. of Kansas, March 30 - April 1, 2012.

CMS Winter Meeting, Toronto, Ontario (Canada), December 9-12, 2011.

Route 81 conference, Cornell, September 24, 2011.

Midwest Commutative Algebra and Geometry Conference, Purdue, May 22 -26, 2011.

Commutative Algebra and its Interaction with Algebraic Geometry, CIRM (Centre International de Rencontres Mathématiques), Luminy (France), November 2010.

Workshop on *Local Rings and Local Study of Algebraic Varieties* Trieste ICTP (Italy), June 4 - June 11, 2010.

National Meeting of Modern Algebra, Rome (Italy), May 24-28, 2010.

Workshop on *Kommutative Algebra* at Mathematisches Forschungsinstitut Oberwolfach (Germany), April 2009.

A Macaulay 2 Conference, Cornell University, March 16-19, 2008.

Commutative algebra and its interaction with algebraic geometry, CIRM, Luminy (France), October 2008

Hilbert functions and syzygies in commutative algebra and combinatorics, a conference in honor of Juergen Herzog on the occasion of his 65th birthday, Cortona (Italy), September 2007.

Workshop on *Syzygies and Hilbert Functions* at the Banff International Research Station (Canada), October 2006.

Commutative Algebra and its Interaction with Algebraic Geometry, CIRM (Centre International de Rencontres Mathematiques), Luminy (France), May 2006.

Special Session on *Combinatorial Algebraic Geometry*, at the 2006 Spring Central Sectional Meeting of the AMS, University of Notre Dame, April 2006.

Special Session on *Syzygies in Commutative Algebra and Geometry* at the 2006 Joint Mathematics Meetings, San Antonio, January 2006.

Midwest Algebra, Geometry and their Interactions Conference (MAGIC05), University of Notre Dame, October 2005.

Workshop on *Kommutative Algebra* at Mathematisches Forschungsinstitut Oberwolfach (Germany), April 2005.

Workshop on Resolutions (part of the Route 81 Conference on Commutative Algebra and Algebraic Geometry), Cornell University, October 2004.

School on *Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics*, Trieste, (Italy), June 2004.

Giornate di Geometria Algebrica ed argomenti correlati VII (Conference for young Italian algebraic geometers), Rimini, (Italy), May 2004.

Lisbon Conference on *Commutative Algebra*, Lisbon, (Portugal), June 2003.

Algèbre commutative et ses interactions avec la géométrie algébrique, CIRM (Centre International de Rencontres Mathematiques) Luminy (France), June 2003.

Ph.D. students Gabriel Sosa (current)
Melissa Lindsey (2011)

Other Professional Activities Referee for *Journal of Algebra*, *Proceeding of the AMS*, *Communications in Algebra*, *Compositio Mathematica*, *Journal of Commutative Algebra*, *Proceedings of the Abel Symposium*, *Mathematical Research Letters*.
Member of the Unione Matematica Italiana.

Individuals familiar with my research David Eisenbud (U.C. Berkeley), Craig Huneke (U. of Virginia), Michael Stillman (Cornell U.), Irena Peeva (Cornell U.), Aldo Conca (U. of Genova), Jürgen Herzog (U. of Essen).