

Cirriculum Vitae of Oleg Karpenkov

PERSONAL DATA

[born:] 14 January 1980, Moscow, Russia
[institution:] Institute of Geometrie, TU Graz (from Sept. 2008)
Lise Meitner Fellowship (Senior Postdoc in Mathematics)
[address postal:] Kopernikusgasse 24, A-8010, Graz, Austria
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EDUCATION

[1997-2002] student of Department of Mechanics and Mathematics, Moscow State University, scientific advisers V. I. Arnold and V. M. Zakalyukin
[1997-2002] (at the same time) student of Higher College of Mathematics, Independent University of Moscow, scientific adviser A. B. Sossinsky
[2002-2005] PhD student of Department of Mechanics and Mathematics, Moscow State University, scientific advisers V. I. Arnold and V. M. Zakalyukin
[2002-2005] (at the same time) PhD student of Higher College of Mathematics, Independent University of Moscow, scientific adviser A. B. Sossinsky

PREVIOUS POSTDOC POSITIONS

[2005-2006] CEREMADE, Université Paris-Dauphine (France). Postdoc in Mathematics (fellowship of Mairie de Paris)
[2006-2008] Mathematical institute of Leiden University (the Netherlands). Postdoc in Mathematics (DIAMANT cluster)

ACADEMIC DEGREES

[18/iv-2002] Master of Science and Bachelor of Science in Mathematics. Independent University of Moscow
[vii/2002] Master of Science and Bachelor of Science in Mathematics. Department of Mechanics and Mathematics, Moscow State University
[15/iv/2005] Ph.D. in Mathematics. My PhD thesis title is *On multidimensional continued fractions of Klein model: classification of two-dimensional faces, algorithms, examples*, scientific advisers V. I. Arnold and V. M. Zakalyukin
[18/xi/2010] Habilitation in Mathematics. My Habilitation thesis title is *Geometry of lattice angles, polygons, and cones*

PRIZES AND FELLOWSHIPS

[2004] Möbius article contest winner
[2005] Moscow Mathematical Society Prize for young mathematicians
[2005-2006] Fellowship of Mairie de Paris
[2011-2013] Lise Meitner Fellowship

MASTER THESIS SUPERVISED

[2006-2007] Alvis Trevisan (student of the international program ALGANT), Master thesis: *Lattice polytopes and toric varieties*

TEACHING EXPERIENCE

- [Winter 2002] Calculus, exercises. Independent University of Moscow (in Russian)
- [Winter 2003] Topology I, exercises. Program Math. in Moscow (in English) of Independent University of Moscow
- [Winter 2003] Topology I, exercises. Independent University of Moscow (in Russian)
- [Summer 2004] Topology I, exercises. Program Math. in Moscow (in English) of Independent University of Moscow
- [Winter 2004] Topology I, exercises. Program Math. in Moscow (in English) of Independent University of Moscow
- [Summer 2005] Complex analysis, exercises. Independent University of Moscow (in Russian)
- [Summer 2005] Topology I, exercises, Program Math. in Moscow (in English) of Independent University of Moscow
- [Summer 2007] Topology II, lectures and exercises (in English), Leiden University
- [Winter 2007] Calculus, teaching assistance (in English), Leiden University
- [Winter 2008] Algebraic topology, lectures with J. Wallner, problem parts of lectures (in English), TU Graz
- [Summer 2009] Knot theory, lectures (in English), TU Graz
- [Winter 2009] Geometry of continued fractions, lectures (in English), TU Graz
- [Summer 2011] Continued fractions and generalizations, lectures (in English), TU Graz
- [Winter 2011] Geometry of continued fractions, lectures (in English), TU Graz

CONFERENCE ORGANIZATION EXPERIENCE

- [2009] local organizer of a workshop *Surfaces, Meshes, Geometric Structures*, Admont (Austria)
<http://www.geometrie.tugraz.at/events/meshes.html>

ACADEMIC VISITS (APPROXIMATELY 1 MONTH EACH)

- [1] Stockholm University, Stockholm, Sweeden, November 2001
- [2] Utrecht University, Utrecht, The Netherlands, March 2003
- [3] Université Paris-Dauphine - CEREMADE, Paris, France, May 2004
- [4] Laboratoire de Mathématiques Discrètes du CNRS (IML), Luminy, France, June 2004
- [5] Stockholm University, Stockholm, Sweeden, May 2006
- [6] Institute of Applied Mathematicks, Khabarovsk, Russia, January 2007
- [7] Liverpool University, Liverpool, UK, March 2008
- [8] Liverpool University, Liverpool, UK, May 2008

List of scientific presentations of Oleg Karpenkov

- [x/2000] Combinatorics, Dynamics, Probabilities // Stockholm, Sweden // *Combinatorics of boundary singularities B_n^l of k -immersions and Bernoulli—Euler updown numbers*
- [ix/2001] Viro's seminar in Uppsala University. // Uppsala, Sweden // *Energy of knots: variational equations.*
- [x/2001] Seminar on low-dimensional problems // St.Petersburg, Russia // *Energy of a knot (review).*
- [xii/2001] Fundamental Mathematics Today // Moscow, Russia // *Energy of a knot: variational principles*
- [vii-2002] Séminaire de mathématiques supérieures. Séminaire scientifique otan, 41-e session-été 2002 // Normal Forms, Bifurcations and Finiteness Problems in Differential Equations // Montréal, Canada // *Energies of knots: some examples*
- [iv/2003] The XXV conference for young mathematician, Department of Mech. and Math. MSU // Moscow, Russia // *Combinatorics of multiboundary singularities for the series B_n^l and Bernoulli-euler numbers*
- [vii/2003] Knots in Poland 2003 // Warsaw and Bedlewo, Poland // *On some particular energies of knots*
- [v/2004] Arnold's seminar in Paris (Institut de Mathématiques de Jussieu) // Paris, France // *Multi-dimensional continued fractions*
- [vi/2004] Seminar "Arithmétique et théorie de l'information" // Marseille, France // *On some new examples for torus decompositions of two-dimensional continued fractions of cubic irrationalities*
- [xii/2004] Seminar on representation theory and dynamical systems in St.Petersburg // St.Petersburg, Russia // *On faces of multidimensional continued fractions*
- [ii/2005] Combinatorial methods in physics and knot theory // Moscow, Russia // *Energies of knots and of certain graphs*
- [vii/2005] XXIVèmes Journées Arithmétiques // Marseille, France // *On realizability condition in generalized Lagrange's theorem*
- [ix/2005] Journées Combinatoire et Géométrie des polyèdres // Paris, France // *On continued multidimensional fractions and multistory completely empty convex pyramids*
- [iii/2006] Seminar "Combinatoire Algébrique et Géométrie", Univ. Paris-6 // Paris, France // *Combinatorics of multidimensional continued fractions in the sense of Klein*
- [iii/2006] Seminar of pure mathematics of ENS Lyon, // Lyon, France // *Combinatorics of multidimensional continued fractions in the sense of Klein*
- [v/2006] "Seminar on low-dimensional mathematics" in Uppsala University // Uppsala, Sweden // *Klein's generalization of ordinary continued fractions and some closely related facts of lattice geometry*
- [vi/2006] "Seminarium i matematik" in Stockholm University // Stockholm, Sweden // *Multi-dimensional continued fractions and some problems in lattice geometry*
- [vi/2006] Seminar of Laboratoire Leibniz (IMAG, Grenoble) // Grenoble, France // *Multi-dimensional continued fractions and some problems in lattice geometry*
- [viii/2007] International conference Analysis and singularities (dedicated to the 70th anniversary of V. I. Arnold) // Steklov Mathematical Institute, Moscow, Russia // *Invariant Möbius measure and Gauss-Kuzmin face distribution*
- [ix/2007] The Algebra and Geometry around Knots and Braids // Euler Institute, St.Petersburg, Russia // *Energies of knots and graphs*
- [i/2008] Colloque International sur la répartition uniforme // CIRM, Luminy (Marseille), France // *Gauss-Kuzmin face distribution and Invariant Möbius measure*
- [iii/2008] Singularity Seminar at Liverpool University // Liverpool, England // *Tensegrities*

- [iii/2008] Colloquium at Liverpool University // Liverpool, England // *On integer trigonometry*
- [iv/2008] Singularity Seminar at Liverpool University // Liverpool, England // *Conjugacy classes in $SL(n, \mathbb{Z})$*
- [v/2008] Geometry seminar in TU Graz // Graz, Austria // *Lattice discretization of trigonometric functions*
- [v/2008] Singularity Day in Liverpool University // Liverpool, England // *Energies of knots and graphs*
- [iv/2009] The 6th status seminar of the Nat. Res. Network “Industrial Geometry” // Strobl, Austria // *Flexibility of Kokotsakis meshes*
- [v/2009] Algebra-topology seminar in ETH // Zürich, Switzerland // *Toric geometry and lattice trigonometry*
- [v/2009] Applied Geometry Seminar ETH // Zürich, Switzerland // *Tensegrities*
- [vii/2009] Surfaces, Meshes, Geometric Structures // Admont, Austria // *Flexibility of meshes and semidiscrete surfaces*
- [ix/2009] ÖMG+DMV Kongress // Graz, Austria // *On integer conjugacy classes of $SL(3, \mathbb{Z})$*
- [ii/2010] Towards new interactions between mathematics and computer science (Lattice algorithms) // CIRM, Luminy (Marseille), France // afternoon workshop *Multidimensional continued fractions and conjugacy classes of $SL(n, \mathbb{Z})$*
- [vi/2010] Seventh International Conference on Curves and Surfaces // Avignon, France // *Flexibility and infinitesimal flexibility of discrete and semidiscrete surfaces*
- [ix/2010] Delone-120 // Moscow State University and Steklov Institute of Mathematics, Moscow, Russia // *Multidimensional Gauss Reduction Theory for conjugacy classes of $SL(n, \mathbb{Z})$*
- [vi/2011] Toric geometry and applications // KU Leuven, Leuven, Belgium // *Global relations for toric surface singularities* (poster)
- [vi/2011] Numération 2011 // University of Liège, Liège, Belgium // *Klein polyhedra and its Gauss-Kuzmin statistics*
- [vii/2011] Contemporary Mathematics // Russian Academy of Sciences (mathematical section), the Steklov Mathematical Institute, the Moscow Department for Education and the Moscow Center for Continuous Mathematical Education, Dubna, Russia // *Integer geometry and trigonometry* (minicourse)

List of publications by Oleg Karpenkov

PUBLICATIONS

- [1] O. Karpenkov, Combinatorics of multiboundary B_n^l singularities and Bernoulli–Euler numbers. *Funct. Anal. Appl.* 36(1), pp. 65–67, 2002.
- [2] O. Karpenkov, Energy of a knot: variational principles. *Russian Jour. of Math. Phys.*, vol. 9(3), pp. 275–287, 2002.
- [3] O. Karpenkov, Energy of a knot: some new aspects. *Fundamental Mathematics Today*, IUM, MCCME, pp. 214–223, 2003.
- [4] O. Karpenkov, On tori triangulation associated with two-dimensional continued fractions of rubic irrationalities. *Func. An. and Appl.*, vol. 38(2), pp. 102–110, 2004.
- [5] O. Karpenkov, On two-dimensional continued fractions for integer hyperbolic matrices with small norm. *Russian Math. Surveys*, vol. 59(5), pp. 959–960, 2004.
- [6] O. Karpenkov, Classification of three-dimensional multistory completely empty convex marked pyramids. *Russian Math. Surveys*, vol. 60(1), pp. 165–166, 2005.
- [7] O. Karpenkov, Möbius energy of graphs. *Math. Notes*, vol. 79(1), pp. 134–138, 2006.
- [8] O. Karpenkov, Classification of lattice-regular lattice convex polytopes, *Funct. Anal. Other Math.*, vol. 1(1), pp. 17–35, 2006.
- [9] O. Karpenkov, Three examples of three-dimensional continued fractions in the sense of Klein, *C. R. Acad. Sci. Paris, Ser. B*, vol. 343, pp. 5–7, 2006.
- [10] O. Karpenkov, On existence and uniqueness conditions of lattice triangles, *Russian Math. Surveys*, vol. 61(6), pp. 1178–1179, 2006.
- [11] O. Karpenkov, On examples of difference operators for $\{0, 1\}$ -valued functions over finite sets, *Funct. Anal. Other Math.*, vol. 1(2), pp. 175–180, 2006.
- [12] O. Karpenkov, Completely empty pyramids on integer lattices and two-dimensional faces of multidimensional continued fractions, *Monatshefte für Mathematik*, vol. 152, pp. 217–249, 2007.
- [13] O. Karpenkov, On invariant Möbius measure and Gauss-Kuzmin face distribution, *Proceedings of the Steklov Institute of Mathematics*, vol. 258, pp. 74–86, 2007.
<http://arxiv.org/abs/math.NT/0610042>
- [14] O. Karpenkov, Elementary notions of lattice trigonometry, *Math. Scand.*, vol. 102(2), pp. 161–205, 2008.
- [15] O. Karpenkov, On irrational lattice angles, *Funct. Anal. Other Math.*, vol. 2(2-4), pp. 221–239, 2009.
- [16] O. Karpenkov, Constructing multidimensional periodic continued fractions in the sense of Klein, *Math. Comp.*, vol. 78, pp. 1687–1711, 2009.
- [17] O. Karpenkov, Bernoulli-Euler numbers and multiboundary singularities of type B_n^l (in Russian), in *Fundamental Mathematics in Works of Young Scientists*, MCCME, Moscow, pp. 43–54, 2009.
<http://arxiv.org/abs/0910.4046> (English version).
- [18] F. Doray, O. Karpenkov, J. Schepers, Geometry of configuration spaces of tensegrities, *Disc. Comp. Geom.*, vol. 43, no. 2, pp. 436–466, 2010.
- [19] O. Karpenkov, On the flexibility of Kokotsakis meshes, *Geom. Dedicata*, vol. 147, pp. 15–28, 2010.
- [20] O. Karpenkov, On determination of periods of geometric continued fractions for two-dimensional algebraic hyperbolic operators, *Russian Math. Notes*, vol. 88, no. 1, pp. 30–42, 2010.
- [21] O. Karpenkov, A. Vershik, Rational approximation of the maximal commutative subgroups of $GL(n, \mathbb{R})$, *J. Fixed Point Theory*, vol. 7, no. 1, pp. 241–263, 2010.
- [22] O. Karpenkov, Continued fractions and the second Kepler law, *Manuscripta Math.*, vol. 134, pp. 157–169, 2011.
- [23] O. Karpenkov, A. Sossinsky, Energies of knot diagrams, *Russian J. Math. Phys.*, vol. 18, no. 3, pp. 306–317, 2011.

SUBMITTED PAPERS

- [1] O. Karpenkov, Necessary flexibility conditions of semidiscrete surfaces, September 2010, 19 pp.
- [2] O. Karpenkov, Multidimensional Gauss Reduction Theory for conjugacy classes of $SL(n, \mathbb{Z})$, March 2011, 39 pp.

OTHER PAPERS

- [1] O. Karpenkov, *Vladimir Igorevich Arnold*, Internat. Math. Nachrichten, 2010.
<http://arxiv.org/abs/1007.0688>