

Vasily Ilin

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Education

University of Washington | 2020 - 2025

PhD in Mathematics

Boston University | 2019 - 2020

Master of Science in Computer Science | GPA: 4.0

Boston University | 2015 - 2019

Master of Arts in Mathematics | GPA: 4.0

Bachelor of Arts in Mathematics with honors

Graduated with Magna Cum Laude and the Marvin Freedman Prize

Thesis: “Stochastic Simulation Algorithms and Benchmarks” supervised by Samuel Isaacson

Graduate Coursework

Analysis

MATH 525-526 (UW) – Measure theory, functional analysis.

MA 511, 512 – Metric spaces, convergence, Fourier theory, integrability.

MA 711 – Measure theory, L^p spaces, integration.

MA 713 – Analytic functions, contour integration, biholomorphic maps.

MA 776 (audited) – Partial Differential Equations.

Algebra and Number Theory

MATH 505-507 (UW) – groups, field and Galois theory, commutative algebra, representation theory.

MA 742 – Algebras, matrix canonical forms.

MA 741 – Groups extensions, domains (ED, PID, UFD, Noetherian), modules, tensor products, Hom, exactness.

MA 542 – Ring & Field theory, Galois theory.

MA 547/548 – Continued fractions, cyclic groups, PIDs, quadratic reciprocity.

Probability and Statistics

MA 581, 582 – Random variables, WLLN, CLT, generating functions, estimation theory.

MA 779, 780 (audited) – Probability with measure theory.

Topology & Geometry

MATH 545-547 (UW) – Topological manifolds and smooth manifolds.

MA 563 – Fundamental forms of surfaces, curvature, geodesics.

MA 564 – Topological spaces, fundamental group, covering spaces, homotopy theory.

Applied & Computational Mathematics

MA 565, 579 – Analytic and numerical methods for ODEs and PDEs in mathematical biology.

CS 535 – TM's, uncomputability, NP problems, complexity, randomized algorithms, interactive proofs, PCP theorems.

CS 537 – Randomness in Computing.

CS 591 – Random graph algorithms.

Computer Science

CS 591 – Object Oriented Design in Java.

CS 565 – Data Mining.

CS 530 – Data Structures and Algorithms.

Projects

DiffEqJump | Summer, 2020

Extensively contributed to [DiffEqJump](#), a Julia package for building and solving jump equations via SSAs (stochastic simulation algorithms), e.g. the Gillespie method. Wrote two SSAs, one of them novel, refactored old code, wrote code toward simulating spatially non-homogeneous systems.

Dense Low Rank Subgraph | Summer, 2020

Researched a novel problem of finding a dense low-rank subgraph, supported by a grant of Evimaria Terzi. The problem description, write-up and code available on [github](#).

Fully Dynamic Connectivity | Spring, 2020

Implemented a Fully Dynamic Connectivity data structure described in Henzinger and King, 1995, and did benchmarking and experimentation. Worked in Python with a partner. Report and code available on [github](#).

Rogue-like Object-Oriented game | Spring, 2020

Wrote a rogue-like Quest game playable in the terminal, following object-oriented practices. Code available on [github](#). Additionally, worked with a partner to make a MOBA-inspired game that extends the Quest.

Bank | Spring, 2020

Implemented a bank in Java. Designed and implemented the class structure, used JSON files for data permanence and Java Swing for GUI. Followed best OOP practices. Report and code available on [github](#).

Research in Stochastic Simulation Algorithms (Work for Distinction) | Fall, 2018 - Spring, 2019

Implemented several numerical methods of simulating chemical stochastic systems in three dimensions with reactions and diffusion in Julia. Compared asymptotic complexity and the real run time of each algorithm in several implementations. Received the Marvin Freedman Prize for this work. The report is available at [vasilyilin.com](#).

Data Mining Competition | Fall 2019

Placed second out of a class of over 100 graduate students in BU's data mining competition. Code available on [github](#). The leaderboard is available [here](#).

Mini Language | Summer, 2019

Wrote an imperative language in Haskell and solved five problems from project Euler. Worked with a team of three. Code is available on [github](#).

Twitter Sentiment Analysis | Spring, 2018

Trained a Word2Vec model on the Wikipedia corpus, trained a logistic regression on a labeled dataset of tweets, built a tweet classifier by sentiment, visualized tweets with Google Maps API. Worked in a team of two. Code available on [github](#).

Research in Theoretical Behavioral Economics | Summer, 2018

Wrote a full grant proposal and won the funding, explored a novel theoretical model in behavioral economics inspired by neural networks in cognitive science, implemented the model in Python. Available on [github](#).

Work Experience

Teaching Assistant for Calculus at UW | Fall, 2020 - present

I teach two discussion section of 30 people each, hold office hours and grade exams in calculus.

Teaching Assistant for Data Science at BU | Spring, 2020

Taught discussions, designed homework and held office hours for a data science class at Boston University.

Tutor & Grader | Fall, 2016 - Spring, 2020

I tutored pre-calculus and calculus. Graded classes in abstract algebra, mathematical statistics, differential equations and calculus.

Data Science Intern at Orion Health | Fall, 2017

Developed an anomaly classifier algorithm for an AWS server based on 250 features, used PCA, T-SNE and K-means to find patterns, self-studied data science and precision medicine. Worked in a team of 6 machine learning and data science specialists.

Skills

Technical Skills

Python, Julia, Java, Git, \LaTeX , Data Structures & Algorithms, Complexity Analysis & Optimization

Languages & General Skills

Russian (native), German (A3 level), problem solving, quantitative thinking, patience, ability to learn quickly, teamwork