

KIRILL BRILLIANTOV

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EDUCATION

ETH Zurich (ETH)

Master of Computer Science

Sep 2023 - Jun 2025

Zurich, Switzerland

Constructor (Jacobs) University Bremen (JUB)

Bachelor, Computer Science program, GPA 1.5 / 1.0

Sep 2022 - Jun 2023

Bremen, Germany

Relevant Courses: Distributed Systems, Natural Language Processing, Optimization Methods, Category Theory

(discontinued) **Higher School of Economics Saint-Petersburg (HSE SPb)** **Sep 2019 - Aug 2022**

Bachelor, Applied Mathematics and Informatics program, GPA 9.08 / 10.0 *Saint-Petersburg, Russia*

Relevant Courses: Calculus 1 & 2, Probability Theory, Statistics, Group & Number Theory, Linear Algebra & Advanced Algebra, Discrete Math, Graph Theory, Data Structures & Algorithms, Probability Algorithms, Approximate Algorithms, Exact Exponential Algorithms, Introduction to Machine Learning, Deep Learning, Numerical Methods 1 & 2, Software Engineering & Design, Java, C/C++, Haskell, High Performance Computations

PUBLICATIONS

1. (preliminary) **Brilliantov, K.**; Alferov, V.; and Bliznets, I. 2023. Improved Algorithms for Maximum Satisfiability and Its Special Cases. *Proceedings of the AAAI Conference on Artificial Intelligence*
2. (in review) **Brilliantov, K.**; Pavutnitskiy, F.; Pasechuk, D.; Magai, G. 2023. Applying Language Models to Algebraic Topology: Generating simplicial cycles using multi-labeling in Wu's Formula. *arXiv preprint*

RESEARCH EXPERIENCE

Studying Generalization Limits of Persistent Homology

Jun 2023 - Aug 2023

research internship at Aalto under supervision of Vikas Garg

Helsinki, Finland

- There is a method of adding extra information to Graph Neural Networks called Persistent Homology (PH)
- There are studies of Expressivity of these models, but there is a lack of studies about the Generalization Limits of these models

keywords: GNNs PH generalization & expressivity theoretical ML

Applying Language Models to Algebraic Topology

Feb 2022 - May 2023

bachelor's thesis at JUB under supervision of Fedor Pavutnitskiy

Remote

- There is Wu formula for the homotopy groups of the two-dimensional sphere, we tried to sample elements from homotopy group using it.
- We proposed several approximate algorithms, using a wide variety of approaches from optimization theory and application of neural networks to NLP problems.

paid position at EIMI from Feb 2022 to Jul 2022

[github](#), **keywords:** free groups nlp pytorch huggingface

($n, 4$)-MaxSAT and General MaxSAT

coursework at [HSE SPb](#) under supervision of [Ivan Bliznets](#)

Sep 2021 - Jan 2022

Saint-Petersburg, Russia

- Studied the computational complexity of MaxSAT problem and its special cases
- Developed an algorithm with **9.95%** for ($n, 4$)-case and **8.38%** for ($n, 3$)-case faster running time
- Did this by analyzing bottleneck cases of the previous best algorithms
- [AAAI2023](#) accepted [1]

keywords: exact exponential algorithms branch & bound measure & conquer

WORK EXPERIENCE

intern Backend Engineer

at [Yandex.Direct](#), paid position

Jul 2021 - Oct 2021

Saint-Petersburg, Russia

- Was a part of a team developing API
- Rewrote \approx **2000** lines of ancient Perl code to Java
- Learned Perl and had a great experience supporting legacy code and got an **offer** but declined it.

keywords: Java Spring Kotlin

TEACHING EXPERIENCE

Mathematical Logic Teacher's Assistant

at [HSE SPb](#), paid position

Apr 2022 - Jul 2022

Saint-Petersburg, Russia

- Helped [lecturer](#) teaching a group of **14** freshmen to solve mathematical logic problems.
- Checked their homework and did seminars.
- We covered: equinumerosity, boolean functions, boolean schemes, basics of proof theory.

C++ Teacher's Assistant

at [HSE SPb](#), volunteer

Sep 2022 - Dec 2022

Remote

- Helped C/C++ [lecturer](#) reviewing home assignments of **20** freshmen
- Gave them feedback about readability, style, architecture, and correctness

C++ Mentor

at [HSE SPb](#), volunteer

Feb 2022 - Jun 2022

Saint-Petersburg, Russia

- Was a mentor for group of **3** freshmen
- Helped solving technical and architectural problems
- Organized regular calls and did code review
- The commission **highly** rated their [result](#)

PROJECTS

MutationDetector

Jan 2018 - Jan 2019

- Developed a GUI for analyzing protein sequences
- It displays the given protein sequence and experiment parameters: difference of a mass between origin sequence and mutated
- It shows possible mutations leading to given mass difference
- Presented this project at [SISC-ISSF](#) 2019 and got **first** prize in the computer science poster session

[supervisor](#), **keywords:** Java Swing