

ALEXANDER A. VORONOV

Education:	Ph.D. in Mathematics, Moscow State University Thesis advisor: Y. I. Manin B.S. in Mathematics Moscow State University summa cum laude	1988 1985
Employment:	Visiting Senior Scientist, Kavli IPMU, Kashiwa, Japan Professor, University of Minnesota Associate Head, University of Minnesota Associate Professor, University of Minnesota Associate Professor, Michigan State University Assistant Professor, Michigan State University Visiting Assistant Professor, M.I.T. Lecturer, University of Pennsylvania Lecturer, Princeton University Visiting Assistant Professor, University of CA, Davis Junior Researcher, Moscow State University, Russia	2010 – Present 2007 – Present 2007–11 2001–07 2000–01 1998–2000 1996–98 1993–96 1991–93 1990–91 1988–90
Short-Term Positions:	Visitor, CGP, IBS, Postech, Pohang, Korea Visiting Professor, University of Tokyo, Japan Visitor, SCGP, Stony Brook, NY Visitor, IHES, Bures-sur-Yvette Visiting Professor, Max-Planck-Institut, Bonn Member, MSRI, Berkeley, CA Member, Fields Institute, Toronto Invited Lecturer, Fourier Institute, Grenoble	May, Dec 2016 Aug–Sep 2015 June 2015 95, 96, 99, 00, 03, 08, 09, 14 94, 95, 98, 02, 12 Spring 2006 Spring 2005 June 1999
Professional Memberships:	Graduate Faculty Mentor, Alliance Member, American Mathematical Society	2016 – Present 2015 – Present
Honors and Awards:	Distinguished Visitor, Lancaster University, UK FSMP Lecturer, University of Tokyo Simons Fellow in Mathematics JSPS Fellow for Research in Japan Stone Visiting Professor, Northeastern University Invited Address, <i>AMS Meeting</i> , Buffalo, NY AMS Centennial Research Fellow “Good Teaching Award” (University of Pennsylvania)	Spring 2017 September 2015 2012 Summer 2010 Spring 2004 April 1999 1996 Fall 1995
Editorial:	Editor, <i>Higher Structures</i>	2016 – Present
Advisory:	International Scientific Board, Neuron Fund, Prague International Advisory Board, Institute of Mathematics of the Czech Academy of Sciences, Prague Simons Collaboration Grant Review NSF Review Panels	2018 – Present 2016 – Present 2015-17 2002, 09
Conference Organization:	Organizer (with Bumsig Kim), Winter School on <i>Higher Categories and TQFT</i> , KIAS, Seoul, South Korea Organizer (with R. Kaufmann), Special Session on <i>Topology and Physics</i> , AMS Meeting, Minneapolis, MN Advisory Committee, XXIII, XXIV, XXXIV, and XXXV Workshops on <i>Geometric Methods in Physics</i> , Poland Scientific Committee, Workshop on <i>Algebra</i> , <i>Geometry, and Mathematical Physics</i> , Bedlewo, Poland	December 2016 October 2016 2004, 05, 15 October 2009

Advisory Committee, Conference on <i>Supersymmetry and Quantum Field Theory</i> , Ukraine	April 2006
Organizer (with T. Lada and J. Stasheff), Special Session on <i>Homotopical Physics</i> , AMS Meeting, Lawrenceville, NJ	April 2004
Advisory Committee, <i>International Symposium</i> on <i>Kac-Moody Lie algebras</i> , University of Madras, India	December 2001
Organizer, Special Session on <i>Operads, Algebras, and</i> <i>Their Applications</i> , AMS Meeting, Buffalo, NY	April 1999
Organizer (with J. Stasheff), Special Session on <i>Moduli</i> <i>Spaces, Operads and Representation Theory</i> , AMS Meeting, Hartford, CT	March 1995
Selected	
Talks:	
Colloquium talks at Harvard-MIT-Brandeis-Northeastern, Stanford, Yale, Michigan, Wisconsin, Minnesota, Stony Brook, Purdue, Duke, Southern California, Dartmouth, Toronto, Lancaster, etc.	
<i>Higher Structures 2</i> , University of Pennsylvania	March 2018
<i>AMS Meeting</i> , University at Buffalo, NY	September 2017
<i>GAP XV Quantization</i> , Penn State	August 2017
<i>Topology Seminar</i> , University of Tokyo	April 2017
Minicourse, <i>Higher Categories and TQFT</i> , Seoul, South Korea	December 2016
Minicourse, <i>20th Brazilian Topology Meeting</i> , Curitiba, Brazil	July 2016
Center for Geometry and Physics, IBS, Pohang, Korea	May 2016
<i>Closing Conference on Higher Structures</i> , MPIM, Bonn	Mar 2016
<i>AMS Meeting</i> , Loyola University, Chicago	Oct 2015
<i>Workshop on Braids, Configuration Spaces and Quantum</i> <i>Topology</i> , Tokyo, Japan	September 2015
<i>Workshop Rikkyo MathPhys 2015</i> , Tokyo, Japan	January 2015
<i>Workshop on Homological Methods in Algebra, Geometry</i> <i>& Physics</i> , London, UK	July 2014
Plenary address, <i>XXXIII Workshop on Geometric Methods</i> <i>in Physics</i> , Bialowieza, Poland	June-July 2014
<i>Integrable systems and moduli spaces</i> Banff, Canada	August 25–30, 2013
<i>AMS Meeting</i> , Iowa State University, Ames, IA	April 2013
<i>Mathematical Physics in Bahia</i> Salvador, Brazil	July 5–10, 2012
<i>Midwest Topology Seminar</i> Purdue, West Lafayette	April 28–29, 2012
<i>CBMS Conference on Deformation Theory of Algebras</i> <i>and Modules</i> , NCSU, Raleigh	May 16–20, 2011
<i>Texas Geometry and Topology Conference</i> Texas Tech, Lubbock	February 18–20, 2011
<i>AMS Meeting</i> , University of Notre Dame	November 2010
<i>AMS-KMS Joint Meeting</i> Ewha Women's University, Seoul, Korea	December 2009
<i>Conference on Quantum algebra related to field theories</i> <i>in geometries</i> , Kyoto, Japan	February 16–20, 2009
Plenary address, <i>Workshop on Algebraic Structures in</i> <i>Geometry and Physics</i> , Leicester, UK	July 21–25, 2008
<i>Journée Groupes Quantiques et Géométrie de Poisson</i> Paris, France	June 3, 2008
<i>Workshop on Symplectic Field Theory</i> Leipzig, Germany	August 5–11, 2006

Plenary address, <i>Workshop on Deformation Quantization and String Topology</i> , Prague, the Czech Republic	May, 2006
Keynote address, <i>The 20th British Topology Meeting</i> , Bristol, UK	September 12–14, 2005
Plenary address, <i>Conference on Groups, Homotopy and Configuration Spaces</i> , Tokyo, Japan	July 5–11, 2005
Lecturer, <i>Summer School on String Topology and Hochschild Homology</i> , University of Almeria, Spain	September 2003
Plenary Speaker, <i>3rd International Symposium on Quantum Theory and Symmetries</i> , Cincinnati	September 2003
Invited address, <i>Algebraic Topology of String Theory and Moduli Space of Riemann Surfaces</i> , Stony Brook	August 2003
Plenary address, <i>XXII Workshop on Geometric Methods in Physics</i> , Bialowieza, Poland	June–July 2003
Lecturer, <i>Graphs and Patterns in Mathematics and Theoretical Physics</i> , Stony Brook	June 2001
Lecturer, <i>School on Operads and Their Applications</i> , Hebrew University of Jerusalem	Feb–Mar 2000
Invited address, <i>AMS Meeting</i> , Buffalo, NY	April 1999
Lecturer, <i>Graduate Colloquium Series</i> , University of Munich	June 1997
AMS-IMS-SIAM Joint Summer Research Conference on <i>Quantization</i> , Mount Holyoke College	July 1996
Plenary address, Conference <i>Higher Homotopy Structures in Topology and Mathematical Physics</i> , Vassar College	June 1996
Plenary address, Workshop on <i>Cyclic Cohomology and Noncommutative Geometry</i> , Waterloo, Canada	June 1995
Plenary address, International Conference on <i>Operads and Homotopy Algebra</i> , Luminy, France	May–June 1995
Invited Speaker, International Conference on <i>The Moduli Space of Curves</i> in Texel, Holland	April 1994

PhD Students: E. Harrelson PhD'06, J. Zuniga PhD'07, K. Chung PhD'08, A. Hanhart PhD'09, Hao Yu PhD'10, D. Bashkirov PhD'14, A. Sharma PhD'16, D. Diroff (current), N. Ott (current), K. Maxwell (current), A. Ma (current)

Postdocs: B. Badzioch 2001–04, S. O. Wilson 2005–08

PUBLICATIONS:

Books and Collections:

1. *String Topology and Cyclic Homology* (with R. L. Cohen and K. Hess), Adv. Courses Math. CRM Barcelona, Birkhäuser, Basel, 2006, 163 pp.
2. *Operads: Proceedings of Renaissance Conferences* (coedited with J.-L. Loday and J. Stasheff), Contemp. Math., vol. 202. AMS, Providence, RI, 1997.

Papers:

1. *On homotopy Lie bialgebroids* (with D. Bashkirov), Preprint IPMU16-0198, 21 pp., submitted, [arXiv:1612.02026](https://arxiv.org/abs/1612.02026) [math.QA].
2. *Categorification of Dijkgraaf-Witten Theory* (with A. Sharma), Adv. Theor. Math. Phys. **21** (2017), no. 4, 1023–1061.
3. *Hey, tell me what you do in research!* Popular science article in *Kavli IPMU News*. **37** (2017), 14.

4. *The MV formalism for IBL_∞ - and BV_∞ -algebras* (with M. Markl), *Lett. Math. Phys.* **107** (2017), no. 8, 1515–1543.
5. *The BV formalism for L_∞ -algebras* (with D. Bashkirov). *J. Homotopy Relat. Struct.* **12** (2017), no. 2, 305–327.
6. *In search of solitons in Amsterdam*. Popular science article in *Kavli IPMU News*. **34** (2016), 13.
7. *Urashima effect: a version*. Popular science article in *Kavli IPMU News*. **31** (2015), 22–23.
8. *r_∞ -Matrices, triangular L_∞ -bialgebras, and quantum $_\infty$ groups* (with D. Bashkirov), *Geometric Methods in Physics. XXXIII Workshop 2014*, 39–47, Trends in Mathematics, Birkhäuser Boston, Inc., Boston, MA, 2015, [arXiv:1412.2413 \[math.QA\]](#).
9. *A higher category of cobordisms and topological quantum field theory* (with M. Feshbach), Preprint IPMU11-0143, 37 pp., submitted, [arXiv:1108.3349 \[math.QA\]](#).
10. *Open-closed moduli spaces and related algebraic structures* (with E. Harrelson and J. J. Zuniga). *Lett. Math. Phys.* **94** (2010), no. 1, 1–26, [arXiv:0709.3874 \[math.QA\]](#).
11. *PROPPed up graph cohomology* (with M. Markl). *Algebra, arithmetic, and geometry: in honor of Yu. I. Manin. Vol. II*, 249–281, *Progr. Math.*, **270**, Birkhäuser Boston, Inc., Boston, MA, 2009, [math.QA/0307081](#).
12. *Graph homology: Koszul and Verdier duality* (with A. Lazarev), *Adv. Math.* **218** (2008), no. 6, 1878–1894, [math.QA/0702313](#).
13. *The canonical delooping machine* (with B. Badzioch and K. Chung). *J. of Pure and Applied Algebra* **208** (2007), no. 2, 531–540, [math.AT/0403098](#).
14. *Notes on string topology* (with R. L. Cohen), *String topology and cyclic homology*, 1–95, *Adv. Courses Math. CRM Barcelona*, Birkhäuser, Basel, 2006, [math.GT/0503625](#).
15. *On Kontsevich’s Hochschild cohomology conjecture* (with P. Hu and I. Kriz). *Compos. Math.* **142** (2006), no. 1, 143–168, [math.AT/0309369](#).
16. *Notes on universal algebra*. *Graphs and Patterns in Mathematics and Theoretical Physics* (M. Lyubich and L. Takhtajan, eds.), *Proc. Sympos. Pure Math.*, vol. 73. AMS, Providence, RI, 2005, pp. 81–103, [math.QA/0111009](#).
17. *Homotopy Gerstenhaber algebras*, *Conférence Moshé Flato 1999* (G. Dito and D. Sternheimer, eds.), vol. 2. Kluwer Academic Publishers, the Netherlands, 2000, pp. 307–331, [math.QA/9908040](#).
18. *The Swiss-cheese operad*, *Homotopy invariant algebraic structures* (Baltimore, MD, 1998), *Contemp. Math.*, vol. 239. AMS, Providence, RI, 1999, pp. 365–373, [math.QA/9807037](#).
19. *Cohomology of conformal algebras* (with B. Bakalov and V. G. Kac), *Comm. Math. Phys.* **200** (1999), 561–598, [math.QA/9803022](#).
20. *Stability of the rational homotopy type of moduli spaces*, *Higher homotopy structures in topology and mathematical physics* (Poughkeepsie, NY, 1996), *Contemp. Math.*, vol. 227. AMS, Providence, RI, 1999, pp. 315–321, [alg-geom/9708019](#).
21. *Semi-Infinite Induction and Wakimoto Modules*, *Amer. J. Math.* **121** (1999), no. 5, 1079–1094, [q-alg/9704020](#).
22. *Quantizing Poisson manifolds*. *Perspectives on Quantization* (L. A. Coburn and M. A. Rieffel, eds.), *Contemp. Math.*, vol. 214. AMS, Providence, RI, 1998, pp. 189–195, [q-alg/9701017](#).

23. *Homotopy Gerstenhaber algebras and topological field theory* (with T. Kimura and G. Zuckerman). Operads: Proceedings of Renaissance Conferences (J.-L. Loday, J. Stasheff, and A. A. Voronov, eds.), Contemp. Math., vol. 202. AMS, Providence, RI, 1997, pp. 305–334.
24. *Semiquantum geometry* (with N. Reshetikhin and A. Weinstein). Algebraic geometry, 5. J. Math. Sci. **82** (1996), no. 1, 3255–3267.
25. *Homology of moduli spaces of curves and commutative homotopy algebras* (with T. Kimura and J. Stasheff). The Gelfand Mathematical Seminars, 1993–1995. Edited by I. Gelfand, J. Lepowsky, and M. M. Smirnov. Birkhäuser Boston, Inc., Boston, MA, 1996, pp. 151–170.
26. *Cohomology and deformation of Leibniz pairs* (with M. Flato and M. Gerstenhaber). Letters in Mathematical Physics **34**(1), 77–90 (1995).
27. *The cohomology of algebras over moduli spaces* (with T. Kimura). In: The Moduli Space of Curves (R. Dijkgraaf, C. Faber, and G. van der Geer, eds.) Progress in Mathematics, vol. 129. Birkhäuser, Boston, MA, 1995, pp. 305–334.
28. *Homotopy G-algebras and moduli space operad* (with M. Gerstenhaber). Internat. Math. Research Notices 141–153 (1995).
29. *Higher-order operations on Hochschild complex* (with M. Gerstenhaber). Functional Anal. Appl. **29**(1), 1–6 (1995).
30. *On operad structures of moduli spaces and string theory* (with T. Kimura and J. Stasheff). Comm. Math. Phys. **171**, 1–25 (1995).
31. *Topological field theories, string backgrounds and homotopy algebras*. In: Proceedings of the XXIInd International Conference on Differential Geometric Methods in Theoretical Physics, Ixtapa-Zihuatanejo, México (J. Keller and Z. Oziewicz, eds.) Advances in Applied Clifford Algebras (Proc. Suppl.) **4** (S1) 167–178 (1994).
32. *Semi-infinite cohomology of Lie algebras*. Proc. Sympos. Pure Math. **56**, part 2, 401–415 (1994).
33. *Semi-infinite homological algebra*. Invent. Math. **113**, 103–146 (1993).
34. *BRST cohomology: a new derived functor*. In: XXth International Conference on Differential Geometric Methods in Theoretical Physics, vol. 2. World Scientific, Singapore, 1992, pp. 905–912.
35. *Complex divisors on algebraic curves and some applications to string theory*. Contemp. Math. **131**, part 3, 515–522 (1992).
36. *A unified approach to string scattering amplitudes*. Comm. Math. Phys. **131**, 179–218 (1990). *Erratum*: **140**, 415–416 (1991).
37. *Superconformal geometry and string theory* (with A. A. Rosly and A. S. Schwarz). Comm. Math. Phys. **120**(3), 437–450 (1989).
38. *Geometry of superconformal manifolds* (with A. A. Rosly and A. S. Schwarz). Comm. Math. Phys. **119**, 129–152 (1988).
39. *Supercellular partitions of flag superspaces* (with Yu. I. Manin). Current problems in mathematics. Newest results, USSR Acad. Sci., Moscow. **32**, 27–70 (1988). (in Russian). English translation: J. Soviet Math. **51**(1), 2083–2108 (1990).
40. *Elements of supergeometry* (with Yu. I. Manin and I. B. Penkov). Current problems in mathematics. Newest results, USSR Acad. Sci., Moscow. **32**, 3–26 (1988) (in Russian). English translation: J. Soviet Math. **51**(1), 2069–2082 (1990).

41. *A formula for the Mumford measure in superstring theory.* Functional Anal. Appl. **22**(2), 139–140 (1988).
42. *The relative disposition of Schubert supervarieties and the resolution of their singularities.* Functional Anal. Appl. **21**, 62–64 (1987).
43. *Schubert supercells* (with Yu. I. Manin). Functional Anal. Appl. **18**, 329–330 (1985).
44. *Mappings of supermanifolds.* Theoret. and Math. Phys. **60**, 660–664 (1985).