Dongshu Dai

Curriculum Vitae

Updated June 1, 2024

Research interests

Toric Geometry, Tropical Geometry, Algebraic Combinatorics

Education

University Of Waterloo — Waterloo, Ontario, Canada

PhD in Pure Mathematics — Fall 2023 – Present
Major GPA: 4.00/4.00
Supervisor: Matthew Satriano

University Of Waterloo — Waterloo, Ontario, Canada
Master in Pure Mathematics — Fall 2022 – Fall 2023
Major GPA: 4.00/4.00
Supervisor: Matthew Satriano

University Of Waterloo — Waterloo, Ontario, Canada
BA in Mathematics — Fall 2018 – Fall 2022
Major GPA: 3.81/4.00

Scholarships&Awards

Rico Mariani 2SLGBTQ+ Graduate Award	2023
University of Waterloo Excellence Entrance Award	2023
NSERC Undergraduate Student Research Award	2021
NSERC Undergraduate Student Research Award	2020
President's Research Award	2020

Research experience

Master in Pure Mathematics
Supervisor: Matthew Satriano (University of Waterloo) Fall 2022–Fall 2023
Resolution property of toriv varities and related topics in equivariant vector bundles. Develop theoretical tools and algorithms for computational purposes, and implement such codes in Python. Examine various family of toric vector bundles (e.g. Nori finite bundles) to abstract possible patterns as high dimension analogies of existing results on the moduli space of toric bundles.

Undergraduate Research Assistant In Algebraic Geometry
Mentors: Matthew Satriano (University of Waterloo) April – August 2021
Examed possible generalizations of previous lower bound on effective threshold for special family of weighted projective planes; utilized SageMath and various tools from geometry, combinatorics and number theory to attack the problem.

Undergraduate Research Assistant In Number Theory
Mentors: Wentang Kuo (University of Waterloo) April – August 2020
Researched class number problem and related notions in both algebraic and analytic number theory setting; analyzed the main tools used in the major breakthrough of the subject.

Skills

Programming
Proficient in: Python/SageMath, Macaulay2
Familiar with: C, C++

Advanced Courses

Finished

PMATH 445: Representations of Fintie Groups	Grade: 85
PMATH 446: Introduction to Commutative Algebra	Grade: CR
PMATH 464: Introduction to Algebraic Geometry	Grade: 92
PMATH 441: Algebraic Number Theory	Grade: 100
PMATH 433: Model Theory and Set Theory	Grade: 85
PMATH 450: Lebesgue Integration and Fourier Analysis	Grade: 94
PMATH 499: Reading in Arithmetic Geometry	Grade: 96
PMATH 940: Geometry of Numbers	Grade: 90
PMATH 940: Modular Forms	Grade: 92
PMATH 940: Diophantine Approximation	Grade 91
PMATH 940: Analytic Methods In Diophantine Problems	Grade 85
PMATH 945: Category Theory and Homological Algebra	Grade 97
PMATH 950: Quantum Representation Theory	Grade 95
PMATH 965: Algebraic Stacks	Grade 96
PMATH 965: Toric Varieties	Grade 97
PMATH 965: Mirror symmetry for Toric and Other GIT Quotients	Grade 97
CO 430: Algebraic Enumeration	Grade: 97
CO 463: Convex Optimization and Analysis	Grade: 100
CO 631: Symmetric Function Theory	Grade 96
CO 739: Asymmetric Function Theory	Grade 97
CO 739: Topics In Macdonald Polynomial	Grade 92
CO 739: Combinatorial Commutative Algebra	Grade 92
CO 739: Analytic And Algorithmic Combinatorics	Grade 87