Mircea Mustaţă

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Professional Experience

Since September 2008 Professor, University of Michigan
2004/2008 Associate Professor, University of Michigan.
2001/2004 Research Fellow, Clay Mathematics Institute.

Visiting Positions

Fall 2006 Institute for Advanced Study, Princeton.
2002/2004 Harvard University.
Spring 2002 Isaac Newton Institute for Mathematical Sciences.
Fall 2001 Université de Nice-Sophia Antipolis.

Education

May 2001 Ph.D. in Mathematics. University of California, Berkeley. Thesis advisor: David Eisenbud.
June 1996 M.S. in Mathematics. University of Bucharest, Romania.
June 1995 B.S. in Mathematics. University of Bucharest, Romania.

Honors

1. Simons Fellow, Spring 2019.
2. ICM invited speaker, Seoul, 2014.
3. Fellow of the AMS, 2013.
4. Invited Address, AMS Meeting at Indiana University, Bloomington, 2008.
5. Five-Year Packard Fellowship for Science and Engineering, 2006.
6. ECM invited speaker, Stockholm, 2004.
7. Three-Year Clay Research Fellowship, 2001.
8. The "George Lazăr" prize of the Romanian Academy, 2001.

Selected recent talks

1. *Conference in honor of François Loeser*, Banyuls-sur-Mer, May 2018.
2. *Singularities and Algebraic Geometry* conference, Da Nang, January 2018.
3. *AGNES* conference, Northeastern University, October 2017.
4. *Instruments of Algebraic Geometry* conference, Bucharest, September 2017.

5. *Complex-analytic and differential geometry*, conference in honor of Jean-Pierre Demailly on the occasion of his 60th birthday, Grenoble, June 2017.
6. Pinsky Lectures, Northwestern University, April 2017
7. *Higher dimensional algebraic geometry and characteristic p* workshop, Luminy, September 2016.
8. *Local and global methods in algebraic geometry*, conference in honor of Lawrence Ein's 60th birthday, Chicago, May 2016.
9. *Singular Landscapes*, conference celebrating Bernard Teissier's 70th birthday, Aussois, June 2015.
10. Simons Symposium on Non-Archimedean and Tropical Geometry, Puerto Rico, February 2015.
11. *Commutative Algebra and Singularity Theory 2014*, conference in honor of Kei-ichi Watanabe, Toyama, July 2014.
12. *Classical algebraic geometry* workshop, Oberwolfach, June 2014.
13. *Birational geometry and foliations* workshop, Bonn, February 2014.
14. *Géométrie birationnelle des variétés algébriques complexes*, conference in honor of Frederic Campana's 60th birthday, Luminy, October 2013.
15. *Complex geometry* conference, Institute for Mathematical Sciences, Singapore, July-August 2013.
16. *Minimal model program in positive characteristic* workshop at AIM, Palo Alto, May 2013.
17. *Higher dimensional algebraic geometry*, conference in honor of Yujiro Kawamata's 60th birthday, Tokyo, January 2013.
18. *Characteristic p and p-adic geometry* conference, Mainz, June 2012.
19. *ACC for minimal log discrepancies and termination of flips* workshop at AIM, Palo Alto, May 2012.
20. *Algebraic geometry* conference, Chulalongkorn University, Bangkok, December 2011.
21. *AGNES* conference, Stony Brook, October 2011.
22. *Number Theory, Algebraic Geometry and Model Theory*, a conference in honor of J. Denef, Luminy, September 2011.
23. *Relating multiplier ideals and test ideals*, workshop at AIM, Palo Alto, August 2011.
24. *MMP and extremal rays*, conference in honor of Shigefumi Mori's 60th birthday, Kyoto, June 2011.
25. *Birational geometry*, conference in honor or V. V. Shokurov, Edinburgh, December 2010.

26. *Higher-dimensional algebraic geometry* conference, Taipei, March 2010.
27. *Topology of algebraic varieties*, a conference in honor of Anatoly Libgober, Jaca, June 2009.
28. *Classification of algebraic varieties* conference, Schiermonokoog, May 2009.
29. *Combinatorial, enumerative and toric geometry*, workshop at MSRI, Berkeley, March 2009.
30. Clay Lectures, Tata Institute, Mumbai, December 2007.
31. *Advances in algebra and geometry*, a conference in honor of David Eisenbud, MSRI, Berkeley, April 2007.

Lecture series and Summer schools

1. *D-modules and Hodge theory*, Chicago, November 2018.
2. *Mixed Hodge modules in Birational Geometry*, Mainz, July 2018.
3. *Tianyuan Advanced Spring School on Moduli Spaces in Algebraic Geometry*, Beijing, March 2017.
4. CIMPA-ICTP school *Toric methods in geometry, arithmetics and dynamics*, Santiago, January 2016.
5. *IMPANGA* Summerschool, Bedlowo, July 2010.
6. *Moduli Spaces and Arcs in Algebraic Geometry*, Cologne, August 2006.
7. *Graduate Student Warm-up Workshop for the AMS Summer Institute in Algebraic Geometry*, Seattle, July 2005.
8. *GAEL*, Luminy, April 2004.
9. *GAC*, Luminy, January 2003.

Other professional activities

1. Organizer (with A. Grassi, C. Hacon, S. Kovács, and M. Olsson) of the MSRI semester *Birational geometry and moduli spaces*, Berkeley, January-May 2019.
2. Organizer (with D. Erman, C. Raicu, and G. Smith) of the conference *A view towards algebraic geometry*, in honor of David Eisenbud's 70's birthday, Martha's Vineyard, May 2017.
3. Organizer (with T. de Fernex, B. Hassett, M. Olsson, M. Popa, and R. Thomas) of the *AMS Summer Institute in algebraic geometry*, Salt Lake City, July 2015.
4. Organizer (with N. Budur and F. Loeser) of the thematic program *Motivic invariants and singularities*, University of Notre Dame, June 2013.

5. Organizer (with C. Huneke, Y. Kawamata, K. Smith, and K.-i. Watanabe) of the MSRI workshop *The Commutative Algebra of Singularities in Birational Geometry: Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods*, Berkeley, May 2013.
6. Organizer (with C. Hacon and M. Popa) of the conference *Recent advances in algebraic geometry*, in honor of Rob Lazarsfeld's 60th birthday, University of Michigan, May 2013
7. Organizer (with D. Eisenbud, C. Huneke and C. Polini) of the *MRC program on Commutative Algebra*, Snowbird, June 2010.
8. Organizer (with M. Blickle, M. Brion, F. Enescu, S. Kumar, and K. Schwede) of the conference *Frobenius splitting in algebraic geometry, commutative algebra, and representation theory*, University of Michigan, May 2010.
9. Organizer (with L. Caporaso, B. Hassett, J. M^{c}Kernan, and M. Popa) of the MSRI workshop *Classical algebraic geometry today'*, Berkeley, January 2009.
10. Organizer (with J. McNeal) of the PCMI program on *Analytic and Algebraic Geometry*, Park City, July 2008.
11. Organizer (with M. Popa) of the *Birational Algebraic Geometry* session, AMS Meeting at Indiana University, Bloomington, April 2008.
12. Coorganizer (with N. Budur, L. Ein, R. Lazarsfeld and V. V. Shokurov) of the AIM workshop *Invariants of singularities and higher-dimensional algebraic varieties*, Palo Alto, August 2006.

Publications

1. An invariant detecting rational singularities via the log canonical threshold (with R. Cluckers), preprint.
2. Hodge filtration, minimal exponent, and local vanishing (with M. Popa), preprint.
3. Igusa's conjecture for exponential sums: optimal estimates for non-rational singularities (with R. Cluckers and K.H. Nguyen), preprint.
4. Hodge ideals for Q-divisors, V-filtration, and minimal exponent (with M. Popa), preprint
5. Hodge ideals for Q-divisors: birational approach (with M. Popa), preprint.
6. Local vanishing and Hodge filtration for rational singularities (with S. Olano and M. Popa), J. Inst. Math. Jussieu, to appear.

7. Restriction, subadditivity, and semicontinuity theorems for Hodge ideals (with M. Popa), Int. Math. Res. Not., to appear.
8. Hodge ideals (with M. Popa), Memoirs of the AMS, to appear.
9. A boundedness conjecture for minimal log discrepancies on a fixed germ (with Y. Nakamura), in *Local and global methods in algebraic geometry*, 287–306, Contemp. Math., 712, Amer. Math. Soc., Providence, RI, 2018.
10. The combinatorics and topology of proper toric maps (with M. de Cataldo and L. Migliorini), J. Reine Angew. Math. 744 (2018), 133–163.
11. Multiplier ideals via Mather discrepancy (with S. Ishii and L. Ein), in *Minimal models and extremal rays (Kyoto, 2011)*, 928, Adv. Stud. Pure Math., 70, Math. Soc. Japan, Tokyo, 2016.
12. The volume of a set of arcs on a variety (with T. de Fernex), Rev. Roumaine Math. Pures Appl. 60 (2015), 375–401.
13. Weight functions on non-Archimedean analytic spaces and the Kontsevich-Soibelman skeleton (with J. Nicaise), Algebr. Geom. 2 (2015), 365–404.
14. The dimension of jet schemes of singular varieties, Proceedings of the International Congress of Mathematicians–Seoul 2014, Vol. II, 673–693, Kyung Moon Sa, Seoul, 2014.
15. On the numerical dimension of pseudo-effective divisors in positive characteristic (with P. Cascini, C. Hacon, and K. Schwede), Amer. J. Math. 136 (2014), 1609–1628.
16. A Frobenius variant of Seshadri constants (with K. Schwede), Math. Ann. 358 (2014), 861–878.
17. The augmented base locus in positive characteristic (with P. Cascini and J. McKernan), Proc. Edinb. Math. Soc. (2) 57 (2014), 79–87.
18. An algebraic approach to the openness conjecture of Demailly and Kollár (with M. Jonsson), J. Inst. Math. Jussieu 13 (2014), 119–144.
19. The non-nef locus in positive characteristic., in *A celebration of algebraic geometry*, 535–551, Clay Math. Proc., 18, Amer. Math. Soc., Providence, RI, 2013.
20. Estimates for F-jumping numbers and bounds for Hartshorne-Speiser-Lyubeznik numbers (with W. Zhang), Nagoya Math. J. 210 (2013), 133–160.
21. Valuations and asymptotic invariants for sequences of ideals (with M. Jonsson), Ann. Inst. Fourier (Grenoble) 62 (2012), 2145–2209.

22. Log canonical thresholds, F-pure thresholds, and nonstandard extensions (with B. Bhatt, D. Hernández, and L. Miller), Algebra Number Theory 6 (2012), 1459–1482.
23. IMPANGA lecture notes on log canonical thresholds (notes by Tomasz Szemberg), EMS Ser. Congr. Rep., Contributions to algebraic geometry, 407–442, Eur. Math. Soc., Zürich, 2012.
24. A finiteness property of graded sequences of ideals (with M. Jonsson), Algebra Number Theory 6 (2012), 561–571.
25. Ordinary varieties and the comparison between multiplier ideals and test ideals II, Proc. Amer. Math. Soc. 140 (2012), 805–810.
26. Ordinary varieties and the comparison between multiplier ideals and test ideals (with V. Srinivas), Nagoya Math. J. 204 (2011), 125–157.
27. Sequences of LCT-polytopes (with A. Libgober), Math. Res. Lett. 18 (2011), 733–746.
28. The Monodromy Conjecture for hyperplane arrangements (with N. Budur and Z. Teitler), Geom. Dedicata 153 (2011), 131–137.
29. Log canonical thresholds on varieties with bounded singularities (with T. de Fernex and L. Ein), in *Classification of algebraic varieties*, 221–257, EMS Ser. Congr. Rep., Eur. Math. Soc., Zrich, 2011.
30. Shokurov's ACC Conjecture for log canonical thresholds on smooth varieties (with T. de Fernex and L. Ein), Duke Math. J. **152** (2010), 93–114.
31. Lectures on flips and minimal models (with A. Corti, J. Kollár, and R. Lazarsfeld), in *Analytic and algebraic geometry*, 557–583, IAS/Park City Math. Ser., 17, Amer. Math. Soc., Providence, RI, 2010.
32. Introduction to resolution of singularities, in *Analytic and algebraic geometry*, 405–449, IAS/Park City Math. Ser., 17, Amer. Math. Soc., Providence, RI, 2010.
33. Positivity for toric vector bundles (with M. Hering and S. Payne), Ann. Inst. Fourier (Grenoble) **60** (2010), 607–640.
34. Toward an inductive description of singularities of pairs, J. Algebraic Geom. 20 (2011), 263–293.
35. F-thresholds of hypersurfaces (with M. Blickle and K. E. Smith), Trans. Amer. Math. Soc. **361** (2009), 6549–6565.
36. Convex bodies associated to linear series (with R. Lazarsfeld), Ann. Sci. École Norm. Sup.(4) **42** (2009), 783–835.

37. T. de Fernex and M. Mustaţă, Limits of log canonical thresholds, Annales Sci. École Norm. Sup. (4) **42** (2009), 491–515.
38. L. Ein, R. Lazarsfeld, M. Mustaţă, M. Nakamaye and M. Popa, Restricted volumes and base loci of linear series, Amer. J. Math. **131** (2009), 571–605.
39. Generically finite morphisms and formal neighborhoods of arcs (with L. Ein), Geom. Dedicata **139** (2009), 331–335.
40. Test ideals vs. multiplier ideals (with K. Yoshida), Nagoya Math. J. **193** (2009), 111–128.
41. Bernstein-Sato polynomials in positive characteristic, J. Algebra **321** (2009), 128–151.
42. Jet schemes and singularities (with L. Ein), in *Algebraic geometry—Seattle 2005, Part 2*, 505–546, Proc. Sympos. Pure Math., **80**, Part 2, Amer. Math. Soc., Providence, RI, 2009.
43. Discreteness and rationality of F-thresholds (with M. Blickle and K. E. Smith), Special volume in honor of Melvin Hochster, Michigan Math. J. **57** (2008), 43–61.
44. F-thresholds, tight closure, integral closure, and multiplicity bounds (with C. Huneke, S. Takagi, and K.-i.Watanabe), Special volume in honor of Melvin Hochster, Michigan Math. J. **57** (2008), 463–483.
45. On Igusa zeta functions for monomial ideals (with J. Howald and C. Yuen), Proc. Amer. Math. Soc. **135** (2007), 3425–3433.
46. Invariants of singularities of pairs (with L. Ein), *International Congress of Mathematicians*, Vol. II, 583–602, Eur. Math. Soc., Zürich, 2006.
47. Multiplier ideals of hyperplane arrangements, Trans. Amer. Math. Soc. **358** (2006), 5015–5023.
48. Asymptotic invariants of base loci (with L. Ein, R. Lazarsfeld, M. Nakamaye and M. Popa), Ann. Inst. Fourier (Grenoble) **56** (2006), 1701–1734.
49. Combinatorial description of the roots of the Bernstein-Sato polynomials for monomial ideals (with N. Budur and M. Saito), Comm. Algebra **34** (2006), 4103–4117.
50. Bernstein-Sato polynomials of arbitrary varieties (with N. Budur and M. Saito), Compos. Math. **142** (2006), 779–797.
51. Roots of Bernstein-Sato polynomials for monomial ideals: a positive characteristic approach (with N. Budur and M. Saito), Math. Res. Lett. **13** (2006), 125–142.
52. Ehrhart polynomials and stringy Betti numbers (with S. Payne), Math. Ann. **333** (2005), 787–795.

53. Asymptotic invariants of line bundles (with L. Ein, R. Lazarsfeld, M. Nakamaye and M. Popa) Pure Appl. Math. Q. **1** (2005), 379–403.
54. F-thresholds and Bernstein-Sato polynomials (with S. Takagi and K.-i. Watanabe), European Congress of Mathematics, 341–364, Eur. Math. Soc., Zürich, 2005.
55. Inversion of adjunction for local complete intersection varieties (with L. Ein), Amer. J. Math. **126** (2004), 1355–1365
56. Contact loci in arc spaces (with L. Ein and R. Lazarsfeld), Compos. Math. **140** (2004), 1229–1244.
57. Multiplicities and log canonical threshold (with L. Ein and T. de Fernex), J. Alg. Geom. **13** (2004), 603–615.
58. Universal rational parametrizations and toric varieties (with D. Cox and R. Krasauskas) in *Topics in algebraic geometry and geometric modeling*, 241–265, Contemp. Math., 334, Amer. Math. Soc., Providence, RI, 2003.
59. Jet schemes, log discrepancies and Inversion of Adjunction (with L. Ein and T. Yasuda), Invent. Math. **153** (2003), 119–135.
60. Divisors on $\mathcal{M}_{g,g+1}$ and the minimal resolution conjecture for points on canonical curves (with G. Farkas and M. Popa), Ann. Sci. École Norm. Sup. (4) **36** (2003), 553–581.
61. Bounds for log canonical thresholds with applications to birational rigidity (with T. de Fernex and L. Ein), Math. Res. Lett. **10** (2003), 219–236.
62. On multiplicities of graded sequences of ideals, J. Algebra **256** (2002), 229–249.
63. Singularities of pairs via jet schemes, J. Amer. Math. Soc. **15** (2002), 599–615.
64. The multiplier ideals of a sum of ideals, Trans. Amer. Math. Soc. **354** (2002), 205–217.
65. Vanishing theorems on toric varieties, Tohôku Math. J.(2) **54** (2002), 451–470.
66. Jet schemes of locally complete intersection canonical singularities (with an appendix by D. Eisenbud and E. Frenkel), Invent. Math. **145** (2001), 397–424.
67. The module of logarithmic p-forms of a locally free arrangement (with H. Schenck), J. Algebra **241** (2001), 699–719.
68. D-modules on smooth toric varieties (with G. Smith, H. Tsai and U. Walther), J. Algebra **240** (2001), 744–770.

69. Cohomology on toric varieties and local cohomology with monomial supports (with D. Eisenbud and M. Stillman), J. Symbolic Comput. **29** (2000) 583–600.
70. Local cohomology at monomial ideals, J. Symbolic Comput. **29** (2000) 709–720.
71. Graded Betti numbers of general finite subsets of points on projective varieties, Le Matematiche **LIII** (1998) Supplemento, 53–81.
72. A new proof of a theorem of A. Van de Ven (with M. Popa), Bull. Math. Soc. Sc. Math. Roum. **40(88)** (1997) 49–55.