

SEBASTIAN CASALAINA-MARTIN

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APPOINTMENTS

University of Colorado

Associate Professor, 2015–present.
Assistant Professor, 2008–15.

Mathematical Sciences Research Institute (Berkeley)

Postdoctoral Fellow, Spring 2009.

Harvard University

NSF Postdoctoral Research Fellowship, 2005–2008.

Stony Brook University

Simons Instructor, 2004–2007.

EDUCATION

Columbia University

Ph.D., Mathematics, 2004. Advisor: Robert Friedman.
M.Phil., Mathematics, 2004.
M.A., Mathematics, 2000.

Brown University

B.Sc., Mathematics, *Honors*, 1998.

GRANTS AND AWARDS

- (Accepted for funding) PI on **NSA** Grant Proposal 141008, 2016–2018.
- **Simons Foundation** Collaboration Grant for Mathematicians #317572, 2014–2019.
- PI on **NSF** Grant DMS-1101333, 2011–14.
- **NSF** Postdoctoral Research Fellowship DMS-0503228, 2005–2008.

- Co-PI on **NSF** Seminar Grant DMS-1502166, 2015.
- Co-PI on **NSF** Seminar Grant DMS-0955038, 2010–15.
- Co-PI on **NSF** Seminar Grant DMS-0951907, 2009.

RESEARCH

I am an algebraic geometer with a broad range of interests. My research focuses on curves, abelian varieties, cubic threefolds, vector bundles and moduli spaces.

PUBLICATIONS

All publications are available online at <http://math.colorado.edu/~casa>

1. S. Casalaina-Martin, S. Grushevsky, K. Hulek and R. Laza, *Complete moduli of cubic threefolds and their intermediate Jacobians*, preprint.
2. S. Casalaina-Martin and J. Wise, *An introduction to moduli stacks, with a view towards Higgs bundles on algebraic curves*, preprint.
3. J. Achter, S. Casalaina-Martin and C. Vial, *On descending cohomology geometrically*, preprint.
4. S. Casalaina-Martin, J. Kass and F. Viviani, *The singularities and birational geometry of the universal compactified Jacobian*, preprint.
5. S. Casalaina-Martin, S. Grushevsky, K. Hulek and R. Laza, *Extending the Prym map to toroidal compactifications of the moduli space of abelian varieties*, to appear in J. Eur. Math. Soc.
6. S. Casalaina-Martin, *A tour of stable reduction with applications*, A celebration of algebraic geometry, 65–117, Clay Math. Proc., **18**, Amer. Math. Soc., Providence, RI, 2013.
7. S. Casalaina-Martin, D. Jensen and R. Laza, *Log canonical models and variation of GIT for genus four canonical curves*, J. Algebraic Geom. **23** (2014), no. 4, 727–764.
8. S. Casalaina-Martin, D. Jensen and R. Laza, *The geometry of the ball quotient model of the moduli space of genus four curves*, Compact Moduli Spaces and Vector Bundles, 107–136, Contemp. Math. **564**, Amer. Math. Soc., Providence, RI, 2012.
9. S. Casalaina-Martin, J. Kass and F. Viviani, *The local structure of compactified Jacobians*, Proc. Lond. Math. Soc. (3) **110** (2015), no. 2, 510–542
10. S. Casalaina-Martin, J. Kass and F. Viviani, *The geometry and combinatorics of cographic toric face rings*, Algebra and Number Theory **7** (2013), no. 8, 1781–1815.
11. S. Casalaina-Martin and R. Laza, *Simultaneous semi-stable reduction for curves with ADE singularities*, Trans. Amer. Math. Soc. **365** (2013), no. 5, 2271–2295.
12. S. Casalaina-Martin and J. Kass, *A Riemann singularity theorem for integral curves*, Amer. J. Math., **134** (2012), no. 5, 1143–1165.
13. S. Casalaina-Martin, M. Lahoz and F. Viviani, *Cohomological support loci for Abel-Prym curves*, Matematiche (Catania) **63** (2008), no. 1, 205–222.
14. S. Casalaina-Martin and R. Laza, *The moduli space of cubic threefolds via degenerations of the intermediate Jacobian*, J. Reine Angew. Math. **633** (2009), 29–65.
15. S. Casalaina-Martin, *Singularities of theta divisors in algebraic geometry*, Curves and abelian varieties, 25–43, Contemp. Math. **465**, Amer. Math. Soc., Providence, RI, 2008.

16. S. Casalaina-Martin and M. Teixidor i Bigas, *Singularities of Brill-Noether loci for vector bundles on curves*, Math. Nach. **284** (2011), no. 14-15, 1846–1871.
17. S. Casalaina-Martin, T. Gwena, and M. Teixidor i Bigas, *Some examples of vector bundles in the base locus of the generalized theta divisor*, C. R. Math. Acad. Sci. Paris **347** (2009), no. 3-4, 173–176.
18. S. Casalaina-Martin, *Cubic threefolds and abelian varieties of dimension five. II*, Math. Z. **260** (2008), no. 1, 115–125.
19. S. Casalaina-Martin, *Singularities of the Prym theta divisor*, Ann. of Math. **170** (2009), no. 1, 163–204.
20. S. Casalaina-Martin and R. Friedman, *Cubic threefolds and abelian varieties of dimension five*, J. Algebraic Geom. **14** (2005), no. 2, 295–326.

PRESENTATIONS

- University of Utah, *AMS Summer Institute in Algebraic Geometry*, July 2015.
- Stony Brook University, *New Techniques in Birational Geometry*, April 2015.
- Institute for Advanced Study (IAS), Princeton, *Topology of Algebraic Varieties*, January 2015.
- University of Utah, *Algebraic Geometry Seminar*, December 2014.
- National University of Singapore, Institute of Mathematical Sciences, *Workshop on the Geometry, Topology and Physics of Moduli Spaces of Higgs Bundles*, July 2014.
- Humboldt Universität zu Berlin, Germany, *Forschungsseminar Algebraische Geometrie*, June 2014.
- Università Roma Tre, Italy, *Seminari di Geometria*, June 2014.
- University of Northern Texas, *Colloquium*, March 2014.
- Stony Brook University, *Algebraic Geometry Seminar*, October 2013.
- Boston College, *Number Theory and Algebraic Geometry Seminar*, October 2013.
- POSTECH, Korea, *Conference on Moduli and Birational Geometry*, August 2013.
- San Diego, CA, *Singularities in Geometry and Algebra*, Special Session of the AMS joint meeting, January 2013.
- Mathematisches Forschungsinstitut Oberwolfach, Germany, *Komplexe Analysis*, September 2012,
- Busan, Korea, *Workshop on Moduli and Birational Geometry*, July 2012.
- University of Georgia, *Georgia Algebraic Geometry Symposium*, May 2012.
- University of Washington, *Algebraic Geometry Seminar*, March, 2012.

- National University of Singapore, *Topology and Geometry Seminar*, November 2011.
- Salt Lake City, Utah, *Algebraic Geometry*, Special Session of the AMS meeting, October 2011.
- Maresias, Brazil, *11th Meeting on Algebraic Geometry and Commutative Algebra*, October 2011.
- Colorado State University, *Rocky Mountain Algebraic Combinatorics Seminar*, September 2011.
- CUNY Graduate Center, *Commutative Algebra and Algebraic Geometry Seminar*, November 2010.
- University of Washington, *Colloquium*, October 2010.
- University of British Columbia–University of Washington, *Algebraic Geometry Seminar*, October 2010.
- KIAS, Korea, *Algebraic Geometry Seminar*, August 2010.
- POSTECH, Korea, *Workshop on Moduli and Birational Geometry*, August 2010.
- IMPA, Brazil, *10th Meeting on Algebraic Geometry and Commutative Algebra*, July 2010.
- Stony Brook University, *Seminar on Algebra, Geometry, and Physics*, May 2010.
- University of Colorado, *Great Plains Operator Theory Special Year One Day Conference*, November 2009.
- University of California at San Diego, *Algebraic Geometry Seminar*, October 2009.
- Columbia University, *Algebraic Geometry Seminar*, September 2009.
- California Polytechnic State University, *Colloquium*, May 2009.
- University of British Columbia, *Algebraic Geometry Seminar*, April 2009.
- University of Utah, *Western Algebraic Geometry Seminar*, November 2008.
- Colorado State University, *Algebra Seminar*, October 2008.
- University of Illinois at Chicago, *Algebraic Geometry Seminar*, October 2008.
- University of North Carolina, *Colloquium*, February 2008.
- Texas A&M University, *Colloquium*, February 2008.
- Stanford University, *Algebraic Geometry Seminar*, February 2008.
- University of California at Santa Cruz, *Colloquium*, January 2008.
- Rutgers University, *Colloquium*, January 2008.
- University of Toronto, *Colloquium*, January 2008.
- Harvard University, *Algebraic Geometry Seminar*, December 2007.

- CUNY, Lehman College, *Colloquium*, December 2007.
- University of California at Irvine, *Colloquium*, November 2007.
- University of Georgia, *Curves, abelian varieties, and their interactions; on the occasion of the 65th birthday of Roy Smith*, April 2007.
- University of Michigan, *Algebraic Geometry Seminar*, March 2007.
- Brown University, *Algebraic Geometry Seminar*, March 2007.
- Boston University, *Geometry Seminar*, April 2006.
- University of Chicago, *Algebraic Geometry Seminar*, December 2005.
- Harvard University, *Algebraic Geometry Seminar*, March 2005.
- Stony Brook University, *Algebraic Geometry Seminar*, September 2004.
- Salamanca, Spain, *III Iberoamerican conference on geometry*, June 2004.
- Columbia University, *Algebraic Geometry Seminar*, April 2004.

TEACHING

1. *Functions of a complex variable 1*, Fall 2015 (University of Colorado). A graduate course on complex analysis.
2. *Complex analysis*, Spring 2015 (University of Colorado). An undergraduate course on complex analysis.
3. *Euclidean and non-Euclidean geometry*, Spring 2015 (University of Colorado). An undergraduate introduction to Euclidean and non-Euclidean geometry.
4. *Commutative algebra*, Fall 2014 (University of Colorado). A graduate introduction to commutative algebra.
5. *Homological algebra*, Spring 2014 (University of Colorado). Graduate course in homological algebra.
6. *Euclidean and non-Euclidean geometry*, Spring 2014 (University of Colorado). An undergraduate introduction to Euclidean and non-Euclidean geometry.
7. *Analysis 1*, Fall 2013 (University of Colorado). An undergraduate introduction to real analysis.
8. *Introduction to linear algebra*, Spring 2013 (University of Colorado). An undergraduate introduction to linear algebra.
9. *Commutative algebra*, Fall 2012 (University of Colorado). A graduate introduction to commutative algebra.
10. *Analytic geometry and calculus 2*, Spring 2012 (University of Colorado). A second semester undergraduate calculus course. Lectured and served as course coordinator for 8 sections with over 200 students in total, 7 graduate student instructors, 1 instructor, 3 graduate student teaching assistants, and 2 undergraduate learning assistants.
11. *Abstract algebra 2*, Spring 2012 (University of Colorado), A second semester undergraduate course in algebra.

12. *Functions of a complex variable 2*, Spring 2011 (University of Colorado). A second semester graduate course in complex analysis.
13. *Abstract algebra 1*, Spring 2011 (University of Colorado). An undergraduate course on Groups, Rings and Fields.
14. *Algebraic geometry*, Spring 2010 (University of Colorado). A graduate introduction to algebraic geometry.
15. *Abstract algebra 1*, Fall 2009, (University of Colorado). An undergraduate course on Groups, Rings and Fields.
16. *Complex analysis*, Fall 2008 (University of Colorado). An undergraduate course on complex analysis.
17. *Abstract algebra 2*, Spring 2010 (University of Colorado), A second semester undergraduate course in algebra.
18. *Introduction to algebraic geometry II: algebraic surfaces*, Spring 2008 (Harvard). A graduate course focusing on the classification of complex algebraic surfaces.
19. *Theory of schemes II*, Spring 2008 (Harvard). The second semester of a one year graduate course focusing on the theory of schemes, sheaves, and sheaf cohomology.
20. *Introduction to curves and abelian varieties*, Fall 2006 (Harvard). A graduate course on algebraic curves and abelian varieties, focusing on the relation between a curve and its Jacobian.
21. *Calculus 1*, Spring 2005 (Stony Brook University). A first semester course in calculus. Served as course coordinator.
22. *Calculus 1*, Fall 2004 (Stony Brook University). A first semester course in calculus.
23. *Linear algebra*, Summer 2004 (Columbia). An undergraduate course in linear algebra.
24. *Calculus IA*, Spring 2003 (Columbia). First semester courses in calculus.
25. *College algebra and analytic geometry*, Fall 2002 (Columbia). A one-semester course of pre-calculus.
26. *College algebra and analytic geometry*, Summer 2002 (Columbia). A one-semester course of pre-calculus.
27. *Basic mathematics*, Spring 2002 (Columbia). A course in elementary mathematics as a preparation for pre-calculus.
28. *Calculus I*, Summer 2001 (Columbia). First semester courses in calculus.

Advising Graduate students (towards Ph.D.)

- Matthew Grimes (2011-present).
- Krisztian Havasi (2011-present).
- Josh Frinak (2014-present).

SERVICE

- Co-organizer of the Spring 2014 Western Algebraic Geometry Symposium (WAGS) at the University of Colorado.
- Co-organizer of the Front Range Algebra, Geometry and Number Theory Seminar (FRAGMENT), joint with CSU, Fall 2009-present.
- Co-organizer of the Western Algebraic Geometry Symposium (WAGS) held at CSU in Fall 2011.
- Long-term organizing for the Western Algebraic Geometry Symposium (WAGS), Fall 2009-present.
- Co-organizer of the special session on Algebraic Geometry at the AMS sectional meeting held at the University of Colorado, Spring 2013.
- Organizer of the University of Colorado Department of Mathematics Kempner Colloquium, Fall 2011–Spring 2015.
- Co-organizer of a working seminar on Stacks, Groupoids, and Deformation Theory at the University of Colorado, 2009-2012.
- Committee work (University of Colorado): preliminary and comprehensive exam committees, graduate committee, algebra committee, hiring committee. Thesis reader for students at the University of Colorado, Harvard and Tufts.
- Advising of graduate students (towards Ph.D.): Matthew Grimes (2011-present), Krisztian Havasi (2011-present). Josh Frinak (2015-present).
- NSF and NSA grant proposal evaluation.
- Refereed articles for journals including *Compositio Mathematica*, *Bulletin of the London Mathematics Society*, *Algebra and Number Theory*, *Monatshefte fuer Mathematik*, *IMRN*, *Contemporary Mathematics*, and *Communications in Algebra*.