

Curriculum Vitae

Full name: Alexei V. Penskoi

Year of birth: 1973

Place of birth: Sverdlovsk region, USSR

Nationality: Russian Federation

Address: Independent University of Moscow, Bolshoy Vlasievskiy pereulok 11, 119002 Moscow Russia

Web-page: <http://www.mccme.ru/~penskoi>

Languages: English, French, Russian

Education:

M.Sc., Mathematics (with highest honours), 1995, Moscow State University

Title of Thesis: Discrete Lagrangian systems on the Virasoro group

Advisor: Prof. A. P. Veselov

Cand.Sc., Mathematics, 1998, Moscow State University

Title of Thesis: Geometry and Hamiltonian formalism of integrable lattices

Advisor: Prof. A. P. Veselov

Ph.D., Mathematics, 2001, Université de Montréal

Title of Thesis: Nonlinear ordinary differential equations with superposition principles

Advisor: Prof. P. Winternitz

Positions held since receiving the Ph.D.:

2001 – 2004 Postdoctoral Fellow, Centre de Recherches Mathématiques, Université de Montréal

2004 – 2011 Associate Professor, Bauman Moscow State Technical University

2004 – 2013 Lecturer, Independent University of Moscow

2008 – 2010 Director of Undergraduate Studies, Independent University of Moscow

Current Positions:

Associate Professor, Moscow State University (2007–...)

Director of Graduate Studies, Independent University of Moscow (2008–...)

Member of the Independent University of Moscow Executive Board (2009–...)

Full Professor, Independent University of Moscow (2013–...)

Associate Professor, National Research University “Higher School of Economics” (2013–...)

Research Interests: Geometry & Mathematical Physics

- (i) Spectral geometry.
- (ii) Integrable systems and their geometry (especially methods of algebraic geometry in integrable systems, integrable Hamiltonian PDEs, integrable systems on lattices, discrete Lagrangian systems).
- (iii) Applications of Lie groups and algebraic groups to differential equations.
- (iv) Related areas (Spectral Theory, Algebraic Geometry, Representation Theory, Lie Groups etc).

Teaching experience:

Associate Professorship at Moscow State University: Analytic Geometry, Linear Algebra and Geometry, Differential Geometry, Classical Differential Geometry; Proseminar on Topology & Geometry for undergraduate students.

Professorship at the Independent University of Moscow: Spectral Geometry-I.

Associate Professorship at National Research University “Higher School of Economics”: Geometry-I, Differential Geometry.

Lectureship at the Independent University of Moscow: Equivariant Cohomology and Localization Theorem, Geometric Quantization, Differential Geometry, Integrable Systems, Advanced Geometry, Geometry in Mechanics and Physics, 1st year Differential and Integral Calculus,

Analysis on Manifolds, Complex Analytic Manifolds and Holomorphic Vector Bundles, Riemann Surfaces, Morse theory, Laplace-Beltrami operator.

Lectureship at the Independent University of Moscow for the Math in Moscow program (one semester program for U.S. and Canada undergraduate students): Linear Algebra, Advanced Linear Algebra and Elements of Representation Theory, Differential Geometry, Equations of Mathematical Physics, Topology I, Calculus on Manifolds.

Associate Professorship at Bauman Moscow State Technical University: 1st year Mathematical Analysis, 2nd year Mathematical Analysis and Complex Analysis, Linear Algebra, Operational Calculus and Partial Differential Equations, Numerical Methods, Analytic Geometry, Ordinary Differential Equations.

Teaching assistantship at the Moscow State University, Faculty of Sociology: Calculus for sociologists, Probability for sociologists, Statistics for sociologists.

Teaching assistantship at the Université de Montréal: Differential Geometry, Ordinary Differential Equations, Advanced Calculus, Calculus, Calculus II, Linear Algebra.

Selected recent talks:

July 2013: Lectures at II School on Physics and Geometry, Białowieża, Poland.

May 2013: “Globus” Seminar, Independent University of Moscow.

March 2013: Geometry, Topology and Mathematical Physics Seminar, Moscow State University.

March 2013: Analysis Seminar, McGill University, Montréal, Canada.

December 2012: “Applications of Analysis: Game Theory, Spectral Theory and Beyond”, A workshop in honor of Yakar Kannai’s 70th birthday, The Weizmann Institute of Science, Rehovot, Israel.

November 2012: “Séminaire Mathématique Physique”, Institut de Mathématiques de Bourgogne, Dijon, France.

November 2012: Symposium “Adventures in mathematical physics”, Centre Jacques Cartier, Lyon, France.

October/November 2012: Workshop “Geometric Structures in Integrable Systems”, Moscow State University.

June 2012: “Workshop on Geometry of Eigenvalues and Eigenfunctions”, Centre de recherches mathématiques, Université de Montréal.

January 2012: Workshop “Integrability — modern variations” during the Hausdorff Trimester Program “Integrability in Geometry and Mathematical Physics”, Hausdorff Research Institute for Mathematics, Bonn University.

September 2011: La 88ème rencontre entre physiciens théoriciens et mathématiciens: Discrétisation en mathématiques et en physique, IRMA, Université de Strasbourg.

June 2011: International conference “Differential Equations and Related Topics” dedicated to Ivan G. Petrovskii, Moscow State University.

March 2011: Séminaire “Spectral geometry”, Université de Montréal.

February 2011: Seminar in Geometry and Topology, Weizmann Institute of Science.

August 2007: International Conference on Differential Equations “Equadiff-2007”, Vienna University of Technology.

May 2007: International Conference “Differential Equations and Related Topics” dedicated to I. G. Petrovskii, Moscow State University.

January 2007: International Workshop on Classical and Quantum Integrable Systems (CQIS-2007), Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna, Russia.

September 2006: Geometry, Topology and Mathematical Physics Seminar, Moscow State University.

May 2006: International Conference GIMP’06 (Geometry and Integrability in Mathematical Physics), Independent University of Moscow.

March 2005: Seminar on Homological Methods in Geometry of Differential Equations, Independent University of Moscow.

September 2004: Geometry, Topology and Mathematical Physics Seminar, Moscow State University.

April 2004: Séminaire “Analyse non-linéaire / Systèmes dynamiques”
Université de Montréal.

January 2004: Joint Mathematics Meeting (including the 110th
National Annual Meeting of the American Mathematical Society),
Phoenix, AZ, USA.

November 2003: Séminaire “Physique Mathématique,” Université de
Montréal.

June 2003: Fifth International Conference “Symmetry in Nonlinear
Mathematical Physics”, Kyiv (Kiev), Ukraine.

September 2002: Workshop on Superintegrability in Classical and
Quantum Systems, Centre de Recherches Mathématiques, Université
de Montréal.

List of Publications:

- [1] Alexei V. Penskoi, Generalized Lawson tori and Klein bottles. Submitted to Journal of Geometry and Analysis. Preprint [arXiv:1308.1628](#).
- [2] Penskoi, A. V. Metrics extremal for eigenvalues of Laplace-Beltrami operator on surfaces. *Uspekhi Mat. Nauk* 68 (2013), no. 6, 107-168 (Russian). Translation to appear in Russian Math. Survey.
- [3] Alexei V. Penskoi, Extremal spectral properties of Otsuki tori. *Mathematische Nachrichten* 286 (2013), no. 4, 379–391. Preprint [arXiv:1108.5160](#).
- [4] Penskoi, A. V. Extremal spectral properties of Lawson tau-surfaces and the Lamé equation. *Moscow Math. J.* 12 (2012), no. 1, 173–192. Preprint [arXiv:1009.0285](#).
- [5] Penskoi, A. V. Integrable systems and the topology of isospectral manifolds. *Teor. Mat. Fiz.* 155 (2008), no. 1, 140-146 (Russian). Translation in *Theor. Math. Phys.* 155 (2008), no. 1, 627–632. MR 2009m:37167. Preprint [arXiv:0705.0805](#).
- [6] Penskoi, A. V. The Volterra system and topology of the isospectral variety of zero-diagonal Jacobi matrices. *Uspekhi Mat. Nauk* 62 (2007), no. 3, 213-214 (Russian). Translation in *Russian Math. Surveys*, 62 (2007), no. 3, 626–628. MR 2008m:37098. Preprint [math-ph/0701061](#).
- [7] Oblomkov, A.A., Penskoi, A. V. Laplace transformations and spectral theory of two-dimensional semi-discrete and discrete hyperbolic Schrödinger operators. *Int. Math. Res. Not.* 2005, no. 18, 1089–1126. MR 2006e:47070. Preprint [math-ph/0311036](#).

- [8] Penskoi, A. V. Canonically conjugate variables for the periodic Camassa-Holm equation. *Nonlinearity* 18 (2005), no. 1, 415–421. MR 2005h:37168. Preprint [math-ph/0211048](#).
- [9] Penskoi, A. V. Symmetries and Lagrangian time-discretizations of Euler equations, *Superintegrability in classical and quantum systems*, 145–153, CRM Proc. Lecture Notes, 37, *Amer. Math. Soc., Providence, RI*, 2004. MR 2005h:37146. Preprint [math-ph/0407029](#).
- [10] Penskoi, A. V., Winternitz, P. Discrete matrix Riccati equations with superposition formulas. *J. Math. Anal. Appl.* 294 (2004), no. 2, 533–547. MR 2006a:34007. Preprint [math-ph/0305053](#).
- [11] Penskoi, A. V., Veselov, A. P. Discrete Lagrangian systems on the Virasoro group and Camassa-Holm family. *Nonlinearity* 16 (2003), no. 2, 683–688. MR 2004a:37108. Preprint [math-ph/0209037](#).
- [12] Penskoi, A. V. Lagrangian time-discretization of the Hunter-Saxton equation. *Phys. Lett. A* 304 (2002), no. 5-6, 157–167. MR 2003j:35283. Preprint [math-ph/0201035](#).
- [13] Penskoi, A. V. Ordinary differential equations with superposition formulae, II: Parabolic subgroups of the symplectic group. *J. Phys. A* 35 (2002) 425–434. MR 2003k:34019.
- [14] Penskoi, A. V. Generalized matrix Riccati equations with superposition formulae. *J. Phys. A* 34 (2001), no. 3, 609–615. MR 2003k:34023.
- [15] Oblomkov, A. A.; Penskoi, A. V. Two-dimensional algebro-geometric difference operators. *J. Phys. A* 33 (2000), no. 50, 9255–9264. MR 2002e:39056. Preprint [math-ph/0010024](#).
- [16] Penskoi, A. V. Lagrangian time-discretization of the Korteweg-de Vries equation. *Phys. Lett. A* 269 (2000), no. 4, 224–229. MR 2001d:37118.
- [17] Veselov, A. P.; Penskoi, A. V. Algebro-geometric Poisson brackets for difference operators, and the Volterra system. (Russian) *Dokl. Akad. Nauk* 366 (1999), no. 3, 299–303. Translation in *Doklady Mathematics* 59 (1999), no. 3, 391–394. MR 2001b:37105.
- [18] Penskoi, A. V. The Volterra lattice as a gradient flow. *Regul. Khaoticheskaya Din.* 3 (1998), no. 1, 76–77. MR 99j:58157. Preprint [math-ph/0011041](#).
- [19] Veselov, A. P.; Penskoi, A. V. On algebro-geometric Poisson brackets for the Volterra lattice. *Regul. Chaotic Dyn.* 3 (1998), no. 2, 3–9. MR 2000d:37091. Preprint [math-ph/0010027](#).
- [20] Penskoi, A. V. Canonically conjugate variables for the Volterra system with periodic boundary conditions. (Russian) *Mat. Zametki* 64 (1998),

no. 1, 115–128. Translation in *Math. Notes* 64 (1998), no. 1-2, 98–109.
MR 2000f:37103.

[21] Penskoi, A. V. Discrete Lagrangian systems on the Virasoro group.
(Russian) *Vestnik Moskov. Univ. Ser. I Mat. Mekh.* 1996, no. 4, 99–
102. Translation in *Moscow Univ. Math. Bull.* 51 (1996), no. 4, 52–54.
MR 99g:58064.