

Gleb Pogudin

Contact Information

Affiliation **New York University**, *Courant Institute of Mathematical Sciences*.

Email pogudin@cims.nyu.edu

Employment

2017–now **Assistant Professor/Faculty Fellow**, *New York University*.

Courant Institute of Mathematical Sciences

2017–now **Visiting Scholar**, *City University of New York*.

Graduate Center

2016–2017 **Postdoc**, *Johannes Kepler University*, Linz, Austria.

Institut für Algebra, mentored by Manuel Kauers

2012–2016 **Math Instructor**, *Moscow State University*.

Department of Mechanics and Mathematics and A.N.Kolmogorov high school

2014–2016 **Math Instructor**, *College of Moscow Institute of Physics and Technology*.

2012–2013 **Programmer**, *Yandex Company*.

Banner System: Real-time computations and Data Analysis

Education

2012–2016 **Ph.D. in Mathematics**, *Moscow State University*.

Advisor: Yu. P. Razmyslov

2007–2012 **Diploma in Mathematics and Applied Mathematics**, *Moscow State University*.

Advisor: Yu. P. Razmyslov. Diploma with honours.

Publications

Peer-reviewed articles

1. A. Ovchinnikov, G. Pogudin, T. Scanlon, *Effective difference elimination and Nullstellensatz*, accepted for publication in the Journal of the European Mathematical Society, 2019.
2. H. Hong, A. Ovchinnikov, G. Pogudin, C. Yap, *SIAN: software for structural identifiability analysis of ODE models*, accepted for publication in Bioinformatics, 2019.
3. E. Amzallag, G. Pogudin, M. Sun, N. Thieu Vo, *Complexity of triangular representations of algebraic sets*, Journal of Algebra, vol. 523, pp. 342-364, 2019.

4. G. Pogudin, *A differential analog of the Noether normalization lemma*, International Mathematics Research Notices, vol. 2018(4), pp. 1177–1199, 2018.
5. G. Pogudin, A. Szanto, *Irredundant Triangular Decomposition*, refereed Proceedings of the 2018 ACM International Symposium on Symbolic and Algebraic Computation, pp. 311–318, 2018.
6. G. Pogudin, *Products of ideals and jet schemes*, Journal of Algebra, vol. 502, pp. 61–78, 2018.
7. R. Gustavson, A. Ovchinnikov, G. Pogudin, *New order bounds in differential elimination algorithms*, Journal of Symbolic Computation, vol. 85, pp. 128–147, 2018.
8. G. Pogudin, *Power series expansions for the planar monomer-dimer problem*, Physical Review E, vol. 96, 033303, 2017.
9. M. Kauers, G. Pogudin, *Bounds for Substituting Algebraic Functions into D-finite Functions*, refereed Proceedings of the 2017 ACM International Symposium on Symbolic and Algebraic Computation, pp. 245–252, 2017.
10. O. Gerasimova, Yu.P. Razmyslov, G. Pogudin *Rolling Simplexes and Their Commensurability III (Capelli Identities and Their Application to Differential Algebras)*, Journal of Mathematical Sciences, vol. 221(3), pp. 315–325, 2017.
11. G. Pogudin, Yu.P. Razmyslov, *Prime Lie algebras satisfying the standard Lie identity of degree 5*, Journal of Algebra, vol. 468, pp. 182–192, 2016.
12. R. Gustavson, A. Ovchinnikov, G. Pogudin, *Bounds for orders of derivatives in differential elimination algorithms*, refereed Proceedings of the 2016 ACM International Symposium on Symbolic and Algebraic Computation, pp. 239–246, 2016.
13. E.S. Golod, G. Pogudin, *Modules of zero Gorenstein dimension over graph algebras*, Sbornik:Mathematics, vol. 207, issue 7, pp. 81–100, 2016.
14. G. Pogudin, *The primitive element theorem for differential fields with zero derivation on the base field*, Journal of Pure and Applied Algebra, vol 219(9), pp. 4035–4041, 2015.
15. G. Pogudin, *Primary differential nil-algebras do exist*, Moscow University Mathematics Bulletin, vol 69(1), pp 33–36, 2014.
16. Yu.P. Razmyslov, G. Pogudin, *The Heisenberg envelope for the Hochschild algebra of a finite-dimensional Lie algebra*, Journal of Mathematical Sciences, vol. 193(4), pp 580–585, 2013.
17. Yu.P. Razmuslov, G. Pogudin, *Paradigm of Max-Factor and finite-dimensional representation of Lie algebras*, Moscow University Mathematics Bulletin, vol. 67(4), pp 170–172, 2012.
18. G. Pogudin, *Wronskian of derivations*, Moscow University Mathematics Bulletin, Volume 66(1), pp 47–49, 2011.

Preprints

1. H. Hong, A. Ovchinnikov, G. Pogudin, C. Yap, *Global identifiability of differential models*, <https://arxiv.org/abs/1801.08112>.
2. A. Ovchinnikov, G. Pogudin, N. Thieu Vo, *Bounds for elimination of unknowns in systems of differential-algebraic equations*, <https://arxiv.org/abs/1610.04022>.
3. G. Pogudin, *Primitive element theorem for fields with commuting derivations and automorphisms*, <https://arxiv.org/abs/1812.11375>.
4. W. Li, A. Ovchinnikov, G. Pogudin, T. Scanlon, *Elimination of unknowns for systems of algebraic differential-difference equations*, <https://arxiv.org/abs/1812.11390>.
5. E. Amzallag, A. Minchenko, G. Pogudin, *Degree bound for toric envelope of a linear algebraic group*, <https://arxiv.org/abs/1809.06489>.
6. E. Paul, G. Pogudin, W. Qin, R. Laubenbacher *The dynamics of canalizing Boolean networks*, <https://arxiv.org/abs/1902.00056>.

Other publications

1. M. Drmota, C. Krattenthaler, G. Pogudin, *Problem 11997*, The American Mathematical Monthly, vol. 124, number 7, p.660.

Recent presentations

1. *Global identifiability of differential models*, Biomathematics/Computational Biology Colloquium, Courant Institute of Mathematical Sciences, October 23, 2018.
2. *Elimination of unknowns in systems of difference equations*, Differential Algebra and Related Topics IX, Leeds, 30 July - 2 August, 2018.
3. *Global identifiability of differential models*, International Congress on Mathematical Software (ICMS), South Bend, 23-27 July 2018.
4. *Irredundant triangular decomposition*, International Symposium on Symbolic and Algebraic Computation (ISSAC), New York, 16-19 July 2018.
5. *Power series expansion of the free energy for monomer-dimer tilings*, Rutgers Experimental Mathematics Seminar, New Brunswick, 1 February 2018.
6. *Algorithms for checking global identifiability*, Kolchin Seminar in Differential Algebra, CUNY Graduate Center, New York, 1 September 2017.
7. *Computation of a representation of radical ideal via triangular sets*, SIAM Applied Algebraic Geometry, Atlanta, 1-4 August 2017.
8. *Elimination for systems of nonlinear ODEs arising in biology*, Annual Meeting of Society for Mathematical Biology, Salt Lake City, 17-20 July 2017.
9. *Jet Ideals and Products of Ideals in Differential Rings*, Kolchin Seminar in Differential Algebra, CUNY Graduate Center, New York, 18 November 2016.
10. *New effective differential Nullstellensatz*, Differential Algebra and Related Topics VII, CUNY Graduate Center and Hunter College, New York, 1-4 October 2016.

11. *Bounds for orders of derivatives in differential elimination algorithms*, International Symposium on Symbolic and Algebraic Computation (ISSAC), Waterloo, 19-22 July 2016.
12. *On the Existence of Surjective Projection of a d -Dimensional Differential Algebraic Variety onto \mathbb{A}^d* , Kolchin Workshop on Differential Algebra, CUNY Hunter College, New York, 13-15 May 2016.
13. *Differential analogue of the Primitive Element theorem*, Seminar on Computer Algebra, Moscow State University and Dorodnicyn Computing Centre, Moscow, 20 April 2016.
14. *A “polynomial shifting” trick in differential algebra*, Mathematical Aspects of Computer and Information Sciences (MACIS), Berlin, 11-13 November 2015.
15. *Some properties of the differential ideal $[x^m]$* (poster), Model Theory, Difference/Differential Equations and Applications, Lumini, 7-10 April 2015.
16. *On the primitive element theorem for differential field extensions with zero derivation on the base field*, Polynomial Computer Algebra, Euler International Mathematical Institute, St. Petersburg, 16-19 April 2014.
17. *Some properties of the differential ideal $[x^m]$* , Polynomial Computer Algebra, Euler International Mathematical Institute, St. Petersburg, 6-10 May 2013.

Teaching

- New York University: Basic Algorithms (3 semesters, ~ 150 students in total).
- New York Math Circle: “College Bridge” program.
- Johannes Kepler University: Algebra for Computer Scientists, project leader for “Project Week of Applied Mathematics” ([link](#)).
- Moscow State University, Department of Mechanics and Mathematics:
 - Abstract Algebra I, II,
 - Ring theory.
- Moscow State University, A.N. Kolmogorov school:
 - Calculus I, II.
 - Intermediate Algebra.
- College of Moscow Institute of Physics and Technology:
 - Discrete Mathematics,
 - Probability and Statistics.

Mentoring students

- 2017-2018 Project “*A method for identifying parameters in the May-Leonard system using Gröbner bases*” by Esha Sawant (high school student). The project advanced to the finals of the NYC Science and Engineering Fair.
- 2018-now Project “*Canalizing depth and dynamics of Boolean networks*” by Eli Paul and William Qin (high school students). Work in progress, the software is available at <https://github.com/MathTauAthogen/Canalizing-Depth-Dynamics>.

Teaching awards

- 2015, 2016 The Best Teacher of the A.N. Kolmogorov High School (Moscow State University).
- 2014 Grant recipient of the Education Department of Moscow.

Professional service

- Co-organizer of the workshop Model Theory of Differential Equations, Algebraic Geometry, and their Applications to Modeling (2020, BIRS, Canada)
- Program Committee Member of the 44th International Symposium on Symbolic and Algebraic Computation (ISSAC 2019, Beijing, China).
- Chair of the Workshop on Symbolic-Numeric Methods for Differential Equations and Applications (NYU, USA, 2018).
- Selection Committee Member for Dean's Undergraduate Research Fund (NYU, USA, 2018).
- Judge of the NYU Undergraduate Research Conference (NYU, USA, 2018).
- Publicity Chair of the 43rd International Symposium on Symbolic and Algebraic Computation (ISSAC 2018, CUNY and NYU).
- Poster Committee Member of the 43rd International Symposium on Symbolic and Algebraic Computation (ISSAC 2018, CUNY and NYU).
- Local Organizer of the 8th Differential Algebra and Related Topics conference (Johannes Kepler University, Linz, Austria, 2017).

Additional skills

Programming languages: C++, Python, Perl, Maple, Mathematica, Java, SQL, Coq.