

# Curriculum Vitae

## Mitja Mastnak

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### Research Interests

- Analysis
  - Operator theory
  - Operator algebras
  - Free probability
- Algebra
  - Hopf algebras
  - Homological algebra
  - Representation theory
  - Algebraic combinatorics

### Education

- Ph.D. in Mathematics, Dalhousie University, 2002.
- M.Sc. in Mathematics, Dalhousie University, 1999.
- Diplomirani inženir matematike, Univerza v Ljubljani, 1998.

### Employment

- Associate Professor at Saint Mary's University, 2009-present.
- Assistant Professor at Saint Mary's University, 2008-2009.
- Postdoctoral Fellow at University of Waterloo, 2007-2008.
- NSERC Postdoctoral Fellow:
  - Ludwig-Maximilians-Universität München, 2006.
  - University of British Columbia, 2005.
- Postdoctoral Fellow at Dalhousie University, 2002-2004.

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<sup>0</sup>Last updated on June 15, 2012

## Teaching

- Introduction to Real Analysis, Saint Mary's University, Winter 2012.
- Real Analysis II, Saint Mary's University, Winter 2012.
- Real Analysis I, Saint Mary's University, Autumn 2011.
- Introduction to Real Analysis, Saint Mary's University, Winter 2011.
- Multi-variable Calculus, Saint Mary's University, Autumn 2010.
- Real Analysis II, Saint Mary's University, Winter 2010.
- Introduction to Real Analysis, Saint Mary's University, Winter 2010.
- Real Analysis I, Saint Mary's University, Autumn 2009.
- Multi-variable Calculus, Saint Mary's University, Autumn 2009.
- Multi-variable Calculus, Saint Mary's University, Winter 2009.
- Advanced Calculus, Saint Mary's University, Autumn 2008.
- Real Analysis, University of Waterloo, Spring 2008.
- Calculus for Engineering, University of Waterloo, Spring 2008.
- Advanced Multivariable Calculus, University of Waterloo, Winter 2008.
- Linear Algebra, University of Waterloo, Fall 2007.
- Integral Calculus, University of Waterloo, Winter 2007.
- Differential Calculus, University of British Columbia, Autumn 2005.
- Differential Calculus, Dalhousie University, Autumn 2004.
- Finite Mathematics for Commerce, Dalhousie University, Winter 2004.
- Calculus for Commerce, Dalhousie University, Autumn 2003.
- Linear Algebra, Dalhousie University, Winter 2003.
- Integral Calculus, Dalhousie University, Autumn 2002.
- participating in the selection and training of the Slovene team for the International Mathematical Olympiad, 1994-1998.

## Awards

- NSERC discovery grant, 2009-2014.
- Saint Mary's University, Faculty of Graduate Studies grant, 2011.
- Saint Mary's University, Faculty of Graduate Studies grant, 2009.
- Saint Mary's University, Faculty of Science startup grant, 2008.
- NSERC Postdoctoral Fellowship, 2005-2006.
- Killam Scholarship, 1999-2002.
- Dalhousie Fellowship, 1998-1999.
- *Fakultetna Prešernova nagrada* for undergraduate thesis *Polenostavnost križnega produkta* (Semisimplicity of Crossed Products) given by the government of Slovenia, 1999.
- Second prize in the International Mathematics Competition for University Students (IMC) in each of the years 1995, 1996, 1997.
- Bronze medal in the International Mathematics Olympiad (IMO) in 1994.

## Publications

(published or accepted for publication in peer-reviewed journals)

- *The primitives and antipode in the Hopf algebra of symmetric functions in noncommuting variables*, (with A. Lauve), Adv. in Appl. Math. 47 (2011), no. 3, 536–544.

- *Positivity in matrix semigroups*, (with J. Bernik, H. Radjavi), *Linear Algebra Appl.* 434 (2011), no. 3, 801–812.
- *Cohomology of finite dimensional pointed Hopf algebras*, (with J. Pevtsova, P. Schauenburg, S. Witherspoon), *Proc. London Math. Soc.* (3) 100 (2010), no. 2, 377–404.
- *Hopf algebras and the logarithm of the S-transform in free probability*, (with A. Nica), *Trans. Amer. Math. Soc.* 362 (2010), no. 7, 3705–3743.
- *Triangularizability of operators with increasing spectrum*, (with L. W. Marcoux, H. Radjavi), *J. Funct. Anal.* 257 (2009), no. 11, 3517–3540.
- *Bialgebra cohomology, pointed Hopf algebras, and deformations*, (with S. Witherspoon), *J. Pure Appl. Algebra* 213 (2009), Issue 7, 1399–1417.
- *On the structure of finite, minimal nonabelian groups*, (with H. Radjavi), *Linear Algebra Appl.* 430 (2009), Issue 7, 1838–1848.
- *Realizing semigroups and real algebras of compact operators*, (with J. Bernik, H. Radjavi), *J. Math. Anal. Appl.*, vol. 348, Issue 2 (2008), 692–707.
- *Approximate permutability of traces on semigroups of matrices*, (with J. Bernik, R. Drnovšek, T. Košir, L. Livshits, M. Omladič, and H. Radjavi), *Operators and Matrices* 1 (2007), no. 4, 455–467.
- *On bimeasurings II*, (with L. Grunenfelder), *J. Pure Appl. Algebra* 209 (2007), no. 3, 823–832.
- *An approximate, multivariable version of Specht’s theorem*, (with L. Marcoux, H. Radjavi), *Linear Multilinear Algebra* 55 (2007), no. 2, 159–173.
- *Semitransitive subspaces of matrices*, (with Semitransitivity working group at LAW’05, Bled), *ELA* 15 (2006), 225–238.
- *On bimeasurings*, (with L. Grunenfelder), *J. Pure Appl. Algebra* 204 (2006), no. 2, 258–269.
- *On semitransitive collections of operators*, (with J. Bernik, L. Grunenfelder, H. Radjavi, V. Troitsky), *Semigroup Forum* 70 (2005), no. 3, 436–450.
- *Reduction theorems for groups of matrices*, (with J. Bernik, R. Guralnick), *Linear Algebra Appl.* 383 (2004), 119–126.
- *Cohomology of abelian matched pairs and the Kac sequence*, (with L. Grunenfelder), *J. Algebra* 276 (2004), no. 2, 706–736.
- *Hopf algebra extensions arising from semi-direct products of groups*, *J. Algebra* 251 (2002), no. 1, 413–434.

## Conference Talks

- *Commutators with real spectra and semigroups*, *Linear Algebra Workshop*, Kranjska Gora, Slovenia, May 25–June 1, 2011.
- *Bialgebras and free multiplicative convolution*, *Bialgebras in Free Probability*, Vienna, Austria, February 14–25, 2011.
- *Cocycle deformations, calculus, and extensions*, *Special session on Hopf algebras*, AMA and AMS joint meeting, New Orleans, January 6–9, 2011.
- *Hopf combinatorics*, *East Coast Combinatorics Conference*, Saint Mary’s University, Halifax, Nova Scotia, Canada, April 29–30, 2010.
- *The Hopf Algebra of Strict Multiset Compositions and Structure Transfer*, *SIAM Conference on Discrete Mathematics*, Austin, TX, USA, June 14–17, 2010.

- *Hopf algebras and the logarithm of the S-transform in free probability - Extended abstract*, Formal Power Series and Algebraic Combinatorics, Hagenberg, Austria, July 20-24, 2009.
- *Graded Bialgebras and their deformations*, Groups and Hopf algebras, International workshop & Special session of summer 2009 meeting of CMS, Memorial University of Newfoundland, St. John's, NF, Canada, June 3-7, 2009.
- *Combinatorial Hopf algebras in free probability*, Combinatorial Algebra Meets Algebraic Combinatorics, Memorial University of Newfoundland, St. John's, NF, Canada, January 16 - 18, 2009.
- *Extensions and Singer cohomology of Hopf algebras*, Special session on algebraic topology, AMS Sectional Meeting, Wesleyan University, Middletown, CT, USA, October 12-13, 2008.
- *Realizing irreducible semigroups and real algebras of compact operators*, Canadian Operator Symposium (COSy), University of Toronto, ON, Canada, May 20-24, 2008.
- *Graded deformations and pointed Hopf algebras*, AMS Regional Meeting, DePaul University, Chicago, IL, USA, October 5-6, 2007.
- *Bialgebra Cohomology, Pointed Hopf Algebras, and Deformations*, Groups, Rings, Lie and Hopf Algebras II, Bonne Bay Marine Station of MUN, Norris Point, NL, Canada, August 13-17, 2007.
- *Approximate permutability of traces on semigroups of matrices*, Canadian Operator Symposium (COSy), Guelph, ON, Canada, June 5-9, 2007.
- *About linear spaces of matrices*, Contributed Talks, CMS Winter Meeting, University of Victoria, Victoria, BC, Canada, December 10-12, 2005.
- *About categories of matched pairs and Singer pairs of Hopf algebras*, Special Session on Hopf Algebras at the Crossroads of Algebra, Category Theory, and Topology, AMS Regional Meeting, Evanston, IL, USA, October 23-24, 2004.
- *About Yetter-Drinfel'd modules over semisimple Hopf algebras*, Symposium on Hopf Algebras and Related Topics, CMS Summer Meeting, Dalhousie University, Halifax, NS, Canada, June 11-15, 2004.
- *On Hopf algebras with radical a Hopf ideal*, Symposium on Hopf Algebras and Related Topics, CMS Summer Meeting, Dalhousie University, Halifax, NS, Canada, June 11-15, 2004.
- *Reduction theorems for groups of matrices*, Special Session on Linear Algebra, APICS meeting, University of PEI, Charlottetown, PEI, Canada, October 17-19, 2003.
- *On Bimeasuring*, Special Session on Hopf Algebras, AMS Regional Meeting, Courant Institute, New York, NY, USA, April 12-13, 2003.
- *On Hopf algebra extensions*, Linear Algebra Workshop, Bled, Slovenia, June 4-13, 2002.
- *On Hopf algebra extensions arising from semi-direct products of groups*, The International Workshop on Groups, Rings, Lie and Hopf Algebras, Memorial University of Newfoundland, St. John's, NF, Canada, May 28 - June 1, 2001.

## Colloquium and Seminar Talks

- *Bialgebras and coverings*, Atlantic Category Theory Seminar, Dalhousie, November 15, 2012.

- *Bialgebras and Free Probability Lie algebras*, Colloquium, DePaul University, Chicago, March 11, 2011.
- *Introduction to Hopf algebras*, Colloquium, Saint Mary's University, December 13, 2010.
- *Hopf algebras in combinatorics*, AARMS colloquium, Memorial University of Newfoundland, Saint John's, Newfoundland, Canada, March 26, 2010.
- *Semitransitive Lie algebras*, Algebra Seminar, University of Ljubljana, Ljubljana, Slovenia, May 19, 2010.
- *Operators with increasing spectrum*, Operator Theory Seminar, University of Ljubljana, Ljubljana, Slovenia, May 20, 2010.
- *Free probability and Hopf algebras*, Atlantic Category Theory Seminar, Dalhousie, January 6, 2009.
- *Hopf algebraic approach to the combinatorics of free probability*, Free Probability Seminar, Texas A& M University, November 19, 2008.
- *Combinatorial Hopf algebras*, Colloquium, Dalhousie University, September 22, 2008.
- *Triangularization of semigroups of matrices*, Colloquium, Saint Mary's University, June 16, 2008.
- *On Graded Hopf algebra deformations*, Algebra seminar, Texas A&M University, April 10, 2008.
- *Triangularizing semigroups of matrices*, Colloquium, Colby College, March 17, 2008.
- *Pointed Hopf algebras and bialgebra deformation theories*, Colloquium, University of Windsor, February 23, 2007.
- *Approximate permutability of traces on semigroups of matrices*, Analysis seminar, University of Waterloo, February 9, 2007.
- *Liftings and bialgebra cohomology, Part 3*, Oberseminar Hopfgebren und Quantengruppen, Ludwig-Maximilians-Universität München, November 30, 2006.
- *Bimeasurings*, Atlantic Category Theory Seminar, Dalhousie University, August 8, 2006.
- *Liftings and bialgebra cohomology, Part 2*, Oberseminar Hopfgebren und Quantengruppen, Ludwig-Maximilians-Universität München, July 20, 2006.
- *Liftings and bialgebra cohomology*, Oberseminar Hopfgebren und Quantengruppen, Ludwig-Maximilians-Universität München, June 29, 2006.
- *On cleft Hopf algebra extensions*, Oberseminar Hopfgebren und Quantengruppen, Ludwig-Maximilians-Universität München, February 3, 2006.
- *Koalgebra, bialgebra in Hopfve algebre* (Coalgebras, Bialgebras and Hopf algebras), Seminar za algebro, Univerza v Ljubljani, March 29, 2006.
- *O Hopfovih algebrah* (On Hopf algebras), Seminar za algebro, Univerza v Ljubljani, June 1, 2005.
- *O Hopfovih algebrah* (On Hopf algebras), Seminar za analizo in algebro, Univerza v Mariboru, June 1, 2005.
- *About Hopf algebra extensions and cohomologies*, Algebraic Geometry Seminar, University of British Columbia, February 9, 2005.
- *About Drinfel'd Yetter modules*, Atlantic Category Theory Seminar, Dalhousie University, November 30, 2004.

- *On Bimeasuring*, Atlantic Category Theory Seminar, Dalhousie University, February 17, 2004.
- *Hopf algebra extensions arising from semi-direct products of groups*, Atlantic Category Theory Seminar, Dalhousie University, April 16, 2002.
- *On Extensions of Hopf algebras*, Atlantic Category Theory Seminar, Dalhousie University, September 7, 1999.
- *Semi-simple algebras, Galois actions and group cohomology*, Atlantic Category Theory Seminar, Dalhousie University, November 24, 1998.

## Service

- “AARMS Distinguished Lecturer” Selection Committee, 2012-present.
- Mathematics Undergraduate Advisor, 2011-present.
- University Senate Scholarship Committee, 2010-present.
- Departmental Curriculum Committee, 2009-present.
- Departmental Library Coordinator, 2008-present.

## Other

- Co-organizer of a special session on operator algebras for the Canadian Mathematics Society’s meeting in Windsor in December 2009.
- Referee for: Canadian J. Math., Communications in Algebra, Transactions of Amer. Math. Soc., Linear Multilin. Algebra, Ars Mathematica Contemporanea, J. Pure Appl. Algebra, and Homology, Homotopy and Applications.
- Reviewer for *CMS Notes*