

Curriculum vitae

Bruno VALLETTE

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Family Status

Born the 6th of January 1976 at Gérardmer (Vosges), France.

Current Position

Invited researcher at the Max Planck Institute (Bonn) during the academic year 2009/2010

Maître de conférences (Permanent position, University of Nice Sophia-Antipolis, France)

INSITUATION : Max-Planck-Institut für Mathematik
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Education

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|------------------------------|---|---|
| Jun 2009 | : | Habilitation à diriger des recherches, University of Nice Sophia-Antipolis
(<i>Properads in Algebra, Topology and Geometry and Mathematical Physics</i>) |
| December 2003 | : | Ph.D. Thesis in Mathematics (<i>Koszul duality of props</i>) |
| September 2001 - August 2004 | : | Ph.D. in Mathematics, University of Strasbourg,
(under the supervision of Jean-Louis Loday) |
| September 2000 - August 2001 | : | DEA in Mathematics, University of Strasbourg (graduate studies) |
| July 2000 | : | Agrégation de Mathématiques (national higher competitive exam, rank 8th) |
| September 1997 - August 2000 | : | Undergraduate studies, École Normale Supérieure of Lyon (France). |

Publications

- *Deformation theory of representations of prop(erad)s I*, with Sergei Merkulov, Journal für die reine und angewandte Mathematik (Crelles Journal), Issue 634 (2009), pages 51-106.
- *Free monoids in monoidal abelian categories*, Applied Categorical Structures, Volume 17, Issue 1 (2009), pages 43–63.
- *Manin products, Koszul duality, Loday algebras and Deligne conjecture*, Journal für die reine und angewandte Mathematik (Crelles Journal), Issue 620 (2008), pages 105-164.
- *A Koszul duality for props*, Trans. Amer. Math. Soc. 359 (2007), 4865-4943.
- *Homology of generalized partition posets*, Journal of Pure and Applied Algebra, 208 (2007), no. 2, 699-725.
- *Pointed and multi-pointed partitions of type A and B*, with Frédéric Chapoton, J. Algebraic Combin. 23 (2006), no. 4, 295-316.
- *Koszul duality for PROPs*, C. R. Math. Acad. Sci. Paris 338 (2004), no. 12, 909-914.

Preprints

- *Deformation theory of representations of prop(erad)s II*, with Sergei Merkulov, 52 pages, to appear in Journal für die reine und angewandte Mathematik (Crelles Journal) arxiv.org/abs/0707.0889.
- *Homotopy Batalin-Vilkovisky algebras*, with Imma Gálvez-Carrillo and Andy Tonks, 49 pages, arxiv.org/abs/0907.2246.
- *Properads in Algebra, Topology, Geometry and Mathematical Physics*, Habilitation à diriger des recherches (June 2009), preprint J.-A. Dieudonné Department, <http://math1.unice.fr/~brunov/publications/HDR.pdf>
- *Koszul duality of props*, PhD Thesis (December 2003), IRMA preprint, <http://math.unice.fr/~brunov/publications/these.ps>

Conferences

- *Homotopy Batalin-Vilkovisky algebras*, Algebra Workshop (Clermont-Ferrand, June 2009)
- *Homotopy Batalin-Vilkovisky algebras*, Quantum groups and Poisson geometry workshop (IHP, June 2009)
- *Homotopy and deformation theory of algebraic structures*, [mini-course, 3 hours] Workshop Strings, fields and topology (University of Berkeley, January 2009)
- *Homotopy Batalin-Vilkovisky algebras* Higher Structures in Mathematics and Physics (EPFL Lausanne, November 2008)
- *Algèbres de Batalin-Vilkovisky à homotopie près* Annual meeting of the French Algebraic topology network (Paris 13, October 2008)
- *Algebraic structures up to homotopy* International Conference on K-Theory and Homotopy Theory (Santiago de Compostela, September 2008)
- *Deformation theory of algebraic structures* Workshop on Algebraic and Geometric Deformation Spaces (Max Planck Institute, Bonn, August 2008)
- *Deformation theory of algebraic structures* Second Congrès Canada-France (Montréal, June 2008)
- *Théorie de déformation de structures algébriques* Conference on Algèbre combinatoire et Arbres (Lyon, May 2008)
- *Deformation theory of morphisms of props* Workshop on operads and props (Montpellier, May 2008)
- *How to make cofibrant models for operads explicit ?* [2 talks] Workshop on Higher operads (CRM, Barcelona, April 2008)
- *Moduli spaces of algebraic structures* Moduli Spaces Conference (Max Planck Institute, Bonn, January 2008)
- *Deformation theory of morphisms* Non-Commutative Geometry Conference (Northwestern University, May 2007)
- *Koszul duality and Posets et Prop(erad)s and types of (bial)gebras* Workshop on Hopf Algebras and Props (Boston, 2007)
- *Manin products and Deligne conjecture* Operads 2006 (Strasbourg, November 2006)
- *Manin products and Koszul Duality pattern* Alpine Operad Workshop (Villard, Switzerland, March 2006)
- *Deformations of algebraic structures* BASCOLA, Coloquio de Àlgebra (Buenos Aires, Argentina, August 2005)
- *Partition type posets* XVI Coloquio Latino-Americano de Àlgebra (Colonia del Sacramento, Uruguay, August 2005)
- *Koszul duality and posets* Operads 2005 (Luminy, France, April 2005)
- *Koszul duality for props*, Congrès du Groupement de Recherche Européen de Topologie Algébrique (Louvain-La-Neuve, June 2004)

Seminars

- 2009** CUNY Graduate Center-Einstein Chair Seminar (New York),
Max Planck Institut for Mathematics (Bonn),
- 2008** CRM (Universitat Autònoma de Barcelona), University of Lyon, EPFL (Lausanne)
- 2007** University of Chicago, Northwestern University (Chicago),
CUNY Graduate Center (New York), Algebra Seminar IHP (Paris),
University of Strasbourg (February and September), University of Lille.
- 2006** IHES, Max Planck Institut (Bonn), Bochum Universität.
- 2005** University of Stockholm, Texas A&M (College station),
Rutgers University (New Brunswick),
UPenn (Philadelphia), Rutgers University (Newark),
IRMA Strasbourg, University of Paris 13, Institut Henri Poincaré (Paris).
- 2004** University of Nice, University of Freiburg,
University of Montpellier, University of Saint-Etienne,
IRMA Strasbourg, Institut Jordan-University of Lyon I,
University of Paris 13, University of Clermont-Ferrand.
- 2003** University of Lille, IRMA Strasbourg.

Lectures

- 2009** Lecture on Operads and Koszul duality theory [5 hours]
(Thematic School : Operads, CIRM Luminy, April 2009)
- 2008** Lecture on deformation theory of algebraic structures [8 hours]
(ETH Zürich, May 2008)
- 2007** Lecture on Koszul duality for properads with applications in deformation theory [6 hours]
(University of Barcelona, July 2007).

Visiting Positions

- Max-Planck-Institut für Mathematik (Bonn), August 2009-June 2010
- CUNY (New York), January 2009, invited by Dennis Sullivan.
- University of Valparaiso (Chile), December 2008.
- Institut de Matemàtica de la Universitat de Barcelona (Spain), July 2008.
- ETH Zürich (Switzerland), May 2008.
- University of Barcelona (Spain), July 2007.
- University of Stockholm (Sweden), June 2007.
- Northwestern University, Chicago (USA), March-June 2007.
- Stony Brook University, New York, (USA), March 2007,
invited by Dennis Sullivan.
- Max-Planck Institut, Bonn (Germany), May-June 2006.
- IHES (France) March 2006,
invited by Maxim Kontsevich.
- University of Stockholm (Sweden) June and October 2005,
invited by Sergei Merkulov.
- Texas A&M, College Station (USA), April 2005
invited by Marcelo Aguiar,
- Rutgers University, Newark-New Brunswick (USA), April 2005
invited by Li Guo and Earl Taft,
- Mittag-Leffler Institute (Stockholm, Sweden) April 2004,
Noncommutative Geometry Program.

Students

- Joan Millès : Ph.D student working on *André-Quillen cohomology of algebras over an operad*, (since September 2006), <http://math.unice.fr/~jmilles/>
- Olivia Bellier : Ph.D student working on *Koszul duality theory of operads on Coxeter groups and hyperplane arrangements*, (since September 2009).

Book

- *Algebraic Operads*, monograph on algebraic operads and Koszul duality, in collaboration with Jean-Louis Loday.

TABLE OF CONTENTS

1. Algebras, coalgebras, homology
2. Twisting morphisms
3. Koszul duality for associative algebras
4. Algebraic operad
5. Operadic homological algebra
6. Koszul duality of operads
7. The operads A_s and A_∞
8. Homotopy operadic algebras
9. Bar and cobar construction of an algebra over an operad
10. (Co)homology of algebras over an operad
11. Methods to prove Koszul duality
12. Examples of Koszul operads
13. Cyclic operads, modular operads and properads
- A. Representations of the symmetric group
- B. Monoidal categories
- C. Model categories

Work in progress. In September 2009, 90% done.

Organization

CONFERENCES : • *Operads 2009*

International Conference on operads, 27-30 April 2009, CIRM (Luminy)
<http://math.unice.fr/brunov/operads2009conference.html>

• *K-Theory, Cyclic Homology and Operads*

Conference in the honor of the 60th birthday of Jean-Louis Loday
(IRMA Strasbourg, 5-7 January 2005).

WORKSHOP : • *Differential Graded E_n -Operads*

17-21 November 2008 (University of Copenhagen, Denmark)

http://www.math.ku.dk/english/research/conferences/e_n-operads/

SCHOOL : • *Thematic School : Operads*

Lectures on operads with their applications in algebraic topology, differential geometry, algebraic combinatorics, higher categories and computer science.

20-25 April 2009, CIRM (Luminy)

<http://math.unice.fr/brunov/ThematicSchoolOperads.html>

Grant and Network

- *ANR Operads, Bialgebras and Homotopy Theories* with Benoit Fresse, Clemens Berger and David Chataur 2007-2010.
- *ECOS-Sud. Cooperation with Chile* with M. Ronco (Valparaiso) and J.-L. Loday (Strasbourg).

Teaching

- University of Nice Sophia-Antipolis (2004-2009) [in French]
 - Northwestern University (Spring 2007) [in English]
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