

# Vladimir Sosnilo

Germany, Regensburg  
Am Vitusbach, 13, 93051  
✉ [vsosnilo@gmail.com](mailto:vsosnilo@gmail.com)  
🌐 <https://vova-sosnilo.com/>  
date of birth 21.08.1994

## Research interests

- Category theory and  $\infty$ -category theory, homotopy type theory.
- Algebraic K-theory, stable  $\infty$ -categories, noncommutative motives.
- Algebraic geometry, motivic homotopy theory, descent conditions for cohomology theories.

## Employment

2022-2025 **University of Regensburg**, Regensburg, Germany.  
Research assistant

2018-2022 **Laboratory of Modern Algebra and Applications**, *Department of Mathematics & Computer Science of SPbU*, St. Petersburg, Russia.  
Research Engineer

2013-2018 **Chebyshev Laboratory**, *Mathematics & Mechanics Faculty of SPbU*, St. Petersburg, Russia.  
Research Engineer

### Non-academic employment

2011-2012 **LoyaltyPlant company**, St. Petersburg, Russia.  
Software Developer

## Education

2018-2022 **Phd in Mathematics**, *Higher School of Economics*, Moscow, Russia.  
Advisor: Ivan Panin

2016-2017 **Master of Mathematics**, *University of Duisburg-Essen*, Essen, Germany.  
Advisor: Marc Levine

2011-2015 **Bachelor of Mathematics**, *St. Petersburg State University*, St. Petersburg, Russia.  
Advisor: Mikhail Bondarko

## Publications

Most important papers are marked with a star.

- 1 Vladimir Sosnilo.  $\mathbb{A}^1$ -invariance of localizing invariants. *To appear in Annals of K-theory*. arXiv:2211.05602
- 2 Tom Bachmann, Adeel A. Khan, Charanya Ravi, Vladimir Sosnilo. Categorical Milnor squares and K-theory of algebraic stacks. *Selecta Mathematica*, 28 (2022). arXiv:2011.04355
- (★) 3 Elden Elmanto, Vladimir Sosnilo. On nilpotent extensions of  $\infty$ -categories and the cyclic trace. *International Mathematics Research Notices*, 21 (2022). arXiv:2010.09155

- 4 Mikhail Bondarko, Vladimir Sosnilo. On Chow-weight homology of geometric motives. *Transactions of the AMS*, 375 (2022). arXiv:1411.6354
- 5 Vladimir Sosnilo. Regularity of spectral stacks and discreteness of weight-hearts. *Quarterly Journal of Mathematics*, 73 (2022). arXiv:1901.02431
- (\*) 6 Elden Elmanto, Marc Hoyois, Adeel A. Khan, Vladimir Sosnilo, Maria Yakerson. Motivic infinite loop spaces. *Cambridge Journal of Mathematics*, 9 (2021) arXiv:1711.05248
- 7 Tom Bachmann, Elden Elmanto, Marc Hoyois, Adeel A. Khan, Vladimir Sosnilo, Maria Yakerson. On the infinite loop spaces of algebraic cobordism and the motivic sphere. *Épjournal de Géométrie Algébrique*, 5 (2021). arXiv:1911.02262
- (\*) 8 Elden Elmanto, Marc Hoyois, Adeel A. Khan, Vladimir Sosnilo, Maria Yakerson. Modules over algebraic cobordism. *Forum of Mathematics, Pi*, 8 (2020). arXiv:1908.02162
- 9 Elden Elmanto, Marc Hoyois, Adeel A. Khan, Vladimir Sosnilo, Maria Yakerson. Framed transfers and motivic fundamental classes. *Journal of Topology*, 13 (2020), 460-500. arXiv:1809.10666
- (\*) 10 Vladimir Sosnilo. Theorem of the heart in negative K-theory for weight structures. *Documenta Mathematica*, 24 (2019), 2137-2158. arXiv:1705.07995
- 11 Mikhail Bondarko, Vladimir Sosnilo. On purely generated  $\alpha$ -smashing weight structures and weight-exact localizations. *Journal of Algebra*, 535 (2019), 407-455. arXiv:1712.00850
- 12 Sergei O. Ivanov, Roman Mikhailov, Vladimir Sosnilo. Higher colimits, derived functors and homology. *Sbornik Mathematics*, 210 (2019), 1222-1258. arXiv:1805.07754
- 13 Mikhail Bondarko, Vladimir Sosnilo. On the weight lifting property for localizations of triangulated categories. *Lobachevskii Journal of Mathematics*, 39 (2018), 970–984. arXiv:1510.03403
- 14 Mikhail Bondarko, Vladimir Sosnilo. On constructing weight structures and extending them to idempotent extensions. *Homology, Homotopy and Applications*, 20 (2018), pp.37–57. arXiv:1605.08372
- 15 Mikhail Bondarko, Vladimir Sosnilo. Non-commutative localizations of additive categories and weight structures; applications to birational motives. *Journal of the Institute of Mathematics of Jussieu*, 17 (2016), 785-821. arXiv:1304.6059
- 16 Mikhail Bondarko, Vladimir Sosnilo. A Nullstellensatz for triangulated categories. *Algebra and Analysis*, 27 (2015), 41-56. arXiv:1508.04427

### Preprints

- (\*) 1 Maxime Ramzi, Vladimir Sosnilo, Christoph Winges. Every spectrum is the K-theory of a stable  $\infty$ -category. arXiv:2401.06510
- 2 Andrey Druzhinin, Vladimir Sosnilo. Zariski-local framed  $\mathbb{A}^1$ -homotopy theory. arXiv:2108.08257

### PhD thesis

Weighted methods in noncommutative geometry. *Defended at the HSE in Moscow.* [pdf](#)

## Invited Talks & Conferences

- May, 2024 **A counterexample to the nonconnective theorem of the heart.**  
EPFL topology seminar
- Apr, 2024 **Theorems of the heart in algebraic K-theory and their applications in geometry.**  
lecture series at Graduate School of Mathematical Sciences of Tokyo University
- Mar, 2024 **Every noncommutative motive is the motive of a stable  $\infty$ -category.**  
Conference "Motives in Mainz", Mainz University
- Jan, 2024 **Trace methods and the Atiyah-Segal completion theorem.**  
Bangalore Centre of the Indian Statistical Institute
- Jun, 2023 **Pro-excision for K-theory of algebraic stacks.**  
Münster University
- May, 2023 **Introduction to weight structures.**  
Institut de Mathématiques de Jussieu-Paris Rive Gauche
- Feb, 2023 **Weighted  $\mathbb{A}^1$ -invariance and the Atiyah-Segal completion theorem.**  
Conference "Motives in Tokyo", Graduate School of Mathematical Sciences of Tokyo University
- Sep, 2022 **Motives without  $\mathbb{A}^1$ -invariance.**  
lecture series at the Summer school "Motives in Ratisbona", Regensburg University
- Mar, 2022 **Weight structures and applications I: structural results.**  
Leiden University
- Jan, 2021 **On nilpotent extensions of  $\infty$ -categories and the cyclotomic trace.**  
AG seminar, Regensburg University, online
- Oct, 2020 **Comparing Nisnevich descent, Milnor excision, and the pro-cdh excision.**  
AG seminar, St. Petersburg State University, online
- Sep, 2020 **Excision for algebraic K-theory with respect to categorical Milnor squares.**  
Seminar on A1-topology, motives and K-theory, St. Petersburg State University, online
- Jun, 2020 **Pro-excision for stacks, [link](#).**  
Conference "Motives and What Not", online
- Dec, 2019 **Milnor squares and the Weibel's conjecture.**  
Seminar on A1-topology, motives and K-theory, St. Petersburg State University
- Nov, 2019 **Regularity of spectral stacks, their algebraic K-theory, and weight structures, [link](#).**  
AG seminar, Regensburg University
- May, 2018 **K-theory of the category of Voevodsky motives.**  
St. Petersburg algebraic geometry symposium for young mathematicians, St. Petersburg State University
- Dec, 2018 **Weight structures on stable infinity-categories.**  
Algebra/Topology seminar, University of Copenhagen
- Nov, 2017 **Comparing different framed transfers.**  
Seminar on A1-topology, motives and K-theory, St. Petersburg State University
- Jun, 2017 **Theorem of the heart for weight structures.**  
AG seminar, Regensburg University
- Sep, 2016 **Non-commutative localizations of additive categories and weight structures.**  
Harish-Chandra Research Institute
- Apr, 2015 **Noncommutative localizations of additive categories and weight structures.**  
Faddeev seminar, St. Petersburg Department of Steklov Institute

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## Awards

2013, 2017 **Rokhlin grant**, awarded by St. Petersburg Department of Steklov Institute.

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## Teaching experience

- Winter, 2021 **Sheaves and the continuum hypothesis**, lecture series for the Winter School in Mathematics and Theoretical Computer Science, [link](#).  
online
- Fall, 2020 **Homotopy type theory**, Seminar jointly organized with Valery Isaev, [recordings](#) (in Russian).  
online
- Spring, 2020 **Higher category theory**, Seminar jointly organized with Andrei Lavrenov.  
online
- Fall, 2019 **Type theory**, Seminar jointly organized with Dmitry Shtukenberg.  
St. Petersburg State University
- Fall, 2015 **Algebraic topology and vector bundles**, joint with Alexey Ananyevskiy, lecture series for sophomore undergraduate students.  
St. Petersburg State University
- Fall, 2014 **Linear algebra**, problem sessions for sophomore undergraduate students.  
St. Petersburg State University
- Fall, 2013 **Introduction to commutative algebra**, lecture series for high school students.  
Laboratory of Continuous Mathematical Education
- Summer, 2012 **Combinatorics**, lecture series for high school students.  
Laboratory of Continuous Mathematical Education

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## Supervising students

- 2022-2024 Nikita Golub: cosupervising master thesis on quantum field theories and geometry of stacks
- 2015-2016 Gleb Novikov: a high school student of "Laboratory of Continuous Mathematical Education" completed a research project under my supervision and presented it at the International Science and Engineering Fair in Pittsburgh, Pennsylvania, USA

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## Service to the community

Referee reports for various mathematical journals including Alg. & Geom. Topology, IMRN, JIMJ, Annals of K-theory, Compt. Rend. Math.

Quick opinions for various mathematical journals including Duke Mathematical Journal, Invent. Math.

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## Languages

- English: fluent  
German: beginner  
Japanese: intermediate  
Russian: native