

## ANTON M. ZEITLIN

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CONTACT INFORMATION	Department of Mathematics Louisiana State University 303 Lockett Hall Baton Rouge LA 70803 USA	<i>Cell:</i> (917) 7178815 <i>Fax:</i> (225) 5784276 <i>E-mail:</i> zeitlin@lsu.edu <i>WWW:</i> <a href="http://math.lsu.edu/~zeitlin">http://math.lsu.edu/~zeitlin</a>
CITIZENSHIP	Russian, US Permanent Resident	
CURRENT POSITION	Assistant Professor (tenure-track), Louisiana State University, August 21, 2017–	
PREVIOUS EMPLOYMENT	J.F. Ritt Assistant Professor, Department of Mathematics, Columbia University: July 1, 2012–July 1, 2017 On leave 2013-2014 academic year as EPDI fellow: September 1, 2013 - February 28, 2014, Max Planck Institute for Mathematics, Bonn, March 1, 2014 - August 31, 2014, Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette.	
RESEARCH INTERESTS	Representation theory with applications to geometry, topology and mathematical physics. In particular: Enumerative geometry, Higher Teichmüller theory, Supergeometry, Quantum groups, Kac-Moody algebras, Loop groups, Homotopy algebras, Conformal field theory, Integrable systems, Algebraic and Geometric structures of Quantum field theory and Gravity	
EDUCATION	<b>Yale University</b> , Ph.D. in Mathematics, 2006-2012, <b>St. Petersburg State University</b> , St. Petersburg, Russia, M.S., High Energy Physics, 2005	
GRANTS AND AWARDS	Simons Collaboration Grant: 2018-2023 AMS Simons Travel Grant: 2016-2018 EPDI laureate (IHES): 2012-2014 Yale University: Sterling stipend, 2006-2008 Dynasty Foundation Stipend: 2003-2006 CRDF: Grant No. RUM1-2622-ST-04 (as a member of Group), 2005-2006 RFBR: grant 05-01-00922 (as a member of Group), 2005-2006	
TEACHING EXPERIENCE	<b>Louisiana State University</b> , Baton Rouge, Louisiana, USA  <i>Instructor</i> <span style="float: right;"><b>2018-2019</b></span> Teaching courses "Calculus I" and "Representation theory"  <i>Instructor</i> <span style="float: right;"><b>2017-2018</b></span> Taught course "Calculus I"  <b>Columbia University</b> , New York, New York, USA  <i>Instructor</i> <span style="float: right;"><b>2016-2017</b></span> Taught courses "Calculus II" and "Modern Geometry II" <i>Instructor</i> <span style="float: right;"><b>2015-2016</b></span> Taught courses "Calculus III" and "Introduction to Algebraic Topology" <i>Instructor</i> <span style="float: right;"><b>2014-2015</b></span> Taught courses "Calculus III" and "Conformal Field Theory" <i>Instructor</i> <span style="float: right;"><b>2012-2013</b></span>	

Taught course "Calculus of Functions of One Variable I"

**Yale University**, New Haven, Connecticut, USA

*Instructor*

**2009-2012**

Taught courses "Calculus of Functions of One Variable I, II", "Calculus of Functions of Several Variables".

*Teaching Assistant*

**Spring, 2008**

Led weekly recitation sessions for the course "Vector Calculus and Linear Algebra".

CO-ADVISING PHD STUDENTS    Andrey V. Smirnov (currently a tenure-track Assistant Professor at UNC Chapel Hill)  
Petr P. Pushkar (currently a postdoc at Perimeter Institute)

SELECTED  
PUBLICATIONS

PREPRINTS

- 42. Fatgraphs and Super-Riemann surfaces (with A.S. Schwarz), to appear in 2018
- 41. Quantum/Classical duality via q-operators (with P. Koroteev), to appear in 2018
- 40. Difference Equations for K-theoretic Vertex Functions of Type-A Nakajima Varieties (with P. Koroteev), submitted to **Mathematical Research Letters**, arXiv:1802.04463
- 39. On the Ramond decorations (with I. C.-H. Ip, R.C. Penner), submitted to **Communications in Mathematical Physics**, arXiv:1709.06207
- 38. Quantum K-theory of Quiver Varieties and Many-Body Systems (with P. Koroteev, P.P. Pushkar, A. Smirnov), submitted to **Selecta Mathematica New Series**, arXiv:1705.10419
- 37. Baxter Q-operator from Quantum K-theory (with P. Pushkar, A. Smirnov), submitted to **Advances in Mathematics**, arXiv:1612.08723

PUBLISHED AND ACCEPTED PAPERS

- 36.  $\mathcal{N} = 2$  Super-Teichmüller Theory (with I. C.-H. Ip, R.C. Penner), **Advances in Mathematics**, Volume 336 (2018) pp. 409-454, arXiv:1605.08094
- 35. Decorated Super-Teichmüller Space (with R.C. Penner), **Journal of Differential Geometry**, in press, arXiv:1509.06302
- 34. Homotopy Algebras of Differential (Super)forms in Three and Four Dimensions (with M. Rocek), **Letters in Mathematical Physics**, in press, arXiv:1702.03565
- 33. Super-Teichmüller spaces and related structures, **Oberwolfach Reports**, to appear in 2018

32. On the unitary representations of affine  $ax+b$ -group,  $\widehat{sl}(2, \mathbb{R})$  and their relatives, **Proc. Symp. Pure Math., AMS** Volume 92 "Lie Algebras, Lie Superalgebras, Vertex Algebras and Related Topics", pp. 325-355, 2016, arXiv:1509.06072
31. Sigma-models and homotopy algebras, **Journal of Physics CS**, Volume 597, 012074, 2015, arXiv:1509.06067
30. Beltrami-Courant Differentials and  $G_\infty$ -algebras, **Advances in Theoretical and Mathematical Physics**, Volume 19, Number 6, pp. 1249-1275, 2015, arXiv:1404.3069, IHES: M-14-19
29. Q-operator and fusion relations for  $C_q(2)^{(2)}$  (with I. C.-H. Ip), **Letters in Mathematical Physics**, Volume 104, Issue 8, pp. 1019-1043, 2014, arXiv: 1312.4063, MPIM: 2014-8
28. Superopers on Supercurves, **Letters in Mathematical Physics**, Volume 105, Issue 2, 149-167, 2015, arXiv: 1311.5997, MPIM: 2014-7
27. Supersymmetry and the Modular Double (with Ivan Chi-Ho Ip), **Contemporary Mathematics**, Volume 623, pp. 81-97, 2014, arXiv:1304.6787
26. On higher order Leibniz identities in TCFT, **Contemporary Mathematics**, Volume 623, pp. 267-280, 2014, arXiv:1301.6382
25. On the continuous series for  $\widehat{sl}(2, R)$  (with I.B. Frenkel), **Communications in Mathematical Physics**, Volume 326, Issue 1, pp. 145-165, 2014, arXiv:1210.2135
24. Quantum Group  $GL_q(2)$  and Quantum Laplace Operator via Semi-infinite Cohomology (with I.B. Frenkel), **Journal of Noncommutative Geometry**, Volume 7, Issue 4, pp. 1007-1026, 2013, arXiv:1110.1696
23. Homotopy Relations for Topological VOA, **International Journal of Mathematics**, Volume 23, 1250012 (2012), arXiv:1104.5038
22. Unitary representations of a loop  $ax+b$  group, Wiener measure and Gamma-function, **Journal of Functional Analysis**, Volume 263, Issue 3, pp. 529-548, 2012, arXiv:1012.4826
21. Quasiclassical Lian-Zuckerman Homotopy Algebras, Courant Algebroids and Gauge Theory, **Communications in Mathematical Physics**, Volume 303, Number 2, pp. 331-359, 2011, arXiv:0910.3652
20. Quantum Group as Semi-infinite Cohomology (with I.B. Frenkel), **Communications in Mathematical Physics**, Volume 297, Number 3, pp. 687-732, 2010, arXiv:0812.1620
19. Beta-Gamma systems and the deformations of the BRST operator, **Journal of Physics A: Mathematical and Theoretical**, Volume 42, Number 35, 355401, 2009, arXiv:0904.2234
18. Conformal Field Theory and Algebraic Structure of Gauge Theory, **Journal of High Energy Physics**, JHEP03(2010)056, 2010, arXiv: 0812.1840

17. SFT-inspired Algebraic Structures in Gauge Theories, **Journal of Mathematical Physics** 50, Issue 6, 063501, 2009, arXiv:0711.3843
16. BV Yang-Mills as a Homotopy Chern-Simons via SFT, **International Journal of Modern Physics A** 24, Issue 7, 1309-1331, 2009, arXiv:0709.1411
15. Homotopy Lie Superalgebra in Yang-Mills Theory, **Journal of High Energy Physics**, JHEP09(2007)068, 2007, arXiv:0708.1773
14. Formal Maurer-Cartan Structures: from CFT to Classical Field Equations, **Journal of High Energy Physics**, JHEP12(2007)098, 2007, arXiv:0708.0955
13. Perturbed Beta-Gamma Systems and Complex Geometry, **Nuclear Physics B**, Volume 794, Issue 3[PM], pp. 381-401, 2008, arXiv:0708.0682
12. BRST, Generalized Maurer-Cartan Equations and CFT, **Nuclear Physics B**, Volume 759, Issue 3, pp. 370-398, 2006, hep-th/0610208
11. On First Order Formalism in String Theory (with A.S. Losev, A. Marshakov), **Physics Letters B**, Volume 633/2-3 pp. 375-381, 2006, hep-th/0510065
10. Quantization of N=2 supersymmetric KdV Hierarchy, **Theoretical and Mathematical Physics**, v. 147, n. 2, pp. 303-314, 2006 (in russian); Engl. transl.: Theoretical and Mathematical Physics, v. 147, n. 2, pp. 698-708, 2006, hep-th/0606129
9. Quantum supersymmetric Toda-mKdV hierarchies (with P. Kulish), **Nuclear Physics B**, Volume 720, Issue 3, pp. 289-306, 2005, hep-th/0506027
8. Superconformal field theory and SUSY N=1 KdV hierarchy II: the Q-operator (with P. Kulish), **Nuclear Physics B**, Volume 709, Issue 3, pp. 578-591, 2005, hep-th/0501019
7. Integrability of Superconformal Field Theory and SUSY N=1 KdV, in String Theory: from Gauge Interactions to Cosmology, NATO Advanced Study Institute, **Proc. of Cargese Summer School**, 2004, NATO Science Series II: Mathematics, Physics and Chemistry, v. 208, 393-396, Springer, 2005, hep-th/0501150
6. Quantum inverse scattering method and (super)conformal field theory (with P. Kulish), **Theoretical and Mathematical Physics**, v. 142, n. 2, pp. 252-264, 2005 (in russian); Engl. transl.: Theoretical and Mathematical Physics, v. 142, n. 2, pp. 211-221, 2005, hep-th/0501018
5. Superconformal Field Theory and SUSY N=1 KdV Hierarchy I: Vertex Operators and Yang-Baxter Equation (with P. Kulish), **Physics Letters B**, Volume 597, Issue 2, pp. 229-236, 2004, hep-th/0407154
4. Quantization of integrable models with hidden symmetries: super-KdV equation (with P. Kulish), **Journal of Modern Optics**, Volume 51, Numbers 6-7, pp. 1107 - 1108, 2004

3. Super-KdV equation: classical solutions and quantization (with P. Kulish), **Proceedings in Applied Mathematics and Mechanics (PAMM)**, Volume 4, Issue 1, pp. 576 - 577, Wiley InterScience, 2004
2. Integrable Structure of Superconformal Field Theory and Quantum super-KdV Theory (with P. Kulish), **Physics Letters B**, Volume 581, Issues 1-2, pp. 125-132, 2004, hep-th/0312159
1. Group Theoretical Structure and Inverse Scattering Method for super-KdV Equation (with P. Kulish), Zapiski Nauchnih Seminarov POMI (Steklov Institute), vol. 291, 185-205, 2002 (in russian); Engl. transl. : **Journal of Mathematical Sciences** (Springer/Kluwer), v. 125, n. 2, 203-214, 2005, hep-th/0312158

#### INVITED TALKS

“Super-Teichmueller spaces and related structures”, Oberwolfach workshop: New Trends in Teichmüller Theory and Mapping Class Groups, 2 September - 8 September, 2018.

“Super-Teichmueller spaces and related structures”, Thematic Program on Teichmüller Theory and its Connections to Geometry, Topology and Dynamics, The Fields Institute for Research in Mathematical Sciences, July 17, 2018.

“Super-Teichmueller Theory”, University of California, Davis, QMAP Seminar, April 6, 2018.

“Quantum integrable systems and Enumerative Geometry”, Colloquium, Michigan State University, February 5, 2018.

“Quantum integrable systems and Enumerative Geometry”, Harmonic Analysis Seminar, Louisiana State University, December 6, 2017.

“Quantum equivariant K-theory and integrability”, Enumerative Geometry Seminar, Columbia University, May 8, 2017.

“Quantum Equivariant K-theory and Quantum Spin Chains”, University of California, Davis, QMAP Seminar, March 17, 2017.

“Generalized Teichmueller Spaces, Spin Structures and Ptolemy Transformations”, Louisiana State University, February 6, 2017.

“Generalized Teichmüller Spaces, Spin Structures and Ptolemy Transformations”, Special Mathematics Colloquium, University of Arizona, February 2, 2017.

“Generalizations of Teichmüller space”, Department Mathematics and Statistics, University of Massachusetts Amherst, December 15, 2016.

“Generalizations of Teichmüller Space”, Special Department of Mathematics Colloquium, Purdue University, December 6, 2016.

“Super-Teichmüller spaces and new cluster transformations”, Northeastern University, December 1, 2016.

“Penner coordinates on super-Teichmueller spaces”, Cluster Algebras Seminar, University of Notre Dame, November 7, 2016.

“Penner coordinates on super-Teichmueller spaces”, UC Berkeley, October 28, 2016.

“ $N=1$  and  $N=2$  Super-Teichmüller spaces”, University of Connecticut, October 7, 2016.

“Decorated super-Teichmüller space”, “Einstein field equations, Courant algebroids and Homotopy algebras”, Symplectic Seminar, University of Toronto, September 26-27, 2016.

“Super-Teichmüller Theory”, “Homotopy Gerstenhaber algebra as a hidden structure within Einstein equations, Centre for Quantum Geometry of Moduli Spaces, Aarhus University, June 28-30, 2016.

“Einstein equations, Beltrami-Courant differentials and Homotopy Gerstenhaber algebras”, University of Nottingham, May 25-27, 2016.

“Coordinates on the decorated super-Teichmüller spaces”, Algebra and Combinatorics Seminar, North Carolina State University, April 18, 2016.

“New cluster transformations and super-Teichmüller spaces, Physically Inspired Mathematics Seminar”, The University of North Carolina at Chapel Hill, April 15, 2016.

“Towards the continuous analogue of Kazhdan-Lusztig correspondence”, Vertex Algebras and Quantum Groups, Banff International Research Station, Alberta, Canada, February 7-12, 2016.

“Superopers and supercurves”, Representation Theory and Related Topics, University of Connecticut, USA, May 11-12, 2015.

“Beltrami-Courant Differentials and Homotopy Gerstenhaber algebras”, The 30th International Colloquium on Group Theoretical Methods in Physics Ghent University in Ghent, Belgium, 14-18 July, 2014.

“Superopers on Supercurves”, 567th WE-Heraeus Seminar “Integrable Lattice Models and Quantum Field Theories” Physikzentrum Bad Honnef, Germany, June 28 - July 2, 2014.

“Sigma Models and Beltrami-Courant Differentials”, Mathematics Colloquia and Seminars, String Theory, University of California, Davis, USA, May 27, 2014.

“Towards the unitary representations of affine  $\mathfrak{sl}(2, \mathbb{R})$ ”, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University in the city of New York, USA, April 25, 2014.

“Continuous series of affine  $\mathfrak{sl}(2, \mathbb{R})$ , modular double of quantum group and all that”, Institut des Hautes Etudes Scientifiques, Sminaire de Mathematiques, Serie de “Courts Exposes”, Mardi 1er avril 2014.

“Generalized Beltrami differentials, homotopy Gerstenhaber algebras and sigma-models”, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University in the City of New York, USA, February 21, 2014.

“On the continuous series for affine  $\mathfrak{sl}(2, \mathbb{R})$ ”, Emmy-Noether-Seminar, Emmy-Noether Zentrum, Department Mathematik, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany, February 7, 2014.

“Continuous series of affine  $\mathfrak{sl}(2, \mathbb{R})$  and beyond”, Institute for Theoretical Physics, University of Cologne, Germany, January 16, 2014.

“Generalized Beltrami differentials and homotopy Gerstenhaber algebras”, Higher Differential Geometry Seminar, Max Planck Institute for Mathematics, Bonn, Germany, December 11, 2013.

“Superopers on Supercurves”, Working Group Algebra, Geometry and Quantization, University of Luxembourg, December 3, 2013.

“On the construction of the continuous series of affine  $\mathfrak{sl}(2, \mathbb{R})$ ”, MPI-Oberseminar, Max Planck Institute for Mathematics, Bonn, Germany, November 7, 2013.

“Conformal invariance for sigma models, Courant algebroids and homotopy algebras”, Higher Geometric Structures along the Lower Rhine III October 17-18, 2013; Utrecht University, The Netherlands

“Classical Field Equations, Courant Algebroids and Vertex Algebras”, Algebra Seminar, Temple University, Philadelphia, November 19, 2012.

“Continuous series of affine  $\mathfrak{sl}(2, \mathbb{R})$  and its close friends”, Lie Group/Quantum Mathematics Seminar, Rutgers University, November 9, 2012.

“On the continuous series for affine  $\mathfrak{sl}(2, \mathbb{R})$ ”, New York Applied Algebra Colloquium, CUNY Graduate Center, New York, October 19, 2012.

“On the continuous series for  $\widehat{\mathfrak{sl}}(2, \mathbb{R})$  “Algebraic structures of stringy sigma models and homotopy algebras” AMS Sectional Meeting October 13-14, 2012; Tulane University, New Orleans, LA; Session on Geometric and Algebraic Aspects of Representation Theory, Session on Quantum Groups and Noncommutative Algebraic Geometry

“Higgs effect for mathematicians”, Columbia University, New York, July 31, 2012.

“Lian-Zuckerman homotopy algebras, Courant/Vertex algebroids and beta-functions of string theory”, Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University, New York, October 28, 2011.

“Loop  $ax+b$  group, gamma-function and modular double”, Columbia Informal Categorification and Representation Theory Seminar, Columbia University, New York, October 27, 2011.

“Quantum group as semi-infinite cohomology”, Columbia Informal Categorification and Representation Theory Seminar, Columbia University, New York, October 25, 2011.

“Homotopy Relations for Topological VOA”, AMS Sectional Meeting, Cornell University, Ithaca, NY, September 10-11, 2011 ;  
Special Session on Kac-Moody Lie Algebras, Vertex Algebras, and Related Topics.

“Introduction to Vertex Operator Algebras”, Lectures at Columbia University, New York, July 6-9, 2011.

“Homotopy relations for topological vertex operator algebras”, Seminar “Infinite Dimensional Algebraic Geometry”, Yale University, New Haven, CT, June 9, June 16, 2011.

“Homotopy BV algebras, Courant algebroids and String Field Theory”, AMS Sectional Meeting, Richmond, VA, November 6-7, 2010; Special Session on Kac-Moody Algebras, Vertex (Operator) Algebras, and Applications.

“From Lian-Zuckerman Algebras to the Algebraic Structure of Classical Field Equations”, Lie Group/Quantum Mathematics Seminar, Rutgers University, January 29, 2010.

“Twistor formalism for 10d super Yang-Mills and the Berkovits complex”, Seminar “Infinite Dimen-

sional Algebraic Geometry”, Yale University, New Haven, CT, May 27, 2009.

“The Berkovits complex and super-Yang-Mills”, Seminar ”Infinite Dimensional Algebraic Geometry”, Yale University, New Haven, CT, May 21, 2009.

“Algebraic structures related to D=10 N=1 SUSY Yang-Mills theory”, Seminar ”Infinite Dimensional Algebraic Geometry”, Yale University, New Haven, CT, April 23, 2009.

“Field Equations from Homotopy Algebras of CFT”,  
”Braided Vertex Algebras, Semi-infinite Cohomology and Quantum Group”,  
Session on Homotopical Algebra with Applications to Mathematical Physics, Session on Kac-Moody Algebras, Vertex Algebras, Quantum Groups, and Applications,  
AMS Sectional Meeting, Raleigh, NC, April 4-5, 2009.

Special Minicourse ”Homotopy Structure of Gauge Theory”, Simons Center For Geometry And Physics, Stony Brook University, Stony Brook, NY, March 20-21, 2008.

“BRST, CFT and Classical Field Equations”, Math-Physics Joint Seminar, University of Pennsylvania, Philadelphia, PA, February 29, 2008.

“Gauge Theory and Homotopy Lie Algebras”, Deformation Theory Seminar, University of Pennsylvania, Philadelphia, PA, February 27, 2008.

“Gauge Theories and Homotopy Lie Algebras”, Seminar ”Infinite Dimensional Algebraic Geometry”, Yale University, New Haven, CT, January 31, 2008.

“BV Yang-Mills as a Homotopy Chern-Simons”, informal lunch seminar of Particle Theory Group, Yale University, New Haven, CT, December 6, 2007.

“Representations of quantum superalgebras and integrable structures of superconformal field theory”, Seminar on Department of High Energy and Elementary Particles Physics, Physics Faculty, St. Petersburg State University, Russia, May 22, 2007.

“CFT and representations of quantum (super)algebras: quantization of (super)KdV hierarchies”, Seminar ”Geometry, Symmetry and Physics”, Yale University, New Haven, CT, November 30, 2006.

“Quantum Toda-mKdV Hierarchies Based on Lie Superalgebras & On the First Order Formalism in String Theory”, High energy theory special seminar, Weizmann Institute of Science, Israel, May 18, 2005.



## REFERENCES

Professor **Ron Donagi**,  
Department of Mathematics  
University of Pennsylvania  
David Rittenhouse Lab  
209 South 33rd Street  
Philadelphia, PA 19104-6395,  
donagi@math.upenn.edu

Professor **Mikhail Kapranov**,  
Kavli Institute for  
the Physics and Mathematics  
of the Universe (IPMU)  
5-1-5 Kashiwanoha  
USA Kashiwa, 277-8583, Japan  
mikhail.kapranov@ipmu.jp

Professor **Mikhail Khovanov**,  
Department of Mathematics,  
Columbia University  
2990 Broadway  
509 Mathematics Building  
New York, NY 10027, USA  
khovanov@math.columbia.edu

Professor **Andrei Okounkov**,  
Department of Mathematics,  
Columbia University  
2990 Broadway  
509 Mathematics Building  
New York, NY 10027, USA  
okounkov@math.columbia.edu

Professor **Robert Penner**,  
Chaire René Thom,  
Institut des Hautes Études  
Scientifiques (IHES)  
Le Bois-Marie 35,  
route de Chartres 91440,  
Bures-sur-Yvette, France  
rpenner@ihes.fr

Professor **Nicolai Reshetikhin**,  
Department of Mathematics  
University of California, Berkeley  
970 Evans Hall  
Berkeley, CA 94720-3840, USA  
reshetik@math.berkeley.edu

Professor **Melissa Liu**,  
(evaluating teaching skills)  
Department of Mathematics  
Columbia University  
2990 Broadway  
509 Mathematics Building  
New York, NY 10027, USA  
ccliu@math.columbia.edu