

# Misha Temkin

## PERSONAL INFORMATION

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DATE OF BIRTH: 23 March, 1993  
EMAIL: [misha.temkin@dartmouth.edu](mailto:misha.temkin@dartmouth.edu)  
WEBSITE: [math.dartmouth.edu/~mt](http://math.dartmouth.edu/~mt)

## EDUCATION

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2017-2021 Ph.D. in Mathematics, National Research University “Higher School of Economics”, Moscow  
advisor: Petya Pushkar  
FALL 2016 Exchange semester at King’s College London, UK  
2015-2017 Master of Mathematics and Mathematical Physics (with distinction),  
National Research University “Higher School of Economics”, Moscow  
2011-2015 Bachelor of Mathematics, National Research University “Higher School of Economics”, Moscow

## EMPLOYMENT

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2021- John Wesley Young Research Instructor, Dartmouth College, Hanover, NH

## SCIENTIFIC INTERESTS

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Differential and symplectic topology. Parametric Morse theory and its flavors. Whitehead and Reidemeister torsion.

## TEACHING EXPERIENCE

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Teaching assistant at the Independent University of Moscow:

FALL 2013 Mathematical analysis

Teaching assistant at the Higher School of Economics:

FALL 2014 Topology-1

FALL 2015 Algebra-1

FALL 2018 Mathematical analysis-2

SPRING 2019 Mathematical analysis

FALL 2019 Introduction to algebraic topology

FALL 2020 Introduction to algebraic topology

Instructor at Dartmouth College:

FALL 2021 Math 11 Accelerated Multivariate Calculus

WINTER 2022 Math 24 Honors Linear Algebra

WINTER 2022 Math 8 Calculus of Functions of One and Several Variables

SUMMER 2022 Math 22 Linear Algebra and Its Applications

SPRING 2023 Math 13 Calculus of Vector-valued Functions

SUMMER 2023 Math 20 Probability

WINTER 2024 Math 13 Calculus of Vector-valued Functions

WINTER 2024 Math 22 Linear Algebra and Its Applications

## RESEARCH VISITS

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MAY-JULY 2018 Visiting scholar at Ecole Polytechnique, Palaiseau, France.  
Inviting person: Bertrand Rémy.

APR. 2022 Visitor at Stanford University, CA.  
Inviting person: Yasha Eliashberg.

## PREPRINTS AND PUBLICATIONS

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1. On the differential matrix in the Morse complex, with Petya Pushkar.  
*Russian Math. Surveys* 77 (2022), no. 5, 943–945.
2. Bruhat numbers of a strong Morse function, with Petya Pushkar.  
*Dokl. Math.* 106 (2022), no. 3, 454–457.
3. Enhanced Bruhat decomposition and Morse theory, with Petya Pushkar.  
*Int. Math. Res. Not. IMRN* (2023), no. 19, 16837–16903.

4. Using knot Floer invariants to detect prime knots, with Samantha Allen, Charles Livingston and C.-M. Michael Wong.  
Submitted for publication.  
Available at [arXiv:2311.11089](https://arxiv.org/abs/2311.11089).

## AWARDS

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- FALL 2016 Erasmus+ scholarship granted for an exchange semester at King's College (London, UK).  
 NOV. 2017 HSE academic scholarship for doctorate studies.  
 MAY-JULY 2018 Scholarship provided by Ecole Polytechnique (Palaiseau, France) for a long-term visit.

## PRESENTATIONS

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- OCT. 2014 *Invariants of 4-manifolds*  
Seminar on topology of differentiable manifolds and Morse theory, Higher School of Economics
- SEPT. 2015 *Discrete Morse theory*  
Master programme research seminar, HSE
- NOV. 2015 *Quasi-homogeneous singularities*  
Seminar on singularity theory, HSE
- SEPT. 2016 *Reidemeister torsion*  
Master programme research seminar, HSE
- FEB. 2017 *Discrete Morse theory*  
Course on Morse theory, HSE
- MAY 2017 *Reidemeister torsion*  
Seminar on surgery theory, HSE
- MAY 2017 *Mutant knots and intersection graphs*  
Seminar on combinatorics of Vassiliev invariants, HSE
- JUNE 2017 *Discrete Morse theory*  
Seminar "Geometric structures on manifolds", HSE
- JUNE 2017  $\mathbb{H}\mathbb{P}^4$  *quotiented by the ring automorphisms and conjugation is  $\mathbb{S}^{13}$*   
Seminar "Geometric structures on manifolds", HSE
- OCT. 2017 *The limit of a family of algebraic curves is a tropical one*  
Seminar on convex and algebraic geometry, HSE
- NOV. 2017 *Barannikov approach to Morse theory on manifolds with boundary*  
Seminar on geometric topology, Steklov Institute
- JULY 2018 *Original proof of Bott periodicity via Morse theory*  
Department seminar, Ecole Polytechnique, Palaiseau
- JULY 2018 *Morse-Barannikov complex*  
Department seminar, Ecole Polytechnique, Palaiseau
- JULY 2019 *Kneser inequality via bounded cohomology*  
LUTSINOfest, Lutsino, Moscow region
- SEPT. 2019 *Discrete Morse theory*  
Seminar of Laboratory of algebraic geometry and its applications, HSE
- NOV. 2020 *Gassner invariant and Alexander polynomial of string links* (series of two talks)  
Seminar on geometric topology, Steklov Institute
- DEC. 2020 *Enhanced Bruhat decomposition in strong Morse theory*  
Seminar on geometric topology, Steklov Institute
- JAN. 2021 *Gassner invariant and Alexander polynomial of string links*  
Topology seminar, Dartmouth College
- APR. 2021 *On numbers on the barcode of a strong Morse function*  
Topology seminar, University of Georgia
- APR. 2021 *On numbers on the barcode of a strong Morse function,*  
Seminar of Laboratory of algebraic geometry and its applications, HSE
- JULY 2021 *On numbers on the barcode of a strong Morse function*  
LUTSINOfest, Lutsino, Moscow region
- SEPT. 2021 *Numbers on barcode of a strong Morse function* (rodeo talk)  
South Central Topology Conference, College Station, TX
- SEPT. 2021 *Numbers on barcode of a strong Morse function*  
Topology seminar, Dartmouth College
- OCT. 2021 *Various facets of torsion theory: Whitehead, Reidemeister and Milnor*

Topology seminar, Dartmouth College  
MARCH 2022 *On numbers associated with a strong Morse function*  
Symplectic geometry seminar, Stanford University  
APR. 2022 *On numbers associated with a strong Morse function*  
Topology seminar, University of Notre Dame  
MAY 2022 *On numbers associated with a strong Morse function*  
Bridging applied and quantitative topology, online (poster)  
MAY 2022 *On numbers associated with a strong Morse function*  
Richmond geometry festival, online (poster)  
JUNE 2022 *On numbers associated with a strong Morse function*  
Geometric Topology Workshop, online (contributed talk)  
JAN. 2023 *On numbers associated with a strong Morse function*  
Seminar “Cohomology in algebra, geometry, physics and statistics”  
Charles University, Czech Republic, online  
FEB. 2023 *On numbers associated with a strong Morse function*  
Topology seminar, University of Haifa, Israel  
JUNE 2023 *On numbers associated with a strong Morse function*  
Canadian Math Society Summer meeting, University of Ottawa, Canada  
MARCH 2024 *Numbers on barcodes and Reidemeister torsion*  
Department seminar, University of Massachusetts Boston

## COMMUNITY SERVICE

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MAY 2023 Judged an undergraduate poster session at Dartmouth College.  
JULY 2020 Graded a mathematical olympiad for graduating seniors, which served as an admission exam to the Master’s graduate program at Higher School of Economics.  
JULY 2018 Delivered a lecture at the summer school for undergraduates “Contemporary Mathematics” (Dubna, Russia). Title: *Möbius band, projective plane and icosahedron*.

## LANGUAGES

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ENGLISH Fluent  
RUSSIAN Native

## COMPUTER SKILLS

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PYTHON, SAGE Solid experience  
LINUX Advanced user