

## References

- [1] Valery Alexeev and Michel Brion, *Stable reductive varieties. I. Affine varieties*, Invent. Math. **157** (2004), no. 2, 227–274.
- [2] Ayah Almousa, Juliette Bruce, Michael Loper, and Mahrud Sayrafi, *The virtual resolutions package for Macaulay2*, J. Softw. Algebra Geom. **10** (2020), no. 1, 51–60.
- [3] Marian Aprodu, Gavril Farkas, Ștefan Papadima, Claudiu Raicu, and Jerzy Weyman, *Koszul modules and Green’s conjecture*, Inventiones mathematicae (2019).
- [4] Dave Bayer and David Eisenbud, *Graph curves*, Adv. Math. **86** (1991), no. 1, 1–40. With an appendix by Sung Won Park.
- [5] Aaron Bertram, Lawrence Ein, and Robert Lazarsfeld, *Vanishing theorems, a theorem of Severi, and the equations defining projective varieties*, J. Amer. Math. Soc. **4** (1991), no. 3, 587–602.
- [6] Manjul Bhargava and Bjorn Poonen, *The local-global principle for integral points on stacky curves*, Journal of Algebraic Geometry (2022). to appear.
- [7] Anna Maria Bigatti, *Upper bounds for the Betti numbers of a given Hilbert function*, Comm. Algebra **21** (1993), no. 7, 2317–2334.
- [8] Anthony Bonato, Juliette Bruce, and Ron Buckmire, *Spaces for all: the rise of LGBTQ+ mathematics conferences*, Notices Amer. Math. Soc. **68** (2021), no. 6, 998–1003.
- [9] Madeline Brandt, Juliette Bruce, Melody Chan, Margarida Melo, Gwyneth Moreland, and Corey Wolfe, *On the top-weight rational cohomology of  $\mathcal{A}_g$* , Geometry & Topology (2022). to appear.
- [10] Madeline Brandt, Juliette Bruce, Taylor Brysiewicz, Robert Krone, and Elina Robeva, *The degree of  $\mathrm{SO}(n, \mathbb{C})$* , Combinatorial algebraic geometry, Fields Inst. Commun., vol. 80, Fields Inst. Res. Math. Sci., Toronto, ON, 2017, pp. 229–246.
- [11] Juliette Bruce and Daniel Erman, *A probabilistic approach to systems of parameters and Noether normalization*, Algebra Number Theory **13** (2019), no. 9, 2081–2102.
- [12] Juliette Bruce and Wanlin Li, *Effective bounds on the dimensions of Jacobians covering abelian varieties*, Proc. Amer. Math. Soc. **148** (2020), no. 2, 535–551.
- [13] Juliette Bruce, Daniel Erman, Steve Goldstein, and Jay Yang, *Conjectures and computations about Veronese syzygies*, Exp. Math. **29** (2020), no. 4, 398–413.
- [14] ———, *The Schur-Veronese package in Macaulay2*, J. Softw. Algebra Geom. **11** (2021), no. 1, 83–87.
- [15] Juliette Bruce, *Asymptotic syzygies in the setting of semi-ample growth* (2019). Pre-print: arxiv:1904.04944.
- [16] ———, *The quantitative behavior of asymptotic syzygies for Hirzebruch surfaces*, J. Commut. Algebra **14** (2022), no. 1, 19–26.
- [17] ———, *A word from... Juliette Bruce*, Inaugural President of Spectra, Notices Amer. Math. Soc. **69** (2022), no. 6, 898–899.
- [18] Juliette Bruce, Daniel Corey, Daniel Erman, Steve Goldstein, Robert P. Laudone, and Jay Yang, *Syzygies of  $\mathbb{P}^1 \times \mathbb{P}^1$ : data and conjectures*, J. Algebra **593** (2022), 589–621.
- [19] Juliette Bruce, Lauren Cranton Heller, and Mahrud Sayrafi, *Characterizing Multigraded Regularity on Products of Projective Spaces* (2021). Pre-print: arxiv:2110.10705.
- [20] ———, *Bounds on Multigraded Regularity* (2022). Pre-print: arxiv:2208.11115.
- [21] Alina Bucur and Kiran S. Kedlaya, *The probability that a complete intersection is smooth*, J. Théor. Nombres Bordeaux **24** (2012), no. 3, 541–556 (English, with English and French summaries).
- [22] Weronika Buczyńska and Jarosław Buczyński, *Apolarity, border rank, and multigraded Hilbert scheme*, Duke Math. J. **170** (2021), no. 16, 3659–3702.

- [23] Dustin A. Cartwright, Daniel Erman, Mauricio Velasco, and Bianca Viray, *Hilbert schemes of 8 points*, Algebra Number Theory **3** (2009), no. 7, 763–795.
- [24] Karen A. Chandler, *Regularity of the powers of an ideal*, Comm. Algebra **25** (1997), no. 12, 3773–3776.
- [25] Ted Chinburg, Laurent Moret-Bailly, Georgios Pappas, and Martin J. Taylor, *Finite morphisms to projective space and capacity theory*, J. Reine Angew. Math. **727** (2017), 69–84.
- [26] Alessandro Chiodo, David Eisenbud, Gavril Farkas, and Frank-Olaf Schreyer, *Syzygies of torsion bundles and the geometry of the level  $\ell$  modular variety over  $\overline{M}_g$* , Invent. Math. **194** (2013), no. 1, 73–118.
- [27] S. Dale Cutkosky, Jürgen Herzog, and Ngô Việt Trung, *Asymptotic behaviour of the Castelnuovo-Mumford regularity*, Compositio Mathematica **118** (1999), no. 3, 243–261.
- [28] Anand Deopurkar, *The canonical syzygy conjecture for ribbons*, Math. Z. **288** (2018), no. 3-4, 1157–1164.
- [29] Simon Donaldson and Song Sun, *Gromov-Hausdorff limits of Kähler manifolds and algebraic geometry, II*, J. Differential Geom. **107** (2017), no. 2, 327–371.
- [30] Theodosios Douvropoulos, Joachim Jelisiejew, Bernt Ivar Utstøl Nødland, and Zach Teitler, *The Hilbert scheme of 11 points in  $\mathbb{A}^3$  is irreducible*, Combinatorial algebraic geometry, Fields Inst. Commun., vol. 80, Fields Inst. Res. Math. Sci., Toronto, ON, 2017.
- [31] David Eisenbud and Shiro Goto, *Linear free resolutions and minimal multiplicity*, J. Algebra **88** (1984), no. 1, 89–133.
- [32] David Eisenbud and Joe Harris, *On varieties of minimal degree (a centennial account)*, Algebraic geometry, Bowdoin, 1985 (Brunswick, Maine, 1985), Proc. Sympos. Pure Math., vol. 46, Amer. Math. Soc., Providence, RI, 1987, pp. 3–13.
- [33] Lawrence Ein and Robert Lazarsfeld, *Syzygies and Koszul cohomology of smooth projective varieties of arbitrary dimension*, Invent. Math. **111** (1993), no. 1, 51–67.
- [34] ———, *Asymptotic syzygies of algebraic varieties*, Invent. Math. **190** (2012), no. 3, 603–646.
- [35] David Eisenbud, *The geometry of syzygies*, Graduate Texts in Mathematics, vol. 229, Springer-Verlag, New York, 2005. A second course in commutative algebra and algebraic geometry.
- [36] ———, *Green’s conjecture: an orientation for algebraists*, Free resolutions in commutative algebra and algebraic geometry (Sundance, UT, 1990), Res. Notes Math., vol. 2, Jones and Bartlett, Boston, MA, 1992, pp. 51–78.
- [37] Jordan S. Ellenberg and Daniel Erman, *Furstenberg sets and Furstenberg schemes over finite fields*, Algebra Number Theory **10** (2016), no. 7, 1415–1436.
- [38] Daniel Erman and Jay Yang, *Random flag complexes and asymptotic syzygies*, Algebra Number Theory **12** (2018), no. 9, 2151–2166.
- [39] Gavril Farkas, Mircea Mustață, and Mihnea Popa, *Divisors on  $M_{g,g+1}$  and the minimal resolution conjecture for points on canonical curves*, Ann. Sci. École Norm. Sup. (4) **36** (2003), no. 4, 553–581 (English, with English and French summaries).
- [40] Gavril Farkas and Michael Kemeny, *The generic Green-Lazarsfeld secant conjecture*, Invent. Math. **203** (2016), no. 1, 265–301.
- [41] ———, *The Prym-Green conjecture for torsion line bundles of high order*, Duke Math. J. **166** (2017), no. 6, 1103–1124.
- [42] Ofer Gabber, Qing Liu, and Dino Lorenzini, *Hypersurfaces in projective schemes and a moving lemma*, Duke Math. J. **164** (2015), no. 7, 1187–1270.
- [43] Mark L. Green, *Koszul cohomology and the geometry of projective varieties*, J. Differential Geom. **19** (1984), no. 1, 125–171.
- [44] ———, *Koszul cohomology and the geometry of projective varieties. II*, J. Differential Geom. **20** (1984), no. 1, 279–289.

- [45] Mark Green, *Restrictions of linear series to hyperplanes, and some results of Macaulay and Gotzmann*, Algebraic curves and projective geometry (Trento, 1988), Lecture Notes in Math., vol. 1389, Springer, Berlin, 1989, pp. 76–86.
- [46] Gerd Gotzmann, *Eine Bedingung für die Flachheit und das Hilbertpolynom eines graduierten Ringes*, Math. Z. **158** (1978), no. 1, 61–70 (German).
- [47] Mark Haiman and Bernd Sturmfels, *Multigraded Hilbert schemes*, J. Algebraic Geom. **13** (2004), no. 4, 725–769.
- [48] Robin Hartshorne, *Connectedness of the Hilbert scheme*, Inst. Hautes Études Sci. Publ. Math. **29** (1966), 5–48.
- [49] Milena Hering and Diane Maclagan, *The  $T$ -graph of a multigraded Hilbert scheme*, Exp. Math. **21** (2012), no. 3, 280–297.
- [50] Roser Homs, Joachim Jelisiejew, Mateusz Michałek, and Tim Seynnaeve, *Bounds on complexity of matrix multiplication away from Coppersmith-Winograd tensors*, J. Pure Appl. Algebra **226** (2022), no. 12, Paper No. 107142, 16.
- [51] Heather A. Hulett, *Maximum Betti numbers of homogeneous ideals with a given Hilbert function*, Comm. Algebra **21** (1993), no. 7, 2335–2350.
- [52] A. Iarrobino, *Reducibility of the families of 0-dimensional schemes on a variety*, Invent. Math. **15** (1972), 72–77.
- [53] Joachim Jelisiejew, *Pathologies on the Hilbert scheme of points*, Invent. Math. **220** (2020), no. 2, 581–610.
- [54] Michael Kemeny, *Universal secant bundles and syzygies of canonical curves*, Invent. Math. **223** (2021), no. 3, 995–1026.
- [55] Vijay Kodiyalam, *Asymptotic behaviour of Castelnuovo-Mumford regularity*, Proc. Amer. Math. Soc. **128** (2000), no. 2, 407–411.
- [56] Alex Küronya, Victor Lozovanu, and Catriona Maclean, *Convex bodies appearing as Okounkov bodies of divisors*, Adv. Math. **229** (2012), no. 5, 2622–2639.
- [57] Aaron Landesman, Peter Ruhm, and Robin Zhang, *Spin canonical rings of log stacky curves*, Ann. Inst. Fourier (Grenoble) **66** (2016), no. 6 (English, with English and French summaries).
- [58] Robert Lazarsfeld, Giuseppe Pareschi, and Mihnea Popa, *Local positivity, multiplier ideals, and syzygies of abelian varieties*, Algebra Number Theory **5** (2011), no. 2, 185–196.
- [59] Alexander Lemmens, *On the  $n$ -th row of the graded Betti table of an  $n$ -dimensional toric variety*, J. Algebraic Combin. **47** (2018), no. 4, 561–584.
- [60] Daniel R. Grayson and Michael E. Stillman, *Macaulay 2, a software system for research in algebraic geometry*. Available at <http://www.math.uiuc.edu/Macaulay2/>.
- [61] F. S. MacAulay, *Some Properties of Enumeration in the Theory of Modular Systems*, Proc. London Math. Soc. (2) **26** (1927), 531–555.
- [62] Diane Maclagan and Gregory G. Smith, *Smooth and irreducible multigraded Hilbert schemes*, Adv. Math. **223** (2010), no. 5, 1608–1631.
- [63] ———, *Uniform bounds on multigraded regularity*, J. Algebraic Geom. **14** (2005), no. 1, 137–164.
- [64] ———, *Multigraded Castelnuovo-Mumford regularity*, J. Reine Angew. Math. **571** (2004), 179–212.
- [65] D. Maclagan and R. R. Thomas, *Combinatorics of the toric Hilbert scheme*, Discrete Comput. Geom. **27** (2002), no. 2, 249–272.
- [66] Ezra Miller and Bernd Sturmfels, *Combinatorial commutative algebra*, Graduate Texts in Mathematics, vol. 227, Springer-Verlag, New York, 2005.
- [67] David Mumford, *Further pathologies in algebraic geometry*, Amer. J. Math. **84** (1962), 642–648.
- [68] ———, *Varieties defined by quadratic equations*, Questions on Algebraic Varieties (C.I.M.E., III Ciclo, Varenna, 1969), Edizioni Cremonese, Rome, 1970, pp. 29–100.

- [69] D. Mumford, *On the equations defining abelian varieties. I*, Invent. Math. **1** (1966), 287–354.
- [70] Giorgio Ottaviani and Raffaella Paoletti, *Syzygies of Veronese embeddings*, Compositio Math. **125** (2001), no. 1, 31–37.
- [71] Keith Pardue, *Deformation classes of graded modules and maximal Betti numbers*, Illinois J. Math. **40** (1996), no. 4, 564–585.
- [72] Giuseppe Pareschi, *Syzygies of abelian varieties*, J. Amer. Math. Soc. **13** (2000), no. 3, 651–664.
- [73] Giuseppe Pareschi and Mihnea Popa, *Regularity on abelian varieties. I*, J. Amer. Math. Soc. **16** (2003), no. 2, 285–302.
- [74] ———, *Regularity on abelian varieties. II. Basic results on linear series and defining equations*, J. Algebraic Geom. **13** (2004), no. 1, 167–193.
- [75] Irena Peeva and Mike Stillman, *Toric Hilbert schemes*, Duke Math. J. **111** (2002), no. 3, 419–449.
- [76] Bjorn Poonen, *Bertini theorems over finite fields*, Ann. of Math. (2) **160** (2004), no. 3, 1099–1127.
- [77] Ritvik Ramkumar and Alessio Sammartano, *On the smoothness of lexicographic points on Hilbert schemes*, J. Pure Appl. Algebra **226** (2022), no. 3, Paper No. 106872, 12.
- [78] ———, *On the smoothness of lexicographic points on Hilbert schemes*, J. Pure Appl. Algebra **226** (2022), no. 3, Paper No. 106872, 12.
- [79] Francisco Santos, *Non-connected toric Hilbert schemes*, Math. Ann. **332** (2005), no. 3, 645–665.
- [80] Frank-Olaf Schreyer, *Syzygies of canonical curves and special linear series*, Math. Ann. **275** (1986), no. 1, 105–137.
- [81] ———, *A standard basis approach to syzygies of canonical curves*, J. Reine Angew. Math. **421** (1991), 83–123.
- [82] Roy Skjelnes and Gregory G. Smith, *Smooth Hilbert schemes: their classification and geometry*, Journal für die reine und angewandte Mathematik (Crelle’s Journal), to appear.
- [83] Karen E. Smith and Irena Swanson, *Linear bounds on growth of associated primes*, Comm. Algebra **25** (1997), no. 10, 3071–3079.
- [84] Irena Swanson, *Powers of ideals: primary decompositions, Artin-Rees lemma and regularity*, Math. Ann. **307** (1997), no. 2, 299–313.
- [85] Ravi Vakil, *Murphy’s law in algebraic geometry: badly-behaved deformation spaces*, Invent. Math. **164** (2006), no. 3, 569–590.
- [86] John Voight and David Zureick-Brown, *The canonical ring of a stacky curve*, Mem. Amer. Math. Soc. **277** (2022), no. 1362, v+144.
- [87] Claire Voisin, *Green’s generic syzygy conjecture for curves of even genus lying on a K3 surface*, J. Eur. Math. Soc. (JEMS) **4** (2002), no. 4, 363–404.
- [88] ———, *Green’s canonical syzygy conjecture for generic curves of odd genus*, Compos. Math. **141** (2005), no. 5, 1163–1190.