

## MIHNEA POPA

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Harvard University  
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### EDUCATION

University of Michigan, Ann Arbor  
Ph.D. in Mathematics, June 2001  
Thesis advisor: Robert K. Lazarsfeld  
University of California, Los Angeles  
1996-1997  
University of Bucharest, Romania  
B.S. in Mathematics, 1996

### EMPLOYMENT

Professor, Harvard University, 2020–  
Professor, Northwestern University, 2014–2020  
Professor, University of Illinois at Chicago, 2011–2014  
Associate Professor, University of Illinois at Chicago, 2007–2011  
Assistant Professor, University of Chicago, 2005–2007  
Benjamin Peirce Assistant Professor, Harvard University, 2001–2005

### HONORS and AWARDS

Honorary MA degree, Harvard University, 2020  
Invited speaker, International Congress of Mathematicians 2018, Rio de Janeiro  
Simons Fellow, 2015–2016  
Fellow of the AMS, class of 2015  
Honorary member of the Institute of Mathematics of the Romanian Academy  
Invited address at the AMS Central Sectional meeting, Lansing, March 2015  
Invited address at the joint AMS/RMS meeting, Alba Iulia, Romania, June 2013  
Sloan Research Fellowship, 2007–2009  
AMS Centennial Fellowship, 2005–2007  
Summer Myers Award for best Ph.D. thesis, University of Michigan, 2002  
Liftoff Fellowship, Clay Mathematics Institute, Summer 2001  
Rackham Predoctoral Fellowship, University of Michigan, 2000–2001  
Chancellor's Fellowship, University of California, Los Angeles 1996–1997

### PUBLICATIONS and PREPRINTS

51. Hodge ideals and minimal exponents of ideals (with M. Mustața)  
preprint arXiv:1912.08072, submitted.
50. Hodge filtration, minimal exponent, and local vanishing (with M. Mustața)  
*Invent. Math.* **220** (2020), no.2, 453–478.
49.  $D$ -modules in birational geometry  
Proceedings of the ICM, Rio de Janeiro, vol.2, *World Scientific*, 781–806.

48. Hodge ideals for  $\mathbf{Q}$ -divisors,  $V$ -filtration, and minimal exponent (with M. Mustață)  
*Forum of Mathematics, Sigma* **8** (2020), e19, 41pp.
47. Hodge ideals for  $\mathbf{Q}$ -divisors: birational approach (with M. Mustață)  
*J. de l'École Polytechnique* **6** (2019), 283–328.
46. Brody hyperbolicity of base spaces of certain families of varieties (with B. Taji and L. Wu) –  
*Algebra and Number Theory* **13** (2019), no.9, 2205–2242.
45. Pushforwards of pluricanonical bundles under morphisms to abelian varieties (with L. Lombardi  
and C. Schnell) – *J. Eur. Math. Soc.* **22** (2020), no.8, 2511–2536.
44. Local vanishing and Hodge filtration for rational singularities (with M. Mustață and S. Olano)  
– *J. Inst. Math. Jussieu* **19** (2020), no.3, 801–819.
43. Restriction, subadditivity, and semicontinuity theorems for Hodge ideals (with M. Mustață)  
*Int. Math. Res. Not.* (2018), no.11, 3587–3605.
42. Hodge ideals (with M. Mustață)  
*Memoirs of the AMS* **262** (2019), no.1268.
41. Algebraic fibers spaces over abelian varieties: around a recent theorem by Cao and Păun (with  
C. Hacon and C. Schnell)  
Local and global methods in algebraic geometry: a conference in honor of L. Ein's 60th  
birthday, 143–195, *Contemp. Math.*, **712**, Amer. Math. Soc., Providence, RI, 2018.
40. Generic vanishing and minimal cohomology classes on five-dimensional abelian varieties (with  
S. Casalaina-Martin and S. Schreieder)  
*J. Algebraic Geom.*, **27** (2018), no.3, 553–581.
39. Positivity for Hodge modules and geometric applications  
Algebraic geometry: Salt Lake City 2015, 555–584, *Proc. Sympos. Pure Math.*, **97.1**, Amer.  
Math. Soc., Providence, RI, 2018.
38. Viehweg's hyperbolicity conjecture for families with maximal variation (with C. Schnell)  
*Invent. Math.*, **208** (2017), no.3, 677–713.
37. Hodge modules on complex tori and generic vanishing on compact Kähler manifolds (with G.  
Pareschi and C. Schnell)  
*Geometry and Topology*, **21** (2017), 2419–2460.
36. Derived equivalences of smooth stacks and orbifold Hodge numbers  
*Adv. Studies in Pure Math.*, **74** (2017), Math. Soc. Japan, volume in honor of Y. Kawamata's 60th birthday, 357–380.
35. Weak positivity for Hodge modules (with L. Wu)  
*Math. Res. Lett.*, **23** (2016), no.4, 1137–1153.
34. Kodaira-Saito vanishing and applications  
*L'Enseignement Math.*, **62** (2016), no.1-2, 49–89.
33. On direct images of pluricanonical bundles (with C. Schnell)  
*Algebra and Number Theory*, **8** (2014), no.9, 2273–2295.
32. Kodaira dimension and zeros of holomorphic one-forms (with C. Schnell)  
*Ann. of Math.*, **179** (2014), 1–12.
31. Derived equivalence and non-vanishing loci II (with L. Lombardi)  
in Recent Advances in Algebraic Geometry, volume in honor of Rob Lazarsfeld, *London  
Math. Soc. Lecture Note Series*, **417** (2015), 291–306.
30. Derived equivalence and non-vanishing loci  
*Clay Mathematical Proceedings*, **18** (2013), volume in honor of Joe Harris, 567–575.
29. Generic vanishing theory via mixed Hodge modules (with C. Schnell)  
*Forum of Mathematics, Sigma*, **1** (2013), 1–60.
28. Generalized theta linear series on moduli spaces of vector bundles on curves (survey)  
in the *Handbook of Moduli*, Advanced Lectures in Math., International Press 2013.

27. Extension of sections via adjoint ideals (with L. Ein)  
*Math. Annalen*, **352** no.2 (2012), 373–408.
26. Derived invariance of the number of holomorphic 1-forms and vector fields (with C. Schnell)  
*Ann. Sci. ENS*, **44** no.3 (2011), 527–536.
25. Local positivity, multiplier ideals, and syzygies of abelian varieties (with R. Lazarsfeld and G. Pareschi)  
*Algebra and Number Theory*, **5** no.2 (2011), 185–196.
24. Canonical cohomology as an exterior module (with R. Lazarsfeld and C. Schnell)  
*Pure and Applied Math. Quarterly*, **7** (2011), no.4, Eckart Viehweg memorial volume, 1529–1542.
23. Generic vanishing filtration and perverse objects in derived categories of coherent sheaves in Derived Categories in Algebraic Geometry, Tokyo 2011, *European Mathematical Society* (2012), 251–277.
22. GV-sheaves, Fourier-Mukai transform, and generic vanishing (with G. Pareschi)  
*Amer. J. Math.*, **133** no.1 (2011), 235–271.
21. Derivative complex, BGG correspondence, and numerical inequalities for compact Kähler manifolds (with R. Lazarsfeld)  
*Invent. Math.*, **182** no.3 (2010), 605–633.
20. Regularity on abelian varieties III: relationship with Generic Vanishing and applications (with G. Pareschi)  
in Grassmannians, Moduli Spaces and Vector Bundles, *Clay Mathematics Proceedings* **14**, Amer. Math. Soc., Providence RI, 2011, 141–167.
19. Strong generic vanishing and a higher dimensional Castelnuovo-de Franchis inequality (with G. Pareschi)  
*Duke Math. J.*, **150** no. 2 (2009), 269–285.
18. Restricted volumes and base loci of linear series (with L.Ein, R. Lazarsfeld, M. Mustață, M. Nakamaye)  
*Amer. J. Math.*, **131** no.3 (2009), 607–651.
17. Global divison theorems for cohomology classes via injectivity (with L. Ein)  
*Michigan Math. J.*, special issue in honor of Mel Hochster, **57** (2008), 249–259.
16. Generic vanishing and minimal cohomology classes on abelian varieties (with G. Pareschi)  
*Math. Ann.*, **340** no.1 (2008), 209–222.
15.  $M$ -regularity and the Fourier-Mukai transform (with G. Pareschi), survey paper  
*Pure and Applied Math. Quarterly* issue II in honor of F. Bogomolov, **4** no.3 (2008).
14. Castelnuovo theory and the geometric Schottky problem (with G. Pareschi)  
*J. Reine Angew. Math.*, **615** (2008), 25–44.
13. Asymptotic invariants of base loci (with L.Ein, R. Lazarsfeld, M. Mustață, M. Nakamaye)  
*Ann. Inst. Fourier* **56** no.6 (2006), 1701–1734.
12. Effective divisors on  $\overline{\mathcal{M}}_g$ , curves on  $K3$  surfaces, and the Slope Conjecture (with G. Farkas)  
*J. Algebraic Geom.* **14** (2005), 241–267.
11. Asymptotic invariants of line bundles (with L.Ein, R. Lazarsfeld, M. Mustață, M. Nakamaye), survey paper  
*Pure and Applied Math. Quarterly*, A. Borel issue I, **1** (2005), no.2, 139–163.
10. Effective very ampleness for generalized theta linear series (with E. Esteves)  
*Duke Math. J.* **123** (2004), 429–444.
9. Regularity on abelian varieties II: basic results on linear series and defining equations (with G. Pareschi)  
*J. Algebraic Geom.* **13** (2004), 167–193.

8. Regularity on abelian varieties I (with G. Pareschi)  
*J. Amer. Math. Soc.* **16** (2003), 285–302.
7. Divisors on  $\overline{\mathcal{M}}_{g,g+1}$  and the Minimal Resolution Conjecture for points on canonical curves (with G. Farkas and M. Mustața)  
*Ann. Sci. ENS.* **36** (2003), 553–581.
6. Stable maps and Quot schemes (with Mike Roth)  
*Invent. Math.* **152** (2003), 625–663.
5. Verlinde bundles and generalized theta linear series  
*Trans. Amer. Math. Soc.* **354** (2002), 1869–1898.
4. Linear series on moduli spaces of vector bundles on curves  
University of Michigan thesis (2001; Advisor: Robert Lazarsfeld).
3. Dimension estimates for Hilbert schemes and effective base point freeness on moduli spaces of vector bundles on curves  
*Duke Math. J.* **107** (2001), 469–495.
2. On the base locus of the generalized theta divisor  
*Comptes Rendus de l'Academie des Sciences de Paris* **329** (1999), Série I, 507–512.
1. A new proof of a theorem of A. Van de Ven (with M. Mustața)  
*Bulletin Soc. Sci. Math. de Roumanie*, Tome 40 (88) No.1 (1997), 49–55.

**SELECTED RECENT LECTURE SERIES, COLLOQUIA, and INVITED TALKS (since 2012)**

- Moduli and Algebraic Cycles, Program at the Mittag Leffler Institute, Stockholm, Sweden, September–October 2021
- D-Modules: Applications to Algebraic Geometry, Arithmetic and Mirror Symmetry, CIRM Luminy, France, April 12–16 2021
- Recent applications of the theory of o-minimal structures to various questions in Hodge theory, IMSA Univ. of Miami, November 16–20 2020
- Conference on Hodge Theory in honor of Donu Arapura’s 60th birthday, Univ. of Wisconsin, September 12–15 2019
- Geometry and arithmetic of algebraic varieties, Bonn, Germany, June 11–14 2019
- University of Chicago, Colloquium, March 15 2019
- Harvard University, Colloquium, March 4 2019
- University of Bonn, Colloquium, January 21 2019
- Minicourse at workshop on Mixed Hodge Modules, UIC, November 16–18 2018
- Minicourse at Program on Moduli Spaces and Varieties, Shanghai, China, September 24–28 2018
- ICM, Rio de Janeiro, Brazil, August 1–9 2018
- Oberwolfach workshop “Classical Algebraic Geometry”, July 15–21 2018
- Minicourse at summer school on Mixed Hodge Modules in Birational Geometry, Mainz, Germany, July 9–13 2018
- Singularities, Toric Geometry, and Differential Equations, Chemnitz, Germany, March 19–23 2018
- Singularities and Algebraic Geometry, Da Nang, Vietnam, January 8–13 2018
- Cohomology in Algebraic Geometry and Representation Theory, FRIAS Freiburg, October 1–7 2017
- Oberwolfach workshop “Algebraic Geometry: Birational Classification, Derived Categories, and Moduli Spaces”, September 24–30 2017
- Positivity in Algebraic and Complex Geometry, ICMS Edinburgh, April 2017
- Algebra, Geometry, and Combinatorics conference, Purdue, October 2016
- University of Michigan, Colloquium, October 2016
- Conference in honor of P. Ionescu’s 65th birthday, Bucharest, Romania, July 2016
- New Methods in Birational Geometry, Conference, Toulouse, June 2016

Topology of Complex Algebraic Varieties, Workshop, Luminy, June 2016  
 Yale, Colloquium, March 2016  
 Stony Brook, Colloquium, March 2016  
 Seminar talks at Stanford, Univ. of Michigan, Princeton, 2015–2016  
 AMS Summer Institute in Algebraic Geometry, Utah, July 2015  
 AMS Invited Address, Sectional Meeting, Lansing, March 2015  
 Conference on Complex Algebraic Geometry, Oberwolfach, March 2015  
 Satellite ICM conference on Algebraic and Complex Geometry, Daejeon, August 2014  
 Giornate di Geometria Algebraica, Torino, June 2014  
 Banff workshop on Positivity of Linear Series and Vector Bundles, February 2014  
 Northwestern University, Colloquium, November 2013  
 UCLA, Colloquium, November 2013  
 Brown University, Colloquium, October 2013  
 AGNES Algebraic Geometry Conference, Boston, October 2013  
 Istanbul summer school in Algebraic Geometry, June 2013  
 Clay workshop on Mixed Hodge Modules, August 2013  
 AMS Invited Address, Joint International Meeting of the AMS and the Romanian Mathematical Society, June 2013  
 Recent Advances in Algebraic Geometry, conference honoring R. Lazarsfeld, Ann Arbor, May 2013  
 Higher Dimensional Algebraic Geometry, conference honoring Y. Kawamata, Tokyo, January 2013  
 Mirror symmetry in the Midwest, November 2012  
 Banff workshop on syzygies and string theory, August 2012  
 GCOE Lectures, Univ. of Tokyo, May-June 2012

### **PhD STUDENTS and POSTDOC SUPERVISION**

Sebastián Olano, Ph.D. 2020, Postdoc at Univ. of Michigan  
 Yajnaseni Dutta, Ph.D. 2019, Hausdorff postdoc at Univ. of Bonn  
 Lei Wu, PhD 2017, Postdoc at Univ. of Utah  
 Luigi Lombardi, PhD 2013, Tenure-track at Univ. of Milan  
 Joel Sievert, 2010–2013, Business Intelligence Developer at EPIC  
 Tuan Anh Pham, PhD 2011, Software Developer at EPIC  
 Current students: Yaroslav Khromenkov, Fanjun Meng, Mingyi Zhang (Northwestern), Wanchun (Rosie) Shen, Duc Vo (Harvard)  
 Christian Schnell, postdoc, 2008–2011, Associate Professor at SUNY, Stony Brook  
 Majid Hadian-Jazi, postdoc, 2012–2014, Scott Russell Johnson Senior Postdoctoral Fellow, Caltech  
 Yuan Wang, postdoc, 2017-2020  
 Charlie Stibitz, postdoc, 2018-2021

### **UNIVERSITY AND DEPARTMENTAL SERVICE**

Member of the Promotion Committee, Weinberg College of Arts and Sciences, Northwestern 2019 and 2020.  
 Equity representative on the Northwestern Mathematics Department Hiring Committee, 2018-2020  
 Member of the UIC Faculty Senate, 2009–2013  
 Math Department representative on the WISEST Committee at UIC, devoted to supporting women in STEM fields, 2009–2011  
 Member or head of numerous departmental committees at UIC and Northwestern, including repeatedly the hiring, postdoctoral, promotions, admissions, colloquium, and graduate studies committees.

## SERVICE IN THE MATHEMATICAL COMMUNITY

- Co-organizer (with E. Getzler and Y. Liu) of the Emphasis Year in Algebraic Geometry, Number Theory and Physics at Northwestern, 2016–2017.
- Co-organizer (with T. de Fernex, B. Hassett, M. Mustața, M. Olsson and R. Thomas) of the Summer Institute in Algebraic Geometry, University of Utah, July 2015, and co-editor of its Proceedings.
- Editorial Boards: Algebraic Geometry (Foundation Compositio Mathematica), 2013–2019; Journal of Algebraic Geometry, October 2019– ; Selecta Mathematica, February 2020–
- Member of the Scientific Board of the Superior Normal School, Bucharest, Romania, 2013–
- Co-editor of the volume "Recent Advances in Algebraic Geometry" in honor of Rob Lazarsfeld's 60th birthday, London Mathematical Society Lecture Series **417** (2015)
- Co-organizer of the Algebraic Geometry conference in honor of Rob Lazarsfeld 60th birthday, Ann Arbor, May 2013
- Co-organizer of a special session at the joint AMS and Romanian Mathematical Society meeting, Alba Iulia, Romania, June 2013
- External examiner: PhD thesis of Zhi Jiang, École Normale Supérieure, June 2010; Habilitation thesis of Andreas Horing, University of Bayreuth, 2012; PhD thesis of Sofia Tirabassi, Rome, 2011; Ph.D. thesis of Víctor González-Alonso, Barcelona, 2013.
- Co-editor of the MSRI volume "Current Developments in Algebraic Geometry", Cambridge Univ. Press 2012
- Co-chair of the organizing committee for the workshop "Classical Algebraic Geometry Today", MSRI, January 2009
- Co-organizer, Special session, AMS meeting, Bloomington, Indiana 2008
- Co-organizer of conference in honor of Robin Hartshorne's 70'th birthday, UIC, 2008
- NSF grant review panels, 2006–
- Member, AMS; Reviewer for Mathematical Reviews
- Referee for numerous journals (including *Ann. Math.*, *J. Amer. Math. Soc.*, *Invent. Math.*, *Duke Math. J.*, *Ann. Sci. ENS*, *Geom. and Top.*, *J. Diff. Geom.*, *J. Eur. Math. Soc.*)