Abhay Goel

Curriculum Vitae

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↳ Website

Education

2022–Present	**University of Utah**, *Mathematics*, Ph.D.
	Passed all qualifying exams, preparing for oral qual.
2014–2018	**Kalamazoo College**, *Mathematics and Physics*, Bachelor of Arts, GPA − 3.972/4.0.
	Thesis: *On a Generalization of the Bestvina-Brady Construction*
	Relevant courses: Algebraic Number Theory, Intro to Algebraic Geometry, Abstract Algebra I/II, Real Analysis I/II, Complex Analysis, Differential Equations, Intro to Number Theory, Intro to Topology
2016–2017	**Budapest Semesters in Mathematics**, *Study Abroad*.
	Relevant courses: Advanced Abstract Algebra, Topics in Analytic Number Theory, Commutative Algebra, Algebraic Topology, Conjecture and Proof, Functional Analysis

Employment

2022–Present	**Graduate Student**, *Dr. Sean Howe*, University of Utah, Arithmetic Geometry.
	Funded by teaching assistantships for undergraduate mathematics courses and research assistantships to study arithmetic geometry and representation theory.
2018–2022	**Software Engineer**, Google LLC, Dynamic Search Ads (DSA).
	DSA uses advertiser website content to target ads and fill in the gaps of keyword-based campaigns. DSA headlines and landing pages are also generated using website content to keep ads relevant and save advertisers' time. My responsibilities were to develop infrastructure, design experiments, and run quality analyses to improve the precision of this automated product.
2015–2018	**MPC Tutor**, *Dr. Stephen Oloo, Dr. Mckenzie West*, Kalamazoo College.
	Worked in the Math and Physics Center (MPC) to assist students in all undergraduate mathematics and physics courses.
2015–2016	**Research Assistant**, *Dr. Jan Tobochnik*, Kalamazoo College.
	Optimized Monte Carlo simulations for modelling the phase transition of a colloid. My work entailed optimizing some existing code and adding support for computation of fractal dimension.
2014–2018	**Teaching Assistant**, *Dr. Dave Wilson, et. al.*, Kalamazoo College.
	Worked with students in physics labs to emphasize inquiry-based approach to physics and develop physical intuition. Also graded assignments for various classes in the mathematics and physics departments.

Projects / Schools / Conferences

2024	**Arizona Winter School**, Southwest Center for Arithmetic Geometry, Abelian Varieties.
	Attended the 2024 AWS in the study group of Dr. Valentijn Karemaker. Attended lectures by all of the invited lecturers, and worked on daily problem sessions specific to the geometry and arithmetic of moduli spaces of abelian varieties in positive characteristic presented by Dr. Karemaker.
2023	**Preliminary Arizona Winter School**, Southwest Center for Arithmetic Geometry, Elliptic Curves and Abelian Varieties.
	Attended the lecture series of Dr. Lassina Dembele, introducing abelian varieties in general and over finite fields. Completed exercises and discussed them in weekly problem sessions with peers.
2022	**PCMI Summer School**, Institute for Advanced Study, Number Theory Informed by Computation.
	Attended the 2022 Park City Mathematics Institute Summer School. Attended lectures, problem sessions, and implemented algorithms for point-counting algorithms, etc.

2017–2018	**Senior Thesis**, *Dr. Michele Intermont*, Kalamazoo College, On a Generalization of the Bestvina-Brady Construction.
	Studied a functor that assigned a subcomplex of an $n+1$-dimensional torus to a given n-dimensional simplicial complex. Investigated the combinatorial properties of this functor, as well as the topological and geometric properties of the toroidal spaces.
2018	**JMM Poster Presentation**, San Diego, Joint Mathematics Meetings.
	Presented senior thesis (above) during the student poster presentation. Poster and presentation received Outstanding Poster designation for being in the top 15% of presented topics in topology.
2018	**Mathematics Colloquium**, *Dr. Michele Intermont*, Kalamazoo College.
	Presented distillation of senior thesis to audience of undergraduate students and professors at Kalamazoo College.
2018–2019	**MAA Journal Solution Submissions**.
	Submitted various solutions to problems posed in the "Problems and Solutions" section of three MAA journals: American Mathematical Monthly, Mathematics Magazine, and College Mathematics Journals. Three such submissions were published as the accepted solution by the curators.

Selected grants, distinctions, and fellowships

2023	**RA Funding from RTG Grant**, University of Utah.
	Graduate student research funded under RTG Grant #1840190
2018	**Phi Beta Kappa Member**, Kalamazoo College.
2014–2017	**Putnam Exam**, Kalamazoo College.
	Scored 11,11,41,35 points per year, respectively.
2018	**Clarke Benedict Williams Prize**, Kalamazoo College.
	Established by the mathematics majors in the Class of 1923, awarded to that member of the graduating class who has the best record in mathematics and the allied sciences.
2016	**Thomas O. Walton Prize in Mathematics**, Kalamazoo College.
	Awarded to a member of the junior class for excellence in the work of the first two years in mathematics.
2015	**First-year Mathematics Award**, Kalamazoo College.
	Given annually to the sophomore student who, during the first year, demonstrated the greatest achievement in mathematics.
2015–2017	**Lower Michigan Mathematics Competition**, Kalamazoo College.
	1st place team all three years.
2014–2018	**Dean's List**, Kalamazoo College.

Teaching

University of Utah:

2024	**MATH 1210**, *Calculus I*.
2024	**pre-REU (TA)**, *Expanding circle maps, digit expansions, and topological Markov chains*.
	Worked with Dr. Kurt Vinhage to run a pre-REU for early undergraduate students interested in research mathematics. Lectured, posted lecture notes, and ran problem sessions over a 4-week course in dynamical systems
2024	**MATH 2210**, *Calculus III*.
2023	**MATH 3210**, *Foundations of Analysis I*.
2023	**MATH 1320 (TA)**, *Engineering Calculus II*.
2022	**MATH 1320 (TA)**, *Engineering Calculus II*.

Skills

Languages	C++, Python, Java, LaTeX, SageMath, Macaulay2