Department of Mathematics, University of Toronto, Toronto, ON M5S 2E4 Canada *jkamnitz@aimath.org*

Joel Kamnitzer

Education

University of Califonia, Berkeley, Department of Mathematics
PhD, 2005, thesis: Mirković-Vilonen cycles and polytopes, advisor: Allen Knutson.

University of Waterloo, Departments of Pure Mathematics and Applied Mathematics
B Math, 2001.

Positions

University of Toronto, Assistant Professor, July 2008 - present.

Mathematical Sciences Research Institute, Member, Jan - May 2007.

UC Berkeley, Postdoctoral Fellow and Visiting Assistant Professor, Aug 2006 - May 2007.

Massachusetts Institute of Technology, Postdoctoral Fellow, Sept 2005 - Aug 2006.

Fields of interest

Representation theory, algebraic geometry, combinatorial representation theory, knot homology.

Publications

1. P. Baumann and J. Kamnitzer, Quiver varieties and MV polytopes, in preparation.
2. P. Baumann and J. Kamnitzer, Good bases, MV cycles and the Hopf algebra of functions on the unipotent radical, in preparation.
3. S. Cautis, J. Kamnitzer, A. Licata, Categorical geometric skew Howe duality, sumbitted to *Invent. Math.*; math.AG/0902.1795.
4. S. Cautis, J. Kamnitzer, A. Licata, Coherent sheaves and categorical sl(2) actions, submitted to *Duke Math. J.*; math.AG/0902.1796.
5. S. Cautis, J. Kamnitzer, A. Licata, Derived equivalences for cotangent bundles of Grassmannians via categorical sl(2) actions, submitted to *J. Amer. Math. Soc.*; math.AG/0902.1797.
6. J. Kamnitzer, The Beilinson-Drinfeld Grassmannian and symplectic knot homology, submitted to proceeding of the CMI conference on vector bundles; arXiv:0811.1730.
7. S. Cautis and J. Kamnitzer, Knot homology via derived categories of coherent sheaves II, sl(m) case, *Invent. Math.*, **174** no. 1 (2008), 165–232; math.AG/0710.3216.
8. J. Kamnitzer and P. Tingley, The crystal commutor and Drinfeld's unitarized R-matrix, to appear in *J. of Alg. Comb.*; math.QA/0707.2248.

9. J. Kamnitzer, Hives and the fibres of the convolution morphism, *Selecta Math. N.S.* **13** no. 3 (2007) 483–496; math.AG/0705.1698.
10. S. Cautis and J. Kamnitzer, Knot homology via derived categories of coherent sheaves I, sl(2) case, *Duke Math. J.* **142** no. 3 (2008), 511–588; math.AG/0701194.
11. J. Kamnitzer and P. Tingley, A definition of the crystal commutor using Kashiwara's involution, to appear in *J. of Alg. Comb.*; math.QA/0610952.
12. P. Etingof, A. Henriques, J. Kamnitzer, and E. Rains, The cohomology ring of the real locus of the moduli space of stable curves of genus 0 with marked points, to appear in *Ann. of Math.*; math.AT/0507514.
13. J. Kamnitzer, Crystal structure on Mirković-Vilonen polytopes, *Adv. in Math.* **215** no. 1, (2007) 66–93; math.QA/0505398.
14. J. Kamnitzer, Mirković-Vilonen cycles and polytopes, to appear in *Ann. of Math.*; math.AG/0501365.
15. A. Henriques and J. Kamnitzer, The octahedron recurrence and gl(n) crystals, *Adv. in Math.* **206**, no. 1 (2006), 211–249; math.CO/0408114.
16. A. Henriques and J. Kamnitzer, Crystals and coboundary categories, *Duke Math. J.* **132**, no. 2 (2006), 191-216; math.QA/0406478.
17. J.Kamnitzer and R. B. Mann, Super Liouville black holes. *Nucl. Phys. B* **609** (2001), no. 3, 429–441.
18. J. M. Borwein, J. D. Broadhurst, and J. Kamnitzer, Central binomial sums, multiple Clausen values, and zeta values. *Exper. Math.* **10** (2001), no. 1, 25–34; hep-th/0004153.
19. Armitage et al., Construction and initial beam tests of the Atlas tungsten forward calorimeter. *Nucl. Phys. B, Proc. Suppl.* **78** (1999) 171–175.

Teaching experience

University of Toronto, Winter 2009.
Taught MAT 1344HS, graduate symplectic geometry.

UC Berkeley, Spring 2007.
Was the sole instructor for Math 172, undergraduate combinatorics.

UC Berkeley, Fall 2002, Spring 2005.
Taught a section of Math 53, multivariable calculus, and a section of Math 1B, calculus.

UC Berkeley, 2003, 2004.
Graded graduate Riemannian geometry, elementary differential topology, and mathematical tools for physical sciences.

Awards and Grants

NSERC Discovery Grant, 2008–2013.

UC Berkeley Distinguished Teaching Award, 2007.

Herb Alexander Prize, 2005 (for best thesis in UC Berkeley math department).

American Institute of Mathematics Five Year Fellowship, 2005–2010.

NSERC Postgraduate Scholarship B, 2003–2005.

Julie Payette-NSERC Research Scholarship, 2001–2003.

University of Waterloo Alumni Gold Medal, 2001.

NSERC Undergraduate Summer Research Award, 1999 and 2000.

Putnam Competition Honourable Mention, 1999.

University of Waterloo KD Fryer Entrance Scholarship, 1997–2001.

International Physics Olympiad Silver Medal, 1997.

Conference talks

Conference on geometric representation theory and extended affine Lie algebras, Ottawa, July 2009.

Summer school on geometric representation theory and extended affine Lie algebras, Ottawa, June 2009 (5 lectures).

Abel symposium on combinatorial aspects of algebraic geometry and commutative algebra, Voss, June 2009.

Categorification and geometrization in representation theory, Glasgow, April 2009 (2 lectures).

AMS meeting, Algebra, geometry and combinatoris session, Urbana-Champaign, March 2009.

CMS meeting, Infinite-dimensional Lie algebra session, Ottawa, December 2008.

Conference in honour of Peter Orlik, Toronto, August 2008.

Topics in Combinatorial representation theory, Berkeley, March 2008.

Conference on Algebro-Geometric Derived Categories and Applications, Princeton, March 2008.

Workshop on homological mirror symmetry and related topics, Miami, January 2008.

SACNAS conference, Low dimensional topology and quantum geometry symposium, Kansas City, October 2007.

Algebraic Analysis and Around, Kyoto, June 2007 (poster session).

Link homology and categorification, Kyoto, May 2007 (3 lectures).

Lie algebra workshop, Ottawa, April 2007.

Buildings and combinatorial representation theory workshop, Palo Alto, March 2007.

Winter School on Knot Theory and Representations, Plenary Speaker, Austin, Jan 2007.

CMS meeting, Knot homologies session, Toronto, Dec 2006.

AMS meeting, Combinatorial Representation Theory session, Fayetteville, Nov 2006.

EMS Summer School, Arithmetic and Geometry Around Quantization, Istanbul, June 2006 (2 lectures).

AMS meeting, Arrangements and Configuration Spaces session, Durham, April 2006.

Flavours of Groups conference, Banff, Nov 2005.

AMS meeting, Algebraic Combinatorics and Geometry session, Eugene, Nov 2005.

AMS meeting, Noncommutative algebra session, Eugene, Nov 2005.

Schubert Varieties and Schubert Calculus workshop, Fields Institute, Toronto, June 2005.

CMS meeting, Geometry and Combinatorics session, Waterloo, June 2005.

AMS meeting, Algebraic Geometry and Combinatorics session, Santa Barbara, April 2005.

Western Algebraic Geometry Seminar, Seattle, April 2005.

Geometric Langlands workshop, New Hampshire, March 2005.

AMS meeting, Modern Schubert Calculus session, Evanston, October 2004.

Representations of Algebraic Groups, Quantum Groups and Lie Algebras conference, Utah, June 2004.

Formal Power Series and Algebraic Combinatorics conference, Vancouver, June 2004.

Seminar and Colloquium talks

Georg–August–Universiät Gottingen, Courant lecture series, May 2009 (3 lectures).

UC Berkeley, Representation theory, geometry, and combinatorics seminar, Feb 2009.

University of Toronto, Geometric representation seminar, Jan 2009.

York University, Applied algebra seminar, Nov 2008.

University of Western Ontario, Colloquium, Oct 2008.

University of North Carolina, Colloquium, Oct 2008.

Brown University, Colloquium, Oct 2008.

University of Toronto, Symplectic geometry seminar, Sept 2008.

University of Michigan, Algebraic geometry seminar, Sept 2008.

Queens University, Algebraic geometry seminar, Sept 2008.

Mathematical Sciences Research Institute, Reductive groups seminar, Apr 2008.

Stanford University, Algebraic geometry seminar, Apr 2008.

UC Berkeley, Topology seminar, Apr 2008.

UC Berkeley, Colloquium, Mar 2008.

Institute for Advanced Study, Categories and knot theory seminar, Mar 2008.

California Institute of Technology, Algebraic geometry seminar, Feb 2008.

University of Oregon, Colloquium, Oct 2007.

Rice University, Colloquium, Oct 2007.

UC Davis, Colloquium, Oct 2007.

San Francisco State University, Algebra, geometry and combinatorics seminar, March 2007.

Columbia University, Gauge theory and symplectic geometry seminar, Feb 2007.

University of British Columbia, Representation theory seminar, Jan 2007.

University of British Columbia, Colloquium, Jan 2007.

University of Toronto, Colloquium, Dec 2006.

University of Waterloo, Colloquium, Dec 2006.

UC Riverside, Lie theory seminar, Oct 2006.

UC Berkeley, Representation theory, geometry, and combinatorics seminar, Oct 2006.

Universität zu Köln, Algebra seminar, June 2006.

Boston University, Geometry seminar, March 2006.

UC Berkeley, Combinatorics seminar, Feb 2006.

UC Berkeley, Representation theory, geometry, and combinatorics seminar, Feb 2006.

Stanford University, Algebraic geometry seminar, Feb 2006.

Stanford University, Representation theory seminar, Feb 2006.

UT Austin, GRASP seminar, Jan 2006.

UT Austin, Geometry seminar, Jan 2006.

Massachussets Institute of Technology, Lie groups seminar, Sept 2005.

École Polytechnique Fédérale de Lausanne, Group theory seminar, June 2005.

UC Davis, Geometry/Topology seminar, April 2005.

Stanford University, Algebraic geometry seminar, Feb 2005.

Northwestern University, Algebra seminar, November 2004.

Massachusetts Institute of Technology, Lie groups seminar, October 2004.

University of Toronto, Symplectic geometry seminar, October 2004.

York University, Applied algebra seminar, September 2004.

UC Berkeley, Representation theory, geometry, and combinatorics seminar, Sept 2004.

UC Davis, Representation theory and discrete math seminar, May 2004.

University of Oregon, Colloquium, May 2004.

UC Berkeley, Lie algebras, combinatorics, and geometry seminar, April 2004.

Service

Referee for: Inventiones Mathematicae, Journal of the AMS, Duke Mathematical Journal, Representation theory, Journal of Algebra, Compositio Mathematica, Advances in Mathematics, Selecta Mathematica, Cambridge University Press, Homology, Homotopy, and its Applications, Transactions of the AMS, International Mathematics Research Notices,

Discrete Applied Mathematics, Journal of Combinatorial Theory, Journal of Algebra, Fundamenta Mathematicae

Reviewer for Mathematics Reviews.

Organizer of Southern Ontario Groups and Geometry workshop, Fields Institute, Toronto, Oct 2009.

Organizer of University of Toronto, geometric representation theory seminar, fall 2008 and winter 2009.

Organizer of UC Berkeley, perverse sheaves learning seminar, fall 2007.

Organizer of UC Berkeley, D-modules learning seminar, summer 2007.

Organizer of UC Berkeley, representation theory, geometry and combinatorics seminar, spring 2007.

Organizer of UC Berkeley, graduate student seminar, 2002.

Personal

Canadian Citizen.
Comfortable in written and oral French. Basic level in oral Hebrew.
Born October 30, 1978 in Toronto, Canada.