

DAN ABRAMOVICH

- **Institutional address:** Department of Mathematics, Brown University, 151 Thayer Street, Brown University Box 1917, Providence, RI 02912. Tel: (401) 863-7968. E-mail: abrmovic@math.brown.edu WWW: <http://math.brown.edu/~abrmovic>
- **Education:**
 - Harvard University: Ph.D 1991** in algebraic Geometry. Advisor: Joe Harris.
 - Tel Aviv University: B.Sc. *summa cum laude* 1987.**
- **Research interests:** Algebraic and Arithmetic Geometry.
- **Regular faculty positions:**
 - Brown University:** Professor, July 2003 -present.
 - Boston University:** Associate Professor 1999 - 2003, Assistant Professor 1994 - 1999.
 - Massachusetts Institute of Technology:** C. L. E. Moore instructor, 1991 - 1994.
- **Visiting positions:**
 - Hebrew University, Jerusalem:** Lady Davis visiting Fellow, Spring 2012.
 - Mathematical Sciences Research Institute:** Research Professor, Spring 2009.
 - Brown University:** Visiting Distinguished Professor, spring 2003.
 - Hebrew University, Jerusalem:** Forschhimer / Landau Center Visiting Fellow, February-July 2002.
 - Massachusetts Institute of Technology:** Visiting Professor, September-December 2001.
 - Max Planck Institut für Mathematik, Bonn:** Visitor, April-June 1999.
 - Centre Emile Borel:** Visiting Professor, February 1999.
 - Institut des Hautes Etudes Scientifiques:** Visiting Professor, January-March 1999.
 - Mathematical Sciences Research Institute:** Visiting Member, May-June 1998.
 - Université Paris VI:** Visiting Professor, June 1994.
 - Mathematical Sciences Research Institute:** Postdoctoral fellow, spring 1993.
- **Honors and funding:**
 - Alfred P. Sloan Doctoral Dissertation Fellowship, academic year 1990-1991.
 - Alfred P. Sloan Research Fellowship 1996 - 1998.
 - Lady Davis Fellow, Spring 2002, Spring 2012.
 - GAANN grants co-PI, 1998-2002; 2009-2012
 - NSF research grants 1992-1994, 1995-present.
 - BSF research grants, 2011-present.
 - NSF, conference grants co-PI, Summer 2005; Summer 2008, 2010-present.
 - AMS Fellow, class of 2017.
 - Invited Speaker, ICM 2018.

- **PhD student advising:**

Patricia Pacelli,	B.U.	PhD 1996.	Jian-Hua Wang,	M.I.T.	PhD 1997.
Kalle Karu,	B.U.	PhD 1999.	Gabriele La Nave,	Brandeis	PhD 2000.
Jiun-Cheng Chen,	Harvard	PhD 2003.	James Spencer,	B.U.	PhD 2004.
Jonathan Wise	Brown	PhD 2008	Henning Ulfarsson	Brown	PhD 2009
Qile Chen	Brown	PhD 2011	Noah Giansiracusa	Brown	PhD 2011
Steffen Marcus	Brown	PhD 2011	Samouil Molcho	Brown	PhD 2014
Evangelos Routis	Brown	PhD 2015	Martin Ulirsch	Brown	PhD 2015
Kenneth Ascher	Brown	PhD 2017	Alicia Harper	Brown	PhD 2018
Dori Bejleri	Brown	PhD 2018	Giovanni Inchiostro	Brown	Current

- **Visiting students:** Oskar Kedzierski (Warsaw), Summer 2004; Amost Turchet (Udine), Fall 2012; Dhruv Ranganathan (Yale), Spring 2015.
- **Honors thesis advising:** Daniel Dadush, 2004; Alexander Young, 2007; Alex Kruckman, 2010; Justin Semonsen, 2015.
- **First-year/sophomore advisor:** 2015 - present.
- **NSF post-doctoral fellows and Tamarkins sponsored:** Max Lieblich, 2004-2005; Danny Gillam, 2008-2011, Nathan Pflueger, 2014-2017.
- **Service**

Department and university level:

Chair, Brown Mathematics, 7/2017 - present. Vice chair, 2016-2017.
 Director of graduate studies, BU 1997-1998, Brown 2007-2011.
 GAANN grants senior personnel, BU 1998-2002, Brown 2009-2013.
 MSRI Seminars Committee, spring 2009.
 MSRI Logarithmic Geometry Seminar co-organizer.
 Brown Fulbright committee, Fall 2011, Fall 2012.
 Brown Mathematics Junior Hiring committee, 2010, 2012, 2014. Senior hiring committee 2013.
 Founding co-organizer, Trivial Notions Seminar, Harvard, 1988.

To the profession:

Co-organizer / scientific committees:

- Toroidal geometry and resolution of singularities, BIRS, December 2004.
- AMS Summer Institute in Algebraic Geometry, Seattle July 24-August 12, 2005.
- AMS Special Session, Storrs, CT, October 28-29, 2006
- Aspects of Moduli Theory, de Giorgi Center, Pisa, June 2008
- *Moduli spaces*, Oberwolfach, January 2010 and February 2013.
- Algebraic Geometry New England Series, 2010-present.
- MRC program ‘Birational Geometry and Moduli’, Snowbird, June 2010
- Resolution of Singularities, Valladolid, Spain, March 2010
- A celebration of classical algebraic geometry, August 2011
- Logarithmic Geometry and Moduli, CMI, August 2011.
- STAGS 2.0, Brown University, April 2015.
- BATMoBYle, Brown University, 2014 - present.
- Combinatorial Moduli Spaces, Fields Institute, December 2016.
- Moduli Spaces: Birational Geometry and Wall Crossings, BIRS, October 2018.

– Logarithmic Enumerative Geometry and Mirror Symmetry, Oberwolfach, June 2019.
Mentor, program for women in mathematics, MSRI, 1993.
AMS Committee on Committees, 2003 and 2004; AMS Council member and Committee on the Profession member, 2012-2015; Ad hoc committee 2014-2015.
NSF, NSA, DFG, NSERC reviews and review panels.

Editorial boards:

International Mathematics Research Notices, 1999-2004.
Transactions and Memoirs of the AMS, 2003-2015.
Algebraic Geometry – Seattle 2005, PSPUM 80.
Manuscripta Mathematica, 2014-present.
AMS Graduate Studies in Mathematics, 2014-2017.
Selecta Mathematica, 2016-present.
Geometry and Topology, 2016-present.

Referee/reviewer for numerous papers, grant applications and promotion dossiers.

To the community:

Alef-Bet Child Care board member & Secretary, 2002-2004.

• **Lectures:**

– **Invited lecture series:**

1. **Poincaré Lecture Series**, The Fields Institute for Research in Mathematical Sciences, Toronto.
Title: Resolution of Singularities and Semistable Reduction in Characteristic 0. **Dates:** February 11 and 12, 1997
2. **Working Week on Resolution of Singularities**, Obergurgl, Tirol, Austria.
Title: Alterations and Resolution of Singularities. **Dates:** September 7-14, 1997
3. **Trimester on Diophantine Equations** at Centre Émile Borel, Paris.
Title: The conjectures of Lang and Vojta. **Dates:** February 9-25, 1999.
4. **Summer School on Intersection Theory and Moduli**, International Center for Theoretical Physics, Trieste, Italy.
Title: Orbifold Cohomology and Quantum Cohomology of Orbifolds. **Dates:** September 16-20, 2002
5. **Enumerative invariants in algebraic geometry and string theory** (CIME), Cetraro, Italy.
Title: Gromov-Witten invariants for orbifolds **Dates:** June 6 - 11, 2005
6. **Clay summer school in Arithmetic Geometry**, Göttingen, Germany.
Title: Birational Geometry for Number Theorists **Dates:** July 31-August 4, 2006
7. **Working week in algebraic geometry**, Obergurgl, Tirol, Austria.
Title: The weak factorization theorem **Dates:** October 21-26, 2007
8. **Toric degenerations and mirror symmetry**, Sophus Lie Center, Nordfjordeid, Norway.
Title: Logarithmic Geometry and Moduli **Dates:** June 16-17, 2014
9. **IRTG Moduli and Automorphic Forms**, Siena, Italy.
Title: Logarithmic Geometry and Rational Curves **Dates:** August 24-28, 2015
10. **Tropical Geometry ICM Satellite conference**, Rio de Janeiro, Brazil.
Title: Logarithmic geometry and moduli, **Dates:** August 13-17, 2018.

– **Recent Conference and Workshop Talks**

- * Geometry over nonclosed fields, St. John, USVI: “Logarithmic stable maps”, March 27-April 2, 2012.
- * Giornate di Geometria Algebrica ed Argomenti Correlati XI, Pisa, Italy: “Logarithmic Gromov–Witten invariants”, May 23-26, 2012.
- * Classical Algebraic Geometry, Oberwolfach, Germany: “Logarithmic Gromov–Witten invariants”, June 18-22, 2012.

- * Algebraic, Analytic, and Tropical Geometry, Ein Gedi, Israel: “Birational invariance of logarithmic curve counts”, April 28 - May 3, 2013.
- * Points rationnels, courbes rationnelles et courbes entières sur les variétés algébriques, CRM, Montreal, Canada: “Birational invariance of logarithmic curve counts”, June 24, 2013.
- * Enumerative geometry and Calabi-Yau varieties, Fields Institute, Toronto, Canada: “The decomposition formula for logarithmic Gromov-Witten invariants”, October 16, 2013.
- * Specialization of Linear Series for Algebraic and Tropical Curves, Banff, Canada: “Tropicalizing moduli space(s)”, March 2, 2014.
- * AMS special session on Algebraic Geometry, SFSU: “Factorization of birational maps of qc schemes”, October 26, 2014.
- * AMS special session on Combinatorics and Algebraic Geometry, SFSU: “Artin fans”, October 26, 2014.
- * Simons symposium on Non-Archimedean and Tropical Geometry, Puerto Rico: “Artin fans”, February 6, 2015.
- * AMS summer institute on Algebraic Geometry, SLC: “Artin fans”, July 24, 2015.
- * Student AGNES warmup workshop, Brown: “Introduction to logarithmic curves on logarithmic schemes”, October 2, 2015.
- * Classical Algebraic Geometry, Oberwolfach, Germany: “Level structures on abelian varieties and the conjectures of Lang and Vojta”. June 14, 2016.
- * Boston College - Northeastern Algebraic Geometry Conference: “Resolution in toroidal orbifolds”. March 18, 2017.

– **Recent Seminar and colloquium talks.**

- * MSRI logarithmic geometry seminar: opening lecture, February 2009.
- * MSRI Sponsor meeting lecture, *What’s new in Algebraic Geometry?*, March 2009
- * MSRI Stacks working seminar, *Stacks and their moduli*, April 2009.
- * Stony Brook Algebraic Geometry Seminar, *Logarithmic stable maps*, October 2010.
- * Valley Geometry Seminar, UMass, Amherst: *Logarithmic Gromov–Witten theory*, March 25, 2011.
- * Northwestern Geometry/Physics seminar, *Logarithmic Gromov–Witten invariants*, April 19, 2012.
- * Beer Sheva Algebra Seminar, *Logarithmic Gromov–Witten Invariants*, May 2, 2012.
- * De Giorgi Colloquium, Scuola Normale Superiore, Pisa, *The tropicalization of moduli space*, May 22, 2012.
- * Joint Columbia-CUNY-NYU Number Theory Seminar, *Logarithmic curve counts and their decomposition*, December 5, 2013.
- * Princeton-IAS Algebraic Geometry day, *Factorization of birational maps on steroids*, April 14, 2015.
- * UBC Algebraic Geometry Seminar, *Factorization of birational maps, with a shot of good energy*, February 22, 2016.
- * UIC Algebraic Geometry Seminar, *Resolution in toroidal orbifolds*, September 29, 2017.

• **Publications:**

1. With Joe Harris, *Curves and abelian varieties on $W_d(C)$* , Comp. Math. 78, p. 227-238, 1991.
2. *Subvarieties of Abelian Varieties and of Jacobians of Curves*, Ph.D. Thesis, Harvard U., 1991.
3. With L.-Y. Fong, J. Kollár, K. Matsuki and J. Mckernan: *Abundance for threefolds*. In: *Flips and Abundance on Algebraic Threefolds*, J. Kollár, Astérisque 211, 1992.
4. With J.-F. Burnol and J. Kramer: Lecture notes for C. Soulé’s Book *Lectures on Arakelov Geometry*. Cambridge University Press, 1992.
5. With J. F. Voloch, *Toward a proof of the Mordell Lang conjecture in characteristic p* , IMRN, June 1992.
6. *Subvarieties of semiabelian varieties*, Comp. Math. 90, 1994, p 37-52

7. *Formal finiteness and the torsion conjecture on elliptic curves*, in *Columbia University Number Theory Seminar*, Astérisque 228 (1995).
8. *Uniformité des points rationnels des courbes algébriques sur toutes les extensions quadratiques et cubiques*, C.R. Acad. Sc. Paris, t. 321, Sér. I, p. 755-758, 1995.
9. *Uniformity of stably integral points on elliptic curves*, *Inventiones Math.* 127, 307-317 (1997).
10. With J. F. Voloch, *Lang's conjectures, fibered powers, and uniformity*, *New York J. of Math.* II, p 20-34, 1996. <http://nyjm.albany.edu:8000/j/v2/Abramovich-Voloch.html>
11. *A high fibered power of a family of varieties of general type dominates a variety of general type*, *Inventiones Math.* 128, 481-494 (1997).
12. *Lang maps and Harris's conjecture*, *Israel J. of Math.* 101 (1997), 85-91.
13. With A. J. de Jong, *Smoothness, Semistability, and Toroidal Geometry*, *J. Alg. Geom.* 6 (1997), 789-801.
14. With J. Wang, *Equivariant resolution of singularities in characteristic 0*, *Math. Res. Letters* 4, 427-433 (1997).
15. *A linear lower bound on the gonality of modular curves*, *IMRN* 1996, no 20, 1005-1011.
16. With F. Oort, *Alterations and resolution of singularities*, In: *Resolution of Singularities. A research textbook in tribute to Oscar Zariski*. Eds. H. Hauser, J. Lipman, F. Oort, A. Quirós. *Progress in Math.* vol 181, Birkhäuser 2000.
17. With K. Karu, *Weak semistable reduction in characteristic 0*, *Invent. math.* 139 (2000) 2, 241-273.
18. With A. Vistoli, *Complete moduli for fibered surfaces*, in: *Recent Progress in Intersection Theory*, *Proceedings of the International Conference on Intersection Theory*, Bologna, December 15–20, 1997, G. Ellingsrud, W. Fulton, A. Vistoli (eds.), Birkhäuser, 2000.
19. With K. Matsuki and S. Rashid, *A note on the factorization theorem*, *Tohoku Math. J. (2)* 51 (1999), no. 4, 489–537.
20. With K. Matsuki, *Uniformity of stably integral points on principally polarized abelian varieties of dimension ≤ 2 .*, *Israel J. Math.* 121 (2001), 351–380.
21. With A. Bertram, *The formula $12 = 10 + 2 \times 1$ and its generalizations (Counting rational curves on Hirzebruch surfaces)*, in: *Advances in algebraic geometry motivated by physics (Lowell, MA, 2000)*, 89–100, *Contemp. Math.*, 276, E. Previato, ed., Amer. Math. Soc., Providence, RI, 2001.
22. With F. Oort, *Stable maps and Hurwitz schemes in mixed characteristic*, *Advances in algebraic geometry motivated by physics (Lowell, MA, 2000)*, 89–100, *Contemp. Math.*, 276, E. Previato, ed., Amer. Math. Soc., Providence, RI, 2001.
23. With A. Vistoli, *Compactifying the space of stable maps*, *J. of the Amer. Math. Soc* 15 no. 1. 27-75.
24. With K. Karu, K. Matsuki and W. Włodarczyk, *Torification and factorization of birational maps*, *J. Amer. Math. Soc.* 15 (2002), 531-572.
25. With T. Graber and A. Vistoli, *Algebraic orbifold quantum products. Orbifolds in mathematics and physics (Madison, WI, 2001)*, 1–24, Adem, Morava, Ruan, eds., *Contemp. Math.*, 310, Amer. Math. Soc., Providence, RI, 2002.
26. With T. Jarvis, *Moduli of twisted spin curves*, *Proc. Amer. Math. Soc.* 131 (2003), no. 3, 685–699.
27. With J. M. Rojas, *Extending triangulations and semistable reduction*, in *Proceedings of FoCM 2000, special meeting in honor of Steve Smale's 70th birthday* (July 2000, City University of Hong Kong, Hong Kong), pp. 1-13, World Scientific, 2002.
28. With A. Corti and A. Vistoli, *Twisted covers and level structures*, *Special issue in honor of Steven L. Kleiman. Comm. Algebra* 31 (2003), no. 8, 3547–3618.
29. With A. Vistoli, *Twisted stable maps and quantum cohomology of stacks*, *ICTP lecture notes*, 2005.
30. With J. C. Chen, *Flops, flips and perverse point sheaves on threefold stacks*, *Journal of Algebra* 290 (2005), no. 2, 372–407.

31. With A. Polishchuk, *Sheaves of t -structures and valuative criteria for stable complexes*, J. reine ang. Mathematik, 590 (2006), 89–130.
32. With T. Graber, M. Olsson, and H.-H. Tseng, *On The Global Quotient Structure of The Space of Twisted Stable Maps to a Quotient Stack*, Journal of Algebraic Geometry 16 (2007) no. 4, 731-751.
33. *Lectures on Gromov–Witten invariants of orbifolds*, in: Enumerative invariants in algebraic geometry and String Theory, M. Manetti, ed., LNM 1947, Springer, 2008.
34. With M. Olsson and A. Vistoli, *On tame Artin stacks*, Ann. Inst. Fourier (Grenoble) 58 (2008), no. 4, 1057–1091.
35. With T. Graber and A. Vistoli, *Gromov–Witten invariants of Deligne–Mumford stacks*, Amer. J. Math. 130 (2008), no. 5, 1337–1398.
36. D. Abramovich, A. Bertram, L. Katsarkov, R. Pandharipande, M. Thaddeus (eds.), *Algebraic Geometry - Seattle 2005 I, II*. American Mathematical Society, 2009.
37. *Birational geometry for number theorists*, in *Arithmetic Geometry*, Darmon, Ellwood, Hassett, Tschinkel (eds), Amer. Math. Soc. 2009.
38. With B. Hassett, *Stable varieties with a twist*, in Classification of Algebraic Varieties, Schiermonnikoog, Faber, van der Geer, Looijenga, eds., EMS 2011.
39. With M. Olsson and A. Vistoli, *Twisted stable maps into tame Artin stacks*, J. Algebraic Geom. 20 (2011), 399-477.
40. With J. Lubin, *Raynaud’s group-scheme and reduction of coverings*, With an appendix by Jonathan Lubin. Number theory, analysis and geometry (Lang memorial volume), 118, Springer, New York, 2012.
41. With M. Romagny, *Moduli of Galois p -covers in mixed characteristics*, Algebra and Number Theory, Vol. 6 (2012), No. 4, 757780.
42. *Logarithmic Geometry and Moduli*, CMI annual report 2011, 14-15 (2012).
43. With Qile Chen, Danny Gillam, Yuhao Huang, Martin Olsson, Matt Satriano, and Shenghao Sun, *Logarithmic Geometry and Moduli*, In: *Handbook of Moduli*, G. Farkas and I. Morrison (eds.), International Press, 2013.
44. With C. Cadman, B. Fantechi and J. Wise, *Expanded degenerations and pairs*, Communications in Algebra 41 No. 6, 2346-2386, 2013.
45. With J. Denef and K. Karu, *Weak toroidalization over non-closed fields*, Manuscripta Mathematica 142 No. 1-2, 257-271, 2013.
46. *Moduli of algebraic and tropical curves*, in *Colloquium De Giorgi 2010-2012*. Edited by Umberto Zannier. Colloquia 4. Edizioni della Normale, Pisa, 2013.
47. With Q. Chen, *Logarithmic stable maps to Deligne–Faltings pairs II*, Asian Journal of Mathematics 18.3, July 2014.
48. With S. Marcus and J. Wise, *Comparison theorems for Gromov-Witten invariants of smooth pairs and of degenerations*, Annales de l’Institut Fourier, Vol. 64 no. 4 (2014), p. 1611-1667.
49. With L. Caporaso and S. Payne, *The tropicalization of the moduli space of curves*, Annales de l’École Normale Supérieure (4) 48 (2015), no. 4, 765-809.
50. With B. Fantechi, *Orbifold techniques in degeneration formulas*, Annali della SNS XVI, issue 2 (2016) 519-579. DOI Number: 10.2422/2036-2145.201408_006
51. With Q. Chen, S. Marcus, M. Ulirsch and J. Wise, *Skeletons and fans in logarithmic geometry*, p 287-336 In *Nonarchimedean and Tropical Geometry*, Baker and Payne, eds. Springer 2016
52. With M. Temkin, *Torification of diagonalizable group actions on toroidal schemes*, J. Algebra 272 (2017) 279–338.
53. With Anthony Várilly-Alvarado, *Level structures on abelian varieties and Vojta’s conjecture*, with an appendix by Keerthi Madapusi Pera, Compositio Mathematica 153 (2017), no. 2, 373-394. <https://doi.org/10.1112/S0010437X16008253>

54. With B. Fantechi, *Configurations of points on degenerate varieties and properness of moduli spaces*, Rendiconti del Seminario Matematico di Padova 137 (2017), 1-17. <https://doi.org/10.4171/RSMUP/137-1>
55. With C. Cadman and J. Wise, *Relative and orbifold Gromov–Witten theory*, Algebraic Geometry 4 (4) (2017) 452-471. <https://doi.org/10.14231/AG-2017-024>
56. With Q. Chen, S. Marcus and J. Wise, *Boundedness of the space of stable logarithmic maps*, JEMS 19 (9) (2017) 27832809 <https://doi.org/10.4171/JEMS/728>
57. With M. Temkin, *Luna’s fundamental lemma for diagonalizable groups*, Algebraic Geometry, (1) (2018) 77-113 doi:10.14231/AG-2018-003
58. With J. Wise, *Birational Invariance in logarithmic Gromov-Witten theory*, Compositio Mathematica 154 (3) (2018), 595-620 doi:10.1112/S0010437X17007667
59. With Anthony Várilly-Alvarado, *Level structures, Kodaira dimensions, and Lang’s conjecture*, Advances in Mathematics 329 (2018), pp. 523-540 <https://doi.org/10.1016/j.aim.2017.12.023>

Accepted / In press:

60. With Anthony Várilly-Alvarado, *Campana points, Vojta’s conjecture, and level structures on semistable abelian varieties*, J. Théorie de Nombres de Bordeaux, to appear arXiv:1608.05651.
61. *Resolution of singularities of complex algebraic varieties and their families*, Proc. Int. Cong. of Math. 2018 Rio de Janeiro, to appear <http://arxiv.org/abs/1711.09976>

In progress:

62. With M. Temkin, *Functorial factorization of birational maps for qc schemes in characteristic 0*, arXiv:1606.08414
63. With M. Temkin and J. Włodarczyk, *Toroidal orbifolds, destackification and Kummer blowings up*, arXiv:1709.03206
64. With M. Temkin and J. Włodarczyk, *Principalization on logarithmic orbifolds*, arXiv:1709.03185
65. With Q. Chen, M. Gross and B. Siebert, *Decomposition formula for Logarithmic maps*, arXiv:1709.09864
66. *\mathbf{Q} -mild reduction*, appendix to *Kobayashi hyperbolicity of moduli spaces of minimal projective manifolds of general type* by Ya Deng, arXiv:1806.01666
67. With Q. Chen, M. Gross and B. Siebert, *Punctured Logarithmic maps*, in preparation. <https://www.dpmms.cam.ac.uk/~mg475/punctured.pdf>
68. With J. Wise, *Representability criteria in logarithmic and tropical geometry*, in preparation.
69. With M. Temkin and J. Włodarczyk, *Principalization of ideals and canonical desingularization on logarithmic varieties*, in preparation.
70. With M. Temkin and J. Włodarczyk, *Relative principalization and logarithmically smooth reduction*, in preparation.

Other:

71. *Canonical models and stable reduction for plurifibered varieties*, math.AG/0207004
72. With Q. Chen, D. Gillam and S. Marcus, *The Evaluation Space of Logarithmic Stable Maps*, arXiv:1012.5416
73. With C. Xu, *Pseudoideals as DG schemes*, preliminary manuscript.