NATHAN C. GEER

CURRICULUM VITAE

Mathematics & Statistics
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Education.

University of Oregon, Eugene, Ph.D., Mathematics	June 2004
Advisor: Professor Arkady Vaintrob	
Colorado State University, Fort Collins, B.S. in Mathematics	June 1998

Academic Positions.

Assistant Professor, Utah State University	August 2009 – Present
Member, Max-Planck Institute for Mathematics, Bonn, Germany	August 2008 – July 2009
VIGRE Postdoctoral Fellow, Georgia Institute of Technology	August 2004 – July 2008
Graduate Teaching Fellow , University of Oregon	August 1998 - June 2004

Invited Research Positions (1 month or longer stays).

Paris VII, Jussieu, Paris, France	April 2012
CTQM, Aarhus University, Aarhus, Denmark	June - July 2011
Geneva University, Geneva, Switzerland	July 2008 and June 2009
Institut de Recherche Mathmatique Avance, Strasbourg, France	May - June 2007
Universit de Bretagne Sud, Vannes, France	July 2007 and May 2011

Research Interests. Low Dimensional Topology, Quantum Groups and Lie Theory

Grants.

NSF Division of Mathematical Sciences Grant 1007197	July 2010 - July 2013
"Vanishing Quantum Dimensions in Low-Dimensional Topology"	
NSF Division of Mathematical Sciences Grant 0706725	July 2007 - July 2010
"Low-Dimensional Topology from a 'Super' View Point"	
AMS/NSF Travel Research Grant, ICM, Madrid, Spain	August 2006

Selected Awards and Fellowships.

Thank a Teacher Certificate. Georgia Institute of Technology.	March 2008
Take Your Professor to Lunch, Georgia Institute of Technology.	October 2005
Harrison Research Award, University of Oregon	June 2004
Johnson Research Fellowship, University of Oregon.	June 2001 / June 2003

Accepted and Published Research Papers.

[**1**] *The Kontsevich integral and quantized Lie superalgebras*, Algebr. Geom. Topol. **5** (2005), no. 45. 1111–1139.

[**2**] *The Etingof-Kazhdan quantization of Lie superbialgebras*, Adv. Math. **207** (2006), no. 1, 1–38.

[**3**] (with B. Patureau-Mirand) *Multivariable link invariants arising from* $\mathfrak{sl}(2|1)$ *and the Alexander polynomial*, J. Pure Appl. Algebra **210** (2007), no. 1, 283–298.

[**4**] *Some remarks on quantized Lie superalgebras of classical type*, J. Algebra **314** (2007) no. 2, 565–580.

[**5**] (with P. Etingof) *Monodromy of the trigonometric KZ equations*, Int. Math. Res. Not. IMRN (2007), no. 24.

[**6**] (with B. Patureau-Mirand) *On the colored HOMFLY-PT, multivariable and Kashaev link invariants,* Commun. Contemp. Math. **10** (2008), suppl. 1, 993–1011.

[**7**] (with B. Patureau-Mirand) *An invariant supertrace for the category of representations of Lie superalgebras of type I,* Pacific J. Math. **238** (2008), no. 2, 331–348.

[**8**] (with B. Enriquez) *Compatibility of quantization functors of Lie bialgebras with duality and doubling operations,* Selecta Math. (N.S.) **15** (2009), no. 1, 1–59.

[**9**] (with B. Patureau-Mirand and V. Turaev) *Modified quantum dimensions and re-normalized link invariants,* Compos. Math. **145** (2009), no. 1, 196–212.

[**10**] (with N. Reshetikhin) *On Invariants of Graphs Related to Quantum* $\mathfrak{sl}(2)$ *at Roots of Unity,* Letters in Mathematical Physics. **88** (2009), no. 1-3, 321–331

[**11**] (with B. Patureau-Mirand) *Multivariable link invariants arising from Lie superalgebras of type I*, J. Knot Theory Ramifications **19** (2010), no. 1, 93–115.

[**12**] (with J. Kujawa and B. Patureau-Mirand) *Generalized trace and modified dimension functions on ribbon categories,* Selecta Math. (N.S.) **17** (2011), no. 2, 453–504.

[**13**] (with B. Patureau-Mirand) *Polynomial 6j-Symbols and States Sums,* Algebraic & Geometric Topology **11** (2011) 1821–1860.

[**14**] (with B. Patureau-Mirand and V. Turaev) *Modified* $6j$*-Symbols and* 3*-Manifold Invariants,* accepted for publication in Advances in Math..

[**15**] (with R. Kashaev and V. Turaev) *Tetrahedral forms in monoidal categories and 3-manifold invariants,* accepted for publication in Crelle's Journal.

[**16**] (with J. Kujawa and B. Patureau-Mirand) *Ambidextrous objects and trace functions for non-semisimple categories,* accepted for publication in Proceedings of the American Mathematical Society.

Submitted papers.

[**17**] *The Kontsevich integral and re-normalized link invariants arising from Lie superalgebra,* submitted.

[**18**] (with B. Patureau-Mirand) *Topological invariants from non-restricted quantum groups,* submitted.

[**19**] (with B. Patureau-Mirand and A. Virelizier) *Traces on ideals in pivotal categories,* submitted.

Papers in preparation.

[**20**] (with N. Reshetikhin) *Invariants of links with flat connections in their complements,* In preparation.

[**21**] (with F. Costantino and B. Patureau-Mirand) *Surgery invariants of 3-manifolds from nilpotent representations,* In preparation.

Invited Conference Lectures Series.

Volume Conjecture, Invariants and geometry of knots Waseda University, Tokyo, Japan (3 hours)	January 2010
Representation of $U_q(\mathfrak{sl}(2))$ and the Alexander invariant Institut Fourier Grenoble, France (3 hours)	December 2008

Invited Conference Lectures.

Spring School in Geometry and Quantum Topology Les Diablerets, Switzerland	March, 2011
FRG-Chern-Simons Workshop Berkeley, CA	January, 2011
Quantum Geometry and Topology CIRM, Luminy, France	July, 2010
AMS Sectional Meeting Special Session: Quantum Invariants of 3-manifolds, St. Paul, MN	April, 2010
MAA Sectional Meeting Research Session: Topology, Logan, UT	March, 2010
Lie Groups and Moduli Spaces University of Geneva Geneva, Switzerland	June 2009
Cascade Topology Seminar Boise, Idaho	October 2007
International Conference on Quantum Topology Institute of Mathematics, VAST, Ha-Noi, Vietnam	August 2007
International Congress of Mathematicians Short Communication, Madrid, Spain	August 2006
Pure Mathematics Symposium University of Zurich, Switzerland	June 2006
AMS National Meeting Special Session: Quantum Invariants of Knots and 3-Manifolds, San Antonio, TX	January 2006
Joint Meeting of AMS, DMV, and MG Special Session: Quantum Knot Invariants, Mainz, Germany	June 2005
Workshop on Representation Theory and Geometry University of California, Berkeley	May 2005
AMS National Meeting Special Session: Quantum Topology, Atlanta, GA	January 2005
AMS National Meeting Special Session: Low-Dimensional Topology, Phoenix, AZ	January 2004
Knots in Poland 2003 Banach Center, Bedlewo, Poland	July 2003

Selected Recent Invited Colloquia and Seminar Lectures.

University of California, Berkeley, Geometry, Representations, And Some Physics	October 2011
University of Utah, Representation Theory Seminar	September, 2011

Georgia Institute of Technology, Geometry Topology Seminar	April, 2011
Utah State University, Colloquium	March 2011
University of Miami, Colloquium	February 2011
Boise State University, Topology Seminar	December 2010
University of Montpellier 2, Montpellier, France, Topology Seminar	July 2010
Brigham Young University, Topology Seminar	March 2010
Universit de Bretagne Sud, Vannes, France, Seminaire du LMAM	May 2009
Jussieu Institute of Mathematics, Paris, France, Topology Seminar	April 2009
University of Oxford, Oxford, UK, Representation Theory Seminar	February 2009
IRMA, Strasbourg, France, Seminaire Quantique	January 2009
University Bielefeld, Bielefeld, Germany, Oberseminar Eichtheorie und Topologie	November 2008
Max-Planck Institute for Mathematics, Bonn, Germany, Topic in Topology	October 2008
Max-Planck Institute for Mathematics, Bonn, Germany, MPI-Oberseminar	September 2008
University of Geneva, Geneva, Switzerland, Topology Seminar	July 2008
Microsoft research Station Q, Q-Seminar	June 2008
University of Georgia, Algebra Seminar	April 2008
University of Southern California, Geometry/Topology Seminar	April 2008
University of California, Riverside, Colloquium	November 2007
Indiana University, Topology Seminar	October 2007
University of California, Berkeley, Subfactor Seminar	October 2007
University of California, Davis, Geometry/Topology Seminar	October 2007
University of California, Santa Cruz, Algebra and Number Theory Seminar	October 2007
University of Oregon, Basic Notions Seminar	October 2007
Massachusetts Institute of Technology, Infinite-Dimensional Algebra Seminar	September 2007
University of Wisconsin-Madison, Lie Theory Seminar	September 2007
Universit de Bretagne Sud, Vannes, France, Seminaire du LMAM	July 2007
IRMA, Strasbourg, France, Seminaire Quantique	May 2007
Boise State University, Colloquium	March 2007
University of Calgary, Calgary, Canada, Colloquium	March 2007
University of Nantes, Nantes, France, Topology Seminar	April 2006
Jussieu Institute of Mathematics, Paris, France, Topology Seminar	April 2006
University of Oregon, Colloquium	March 2006
Emory University, Topology Seminar	February 2006
University of Georgia, Topology/Geometry Seminar	January 2006
IRMA, Strasbourg, France, Seminaire Quantique	June 2005
Universit de Bretagne Sud, Vannes, France, Seminaire du LMAM	June 2005
Massachusetts Institute of Technology, Infinite-Dimensional Algebra Seminar	February 2005

Memberships and Service.

Co-Organizer Moab Topology Conference, Moab Utah. `http://www.math.usu.edu/~geer/conference/`	Spring 2012
Organizer of a research section for MAA conference, Utah State University	Spring 2010
Organizer of Topics in Topology, Max-Planck Institute, Bonn, Germany	2008–2009
Organizer of Geometry and Topology Seminar, Georgia Institute of Technology	2005–2006
Co-Organizer of Cascade Topology Seminar, Eugene, Oregon	Fall 2003

Journal Referee: Algebraic and Geometric Topology, Communications in Mathematical Physics, Communications in Algebra, Contemporary Mathematics, Inventiones Mathematicae, Journal of Mathematical Physics, Journal of Algebraic Combinatorics, Knot Theory and its Ramifications, Representation Theory (an electronic journal published by AMS), Quantum Topology.

Advising and Mentoring.

(1) Ph.D. committee member, Jeffrey S Hazboun, Department of Physics, Utah State University.
(2) Ph.D. committee member, Juan Trujillo, Department of Physics, Utah State University.
(3) Ph.D. committee member, Austin Bunker, Department of Physics, Utah State University.

Utah State University Service.

(1) Colloquium Committee, Fall 2010 to Present.
(2) Faculty Search Committee, Fall 2010–Spring 2011.
(3) University New Faculty Panel, Fall 2010.
(4) Calculus Text Book Committee, Fall 2009.

Teaching Experience. I have taught over twenty courses during my academic career as a graduate student at the University of Oregon and as a Postdoctoral Fellow at Georgia Institute of Technology. I have also taught seven courses at Utah State University. In particular, I have been the lead instructor for the following classes:

Honors Calculus	calculus for students in the Honors Program	Fall 2011: USU
Introduction to Modern Algebra	senior level coarse; topics include: Sylow theory for finite groups factorization theory for commutative rings, and Galois theory	Spring 2011: USU
Introduction to Algebraic Structures	first course in theory of algebraic structures; topics include elementary group and ring theory	Fall 2010: USU
Lie Algebras and Representation Theory	graduate course taught to PhD students; topics included: representations of Lie algebras, universal enveloping algebras of Lie algebras and the classification theorem for semi-simple Lie algebras	Fall 2006: GaTech
Ordinary Differential Equations	an introduction to the theory of ODEs, included linear systems of ODEs and power series solutions of ODEs	Spring 2002: UofO
Calculus (all levels)	taught all levels of calculus multiple times; was responsible for writing lesson plans, giving lectures, supervising TAs and graders, writing exams, determining grades and creating different activities for the class; class sizes ranged from 25 to 150	Fall 2000—present: USU, UofO, GaTech