Nikita Kalinin

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Contacts
gmail.com, nikaanspb

Citizenship: Russia.
Birthday: May 6, 1988.

clickable links:

Guangdong Technion profile

mathscinet profile zbmath

ORCID web of science scopus

google scholar arxiv

Interests: sandpile models, random walks, pattern formation, tropical geometry, algebraic curves, number theory.

Positions

Associate professor (tenure track), *Guangdong Technion-Israel Institute of Technology*, Shantou, China (01.2024 – Present).

Visiting Associate professor, *Guangdong Technion-Israel Institute of Technology*, Shantou, China (10.2022 – 11.2023).

Associate professor (доцент), *Department of Mathematics and Computer Science*, Saint Petersburg University, Russia (09.2019 – 11.2022).

Senior Researcher (старший научный сотрудник), *International Laboratory of Game Theory and Decision Making, Saint Petersburg branch of HSE* (National Research University Higher School of Economics), Russia (09.2017 – 10.2022).

A holder of a Swiss grant PostDoc.Mobility with Ernesto Lupercio as a hosting professor, *CINVESTAV (Centro de Investigación y de Estudios Avanzados)*, Mexico City, Mexico (07.2016 – 08.2017).

Education

2015	PhD in Mathematics, *University of Geneva*, Switzerland Thesis topic: "Tropical geometry for Nagata's conjecture and Legendrian curves" Advisor: Grigory Mikhalkin
2010	Specialist (=master) in Mathematics, *Saint Petersburg University*, Russia Thesis topic: "The Alexander polynomial as an intersection of two cycles in a symmetric power" Advisor: Oleg Ya. Viro

Honors, Awards, and Grants

2020	Russian Science Foundation grant №20-71-00007, Scaling in sandpile models, 07.2020–06.2022
2018	Young Russian Mathematics grant holder, A summation over subsets of $SL(2,\mathbb{Z})$, 01.2018–12.2020
2016	PostDoc.Mobility SNSF (Switzerland) grant, P2GEP2_168647, Sandpiles in physics, combinatorics, tropical and algebraic geometry 1.07.2016 – 31.08.2017
2005	Gold medal at the International Mathematical Olympiad

Service

2020-2024	Editor-in-chief of a book about St. Petersburg mathematicians, *Saint Petersburg mathematicians and their discoveries*, 496p., (2024), MCCME. Freely available on `https://sites.google.com/view/spbmath`
2024	Organising a conference Combinatorics and Dynamics in GTIIT
2023-2025	Coordinator of math projects for students in GTIIT
2021	Organiser of several workshops in Euler's institute, Saint Petersburg
2020	Senior Coordinator on International Mathematical Olympiad 2020
2019-2021	Organiser of a program for talented students in Sirius, Sochi
2017-2019	Organiser of an international topology olympiad for students
2005-2011	Tutor of a math circle in high school

Consulting

2021	Consulting Russian government about organizing a centralized university admission system
2019	Consulting participants in Russian crab quota auctions

Industrial Experience

2016	Parallel computations on supercomputer Xiuhcoatl, CINVESTAV, Mexico
2008-2011	Programmer and mathematician, modeling in biology, GGA Software Consulting programmers about statistics and biology

Programming

I used to program on Java, C++, Python, C#, R, Macaulay2, Sage, Mathematica

Languages

English	working proficiency
French	working proficiency
Russian	mother tongue

Teaching Experience

GTIIT:	*Set theory*,
	Infinitesimal analysis 3
	Combinatorial geometry
	Seminar in Geometry
	Probability theory
	Number theory
SPbU:	*Symplectic topology*,
	Introduction to homotopy theory,
	Game theory,
	Introduction to homology theory,
	General topology,
	Hyperbolic geometry,
	Topological data analysis
	Differential forms in algebraic topology
HSE:	*Algebra and analysis* (for sociologists),
	Game theory (for economists),
	Topological data analysis (for programmers)
UniGe:	*Complex Analysis* (assistant; in French),
	Characteristic classes (assistant; in English),
	Méthodes élémentaires (in French)

Master theses under my supervision

2024	Triangulations of flat $\mathbb{R}P^2$ with three different conical points
2024	Sandpile models on oriented graphs
2017	Sandpile phenomena in tropical systems, Mexico City
2014	Un polynôme pour les matroïdes signés: généralisations et applications, Geneva

Bachelor theses under my supervision

2024	Sandpile on infinite graphs
2023	Newton polytopes of singular surfaces
2023	Triangulations of flat $\mathbb{R}P^2$ with four conical points
2023	Densities of lattices of translates
2023	Patterns in sandpiles
2023	Growth phenomena in sandpiles
2022	Analysis of the mechanism of the college admission in Russia in 2021
2021	Equilibrium existence in the case of non-divisible objects
2020	Modeling and analysis of crab auction in Russia
2020	Repeated auctions with a reserve price
2019	Isoperimetric problem for a family of closed curves on a sphere

Submitted papers/preprints

Mordell-Tornheim type series over lattice parallelograms by telescopic summation, `https://arxiv.org/abs/2410.10884`

Several formulae for summation over $SL(2,\mathbb{Z})$, `https://arxiv.org/abs/2409.10592`

Tropical Weil's reciprocity law and Weil's pairing (joint with M. Magin), `http://arxiv.org/abs/2408.06372`

A guide to tropical modifications, https://arxiv.org/abs/1509.03443

Sandpile group of infinite graphs (joint with V. Khramov), https://arxiv.org/abs/2305.05346

Shrinking dynamic on multidimensional tropical series, https://arxiv.org/abs/2201.07982

Tropical curves in sandpile models (joint with M. Shkolnikov), https://arxiv.org/abs/1502.06284

Published papers

(Sandpile patterns on a regular graph of degree eight, in Russian, joint with P. Granin, A. Saakyan) Песочные паттерны на регулярном графе с вершинами степени восемь, *Chebyshevskii Sbornik*, vol. 25 (2024), no. 3, pp.47–69.

(Convergence of a sandpile on a triangular lattice under rescaling, in Russian, joint with A. Aliev) Сходимость песочной кучи на треугольной решётке при ремасштабировании, *Matematicheskii Sbornik*, vol. 214 (2023), issue 12, pp.3–25.

Some statistics about Tropical Sandpile Model, *Communications in Mathematics*, Volume 31 (2023), Issue 3, 9–19. (joint with Y. Prieto)

Sandpile solitons in higher dimensions, *Arnold Mathematical Journal*, 9 (2023), no. 3, 435–454.

Equilateral convex triangulations of $\mathbb{R}P^2$ with three conical points of equal defect, *In the Tradition of Thurston II: Geometry and Groups* (2022), editors: Ken'ichi Ohshika, Athanase Papadopoulos, Springer (joint with M. Chernaviskikh, A. Erdnigor, and A. Zakharov)

Sandpile Solitons via Smoothing of Superharmonic Functions, *Communications in Mathematical Physics*, 378(3) (2020), 1649–1675 (joint with M. Shkolnikov)

Pattern Formation and Tropical Geometry, *Frontiers in Physics*, 2020 (8), 423

Strategic analysis of the Russian crab quota auction in 2019, *Marine Policy*, Volume 122, December 2020, 104266, (joint with Mark Vershinin)

Tropical formulae for summation over a part of $SL(2,\mathbb{Z})$, *European Journal of Mathematics*, Volume 5 (2019), Issue 3, 909–928 (joint with M. Shkolnikov)

Self-Organized Criticality and Pattern Emergence through the Lens of Tropical Geometry, *PNAS* August 28, 2018. 115 (35) E8135–E8142 (joint with A. Guzmán-Sáenz, Y. Prieto, M. Shkolnikov, V. Kalinina, E. Lupercio)

Legendrian curves in $\mathbb{C}P^3$: cubics and curves on a quadratic surface, *Zapiski Nauchnyh Seminarov PDMI*, vol. 476 (2018), Geometry and Topology Series 13, 92-110 (Journal of Mathematical Sciences, 251(4), 489-502)

Introduction to tropical series and wave dynamic on them, *Discrete and continuous dynamical systems, A*, 38(6) (2018): 2843–2865 (joint with M. Shkolnikov)

The number π and summation by $SL(2,\mathbb{Z})$, *Arnold Mathematical Journal*, Volume 3 (2017), Issue 4, 511–517 (joint with M. Shkolnikov)

Tropical approach to Nagata's conjecture in positive characteristic, *Discrete and Computational Geometry*, 58(1) (2017), 158-179

Tropical curves in sandpiles, *Comptes Rendus Mathematique*, Volume 354, Issue 2, 1 February 2016, 125–130 (joint with M. Shkolnikov)

Sandpiles on the heptagonal tiling, *Knot Theory and Its Ramifications*, Vol. 26 (2016), Issue 12, 1642005 (joint with M. Shkolnikov)

The Newton polygon of a planar singular curve and its subdivision, *Journal of Combinatorial Theory, Series A*, 137 (2016), 226–256

The Alexander polynomial as an intersection of two cycles in a symmetric power, *Journal of Knot Theory and Its Ramifications*, Vol. 24 (2015), No. 12, 1550061