

ANTON M. ZEITLIN

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CITIZENSHIP	Russian, US Permanent Resident	
CURRENT POSITION	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: Quantum equivariant K-theory, Higher Teichmüller theory, Supergeometry, Quantum groups, Kac-Moody algebras, Loop groups, Homotopy algebras, Conformal field theory, Integrable systems, Algebraic structures of Quantum field theory and Gravity	
EDUCATION	Yale University , New Haven, Connecticut USA Ph.D. in Mathematics, 2006-2012 <ul style="list-style-type: none">Dissertation Topic: “Semi-infinite Cohomology in Noncommutative Geometry and Conformal Field Theory” Advisor: Igor B. Frenkel St. Petersburg State University , St. Petersburg, Russia M.S., Mathematical Physics, 2005 <ul style="list-style-type: none">Thesis Topic: “Quantum Supersymmetric Integrable Models of KdV Type and Superconformal Field Theory”	
GRANTS AND AWARDS	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	Columbia University , New York, New York, USA <i>Instructor</i> 2016-2017 Teaching courses “Calculus II” and “Modern Geometry II” <i>Instructor</i> 2015-2016 Taught courses “Calculus III” and “Introduction to Algebraic Topology” <i>Instructor</i> 2014-2015 Taught courses “Calculus III” and “Conformal Field Theory”	

Instructor

2012-2013

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 postdoc at UC Berkeley)
Petr P. Pushkar (currently a fourth year student at Columbia University)

SELECTED
PUBLICATIONS

33. Baxter Q-operator from Quantum K-theory (with P. Pushkar, A. Smirnov), *to appear in 2016*
32. $\mathcal{N} = 2$ Super-Teichmüller Theory (with I. C.-H. Ip, R.C. Penner), arXiv:1605.08094
31. Decorated Super-Teichmüller Space (with R.C. Penner), arXiv:1509.06302
30. On the unitary representations of affine $ax + b$ -group, $\hat{sl}(2, \mathbb{R})$ 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
29. Sigma-models and homotopy algebras, Journal of Physics CS, Volume 597, 012074, 2015, arXiv:1509.06067
28. Beltrami-Courant Differentials and G_∞ -algebras, Advances in Theoretical and Mathematical Physics, Volume 19, Number 6, pp. 1249-1275, 2015, arXiv:1404.3069, IHES: M-14-19
27. 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
26. Superopers on Supercurves, Letters in Mathematical Physics, Volume 105, Issue 2, 149-167, 2015, arXiv: 1311.5997, MPIM: 2014-7
25. Supersymmetry and the Modular Double (with Ivan Chi-Ho Ip), Contemporary Mathematics, Volume 623, pp. 81-97, 2014, arXiv:1304.6787
24. On higher order Leibniz identities in TCFT, Contemporary Mathematics, Volume 623, pp. 267-280, 2014, arXiv:1301.6382
23. On the continuous series for $\hat{sl}(2, R)$ (with I.B. Frenkel), Communications in Mathematical Physics, Volume 326, Issue 1, pp. 145-165, 2014, arXiv:1210.2135
22. Quantum Group $GL_q(2)$ and Quantum Laplace Operator via Semi-infinite Cohomology (with I.B. Frenkel), J. Noncomm. Geometry, Volume 7, Issue 4, pp. 1007-1026, 2013, arXiv:1110.1696
21. Homotopy Relations for Topological VOA, International Journal of Mathematics, Volume 23, 1250012 (2012), arXiv:1104.5038

20. Unitary representations of a loop $ax+b$ group, Wiener measure and Gamma-function, J. of Functional Analysis, Volume 263, Issue 3, pp. 529-548, 2012, arXiv:1012.4826
19. 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
18. 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
17. Beta-Gamma systems and the deformations of the BRST operator, J. Physics A: Mathematical and Theoretical, Volume 42, Number 35, 355401, 2009, arXiv:0904.2234
16. Conformal Field Theory and Algebraic Structure of Gauge Theory, Journal of High Energy Physics, JHEP03(2010)056, 2010, arXiv: 0812.1840
15. SFT-inspired Algebraic Structures in Gauge Theories, J. Math. Phys. 50, Issue 6, 063501, 2009, arXiv:0711.3843
14. BV Yang-Mills as a Homotopy Chern-Simons via SFT, Int. J. Mod. Phys. A 24, Issue 7, 1309-1331, 2009, arXiv:0709.1411
13. Homotopy Lie Superalgebra in Yang-Mills Theory, Journal of High Energy Physics, JHEP09(2007)068, 2007, arXiv:0708.1773
12. Formal Maurer-Cartan Structures: from CFT to Classical Field Equations, Journal of High Energy Physics, JHEP12(2007)098, 2007, arXiv:0708.0955
11. Perturbed Beta-Gamma Systems and Complex Geometry, Nuclear Physics B, Volume 794, Issue 3[PM], pp. 381-401, 2008, arXiv:0708.0682
10. BRST, Generalized Maurer-Cartan Equations and CFT, Nuclear Physics B, Volume 759, Issue 3, pp. 370-398, 2006, hep-th/0610208
9. 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
8. 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
7. Quantum supersymmetric Toda-mKdV hierarchies (with P. Kulish), Nuclear Physics B, Volume 720, Issue 3, pp. 289-306, 2005, hep-th/0506027
6. 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
5. 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
4. 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

3. 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
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

TBA, 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-Nrnberg, 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 Represen-

tation 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 Dimensional 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

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Professor **Melissa Liu**,
(evaluating teaching skills)
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Professor **Ron Donagi**
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