

## ALEXANDER A. VORONOV

<b>Education:</b>	Ph.D. in Mathematics, Moscow State University Thesis advisor: Y. I. Manin	1988
	B.S. in Mathematics Moscow State University summa cum laude	1985
<b>Employment:</b>	Visiting Senior Scientist, Kavli IPMU, Kashiwa, Japan	2010–to date
	Professor, University of Minnesota	2007–to date
	Associate Head, University of Minnesota	2007–11
	Associate Professor, University of Minnesota	2001–07
	Associate Professor, Michigan State University	2000–01
	Assistant Professor, Michigan State University	1998–2000
	Visiting Assistant Professor, M.I.T.	1996–98
	Lecturer, University of Pennsylvania	1993–96
	Lecturer, Princeton University	1991–93
	Visiting Assistant Professor, University of CA, Davis	1990–91
	Junior Researcher, Moscow State University, Russia	1988–90
<b>Short-Term Positions:</b>	Distinguished Visitor, Lancaster University, UK	May 2017
	Visitor, CGP, IBS, Postech, Pohang, Korea	May, Dec 2016
	Visiting Professor, University of Tokyo, Japan	Aug–Sep 2015
	Visitor, SCGP, Stony Brook, NY	June 2015
	Visitor, IHES, Bures-sur-Yvette	95, 96, 99, 00, 03, 08, 09, 14
	Visiting Professor, Max-Planck-Institut, Bonn	94, 95, 98, 02, 12
	Member, MSRI, Berkeley, CA	Spring 2006
	Member, Fields Institute, Toronto	Spring 2005
	Invited Lecturer, Fourier Institute, Grenoble	June 1999
<b>Honors and Awards:</b>	Distinguished Visitor, Lancaster University, UK	May 2017
	FSMP Lecturer, University of Tokyo	September 2015
	Simons Fellow in Mathematics	2012
	JSPS Fellow for Research in Japan	Summer 2010
	Stone Visiting Professor, Northeastern University	Spring 2004
	Invited Address, <i>AMS Meeting</i> , Buffalo, NY	April 1999
	AMS Centennial Research Fellow	1996
	“Good Teaching Award” (University of Pennsylvania)	Fall 1995
<b>Editorial:</b>	Editor, <i>Higher Structures</i>	2016-to date
	Editorial and Advisory Board, <i>Archive for Mathematical Physics</i>	2014-to date
	Editorial and Advisory Board, <i>Algebra Geometry Mathematical Physics</i>	2014-to date
	Editor-in-Chief, <i>Journal of Physical Mathematics</i>	2013-15
	Editor-in-Chief, <i>Journal of Generalized Lie Theory and Applications</i>	2013-15
	Editor, <i>Journal of Physical Mathematics</i>	2009-13
	Editor, <i>Journal of Generalized Lie Theory and Appl.</i>	2006-13
<b>Advisory:</b>	Alliance Graduate Faculty Mentor	2016-to date
	International Advisory Board of the Institute of Mathematics of the Czech Academy of Sciences, Prague	2016-to date
	Simons Collaboration Grant Review	2015, 16
	NSF Review Panels	2002, 09
<b>Conference Organization:</b>	Organizer (with Bumsig Kim), Winter School on <i>Higher Categories and TQFT</i> , KIAS, Seoul, South Korea	December 2016

Organizer (with R. Kaufmann), Special Session on <i>Topology and Physics</i> , AMS Meeting, Minneapolis, MN	October 2016
Advisory Committee, XXIII, XXIV, XXXIV, and XXXV Workshops on <i>Geometric Methods in Physics</i> , Poland	2004, 05, 15
Scientific Committee, Workshop on <i>Algebra, Geometry, and Mathematical Physics</i> , Bedlewo, Poland	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 on Kac-Moody Lie algebras</i> , University of Madras, India	December 2001
Organizer, Special Session on <i>Operads, Algebras, and Their Applications</i> , AMS Meeting, Buffalo, NY	April 1999
Organizer (with J. Stasheff), Special Session on <i>Moduli Spaces, Operads and Representation Theory</i> , AMS Meeting, Hartford, CT	March 1995
<b>Selected Talks:</b>	
Colloquium talks at Harvard-MIT-Brandeis-Northeastern, Stanford, Yale, Michigan, Wisconsin, Minnesota, Stony Brook, Purdue, Duke, Southern California, Dartmouth, Toronto, Lancaster, etc.	
AMS Meeting, University at Buffalo, NY	September 2017
GAP XV Quantization, Penn State	August 2017
Topology Seminar, 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
Closing Conference on <i>Higher Structures</i> , MPIM, Bonn	Mar 2016
AMS Meeting, Loyola University, Chicago	Oct 2015
Workshop on <i>Braids, Configuration Spaces and Quantum Topology</i> , Tokyo, Japan	September 2015
Workshop <i>Rikkyo MathPhys 2015</i> , Tokyo, Japan	January 2015
Workshop on <i>Homological Methods in Algebra, Geometry &amp; Physics</i> , London, UK	July 2014
Plenary address, XXXIII Workshop on <i>Geometric Methods in Physics</i> , Bialowieza, Poland	June-July 2014
<i>Integrable systems and moduli spaces</i> Banff, Canada	August 25–30, 2013
AMS Meeting, Iowa State University, Ames, IA	April 2013
<i>Mathematical Physics in Bahia</i> Salvador, Brazil	July 5–10, 2012
Midwest Topology Seminar Purdue, West Lafayette	April 28–29, 2012
CBMS Conference on <i>Deformation Theory of Algebras and Modules</i> , NCSU, Raleigh	May 16–20, 2011
Texas Geometry and Topology Conference Texas Tech, Lubbock	February 18–20, 2011
AMS Meeting, University of Notre Dame	November 2010
AMS-KMS Joint Meeting	
Ewha Women's University, Seoul, Korea	December 2009
Conference on <i>Quantum algebra related to field theories in geometries</i> , Kyoto, Japan	February 16–20, 2009
Plenary address, <i>Workshop on Algebraic Structures in</i>	

Geometry and Physics, Leicester, UK	July 21–25, 2008
Journée Groupes Quantiques et Géométrie de Poisson Paris, France	June 3, 2008
Workshop on Symplectic Field Theory Leipzig, Germany	August 5–11, 2006
Plenary address, Workshop on Deformation Quantization and String Topology, Prague, the Czech Republic	May, 2006
Keynote address, The 20th British Topology Meeting, Bristol, UK	September 12–14, 2005
Plenary address, Conference on Groups, Homotopy and Configuration Spaces, Tokyo, Japan	July 5–11, 2005
Lecturer, Summer School on String Topology and Hochschild Homology, University of Almeria, Spain	September 2003
Plenary Speaker, 3rd International Symposium on Quantum Theory and Symmetries, Cincinnati	September 2003
Invited address, Algebraic Topology of String Theory and Moduli Space of Riemann Surfaces, Stony Brook	August 2003
Plenary address, XXII Workshop on Geometric Methods in Physics, Bialowieza, Poland	June-July 2003
Lecturer, Graphs and Patterns in Mathematics and Theoretical Physics, Stony Brook	June 2001
Lecturer, School on Operads and Their Applications, Hebrew University of Jerusalem	Feb–Mar 2000
Invited address, AMS Meeting, Buffalo, NY	April 1999
Lecturer, Graduate Colloquium Series, University of Munich	June 1997
AMS-IMS-SIAM Joint Summer Research Conference on Quantization, Mount Holyoke College	July 1996
Plenary address, Conference Higher Homotopy Structures in Topology and Mathematical Physics, Vassar College	June 1996
Plenary address, Workshop on Cyclic Cohomology and Noncommutative Geometry, Waterloo, Canada	June 1995
Plenary address, International Conference on Operads and Homotopy Algebra, Luminy, France	May-June 1995
Plenary address, XXIIInd International Conference on Differential Geometric Methods in Theoretical Physics, Ixtapa, Mexico	September 1993

**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)

### PUBLICATIONS:

1. *On homotopy Lie bialgebroids* (with D. Bashkirov), Preprint IPMU16-0198, 13 pp., submitted, [arXiv:1612.02026](https://arxiv.org/abs/1612.02026) [math.QA].
2. *The MV formalism for  $IBL_\infty$ - and  $BV_\infty$ -algebras* (with M. Markl), Preprint IPMU15-0215, 26 pp., to appear in Lett. Math. Phys. (2017), [arXiv:1511.01591](https://arxiv.org/abs/1511.01591) [math.QA].
3. *Categorification of Dijkgraaf-Witten Theory* (with A. Sharma), Preprint IPMU15-0216, 27 pp., to appear in Adv. Theor. Math. Phys. **21** (2017), no. 4, [arXiv:1511.00295](https://arxiv.org/abs/1511.00295) [math.AT].
4. *The BV formalism for  $L_\infty$ -algebras* (with D. Bashkirov). *J. Homotopy Relat. Struct.* **12** (2017), no. 2, 305–327, [arXiv:1410.6432](https://arxiv.org/abs/1410.6432) [math.QA].
5. *In search of solitons in Amsterdam*. Popular science article in *Kavli IPMU News*. **34** (2016), 13.

6. *Urashima effect: a version*. Popular science article in *Kavli IPMU News*. **31** (2015), 22–23.
7.  *$r_\infty$ -Matrices, triangular  $L_\infty$ -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](#)].
8. *A higher category of cobordisms and topological quantum field theory* (with M. Feshbach), Preprint IPMU11-0143, 37 pp., submitted, [arXiv:1108.3349](#) [[math.QA](#)].
9. *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](#)].
10. *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](#).
11. *Graph homology: Koszul and Verdier duality* (with A. Lazarev), Adv. Math. **218** (2008), no. 6, 1878–1894, [math.QA/0702313](#).
12. *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](#).
13. *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](#).
14. *String Topology and Cyclic Homology* (with R. L. Cohen and K. Hess), Adv. Courses Math. CRM Barcelona, Birkhäuser, Basel, 2006, 163 pp.
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. *Operads: Proceedings of Renaissance Conferences* (coedited with J.-L. Loday and J. Stasheff), Contemp. Math., vol. 202. AMS, Providence, RI, 1997.
24. *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.

25. *Semiquantum geometry* (with N. Reshetikhin and A. Weinstein). Algebraic geometry, 5. J. Math. Sci. **82** (1996), no. 1, 3255–3267.
26. *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.
27. *Cohomology and deformation of Leibniz pairs* (with M. Flato and M. Gerstenhaber). Letters in Mathematical Physics **34**(1), 77–90 (1995).
28. *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.
29. *Homotopy  $G$ -algebras and moduli space operad* (with M. Gerstenhaber). Internat. Math. Research Notices 141–153 (1995).
30. *Higher-order operations on Hochschild complex* (with M. Gerstenhaber). Functional Anal. Appl. **29**(1), 1–6 (1995).
31. *On operad structures of moduli spaces and string theory* (with T. Kimura and J. Stasheff). Comm. Math. Phys. **171**, 1–25 (1995).
32. *Topological field theories, string backgrounds and homotopy algebras*. In: Proceedings of the XXIIInd 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).
33. *Semi-infinite cohomology of Lie algebras*. Proc. Sympos. Pure Math. **56**, part 2, 401–415 (1994).
34. *Semi-infinite homological algebra*. Invent. Math. **113**, 103–146 (1993).
35. *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.
36. *Complex divisors on algebraic curves and some applications to string theory*. Contemp. Math. **131**, part 3, 515–522 (1992).
37. *A unified approach to string scattering amplitudes*. Comm. Math. Phys. **131**, 179–218 (1990). *Erratum*: **140**, 415–416 (1991).
38. *Superconformal geometry and string theory* (with A. A. Rosly and A. S. Schwarz). Comm. Math. Phys. **120**(3), 437–450 (1989).
39. *Geometry of superconformal manifolds* (with A. A. Rosly and A. S. Schwarz). Comm. Math. Phys. **119**, 129–152 (1988).
40. *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).
41. *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).
42. *A formula for the Mumford measure in superstring theory*. Functional Anal. Appl. **22**(2), 139–140 (1988).
43. *The relative disposition of Schubert supervarieties and the resolution of their singularities*. Functional Anal. Appl. **21**, 62–64 (1987).
44. *Schubert supercells* (with Yu. I. Manin). Functional Anal. Appl. **18**, 329–330 (1985).
45. *Mappings of supermanifolds*. Theoret. and Math. Phys. **60**, 660–664 (1985).