

YIFAN ZHANG

yifan12@illinois.edu

EDUCATION

University of Illinois at Urbana-Champaign
Bachelor of Science in Mathematics

August 2018 - Present
Current GPA: 3.96

HONORS

Member of Pi Mu Epsilon Math Honorary Society
Edmund James Scholar
Dean's List

2019
2018-19
2018-present

REPRESENTATIVE COURSEWORK

Graduate Courses:

ECE 563 Information Theory A
MATH 540 Real Analysis A
MATH 558 Methods of Applied Math A-
ECE 534 Random Processes A+
MATH 553 Partial Differential Equations A

Undergraduate Courses

MATH 448 Complex Variables A
GEOG 468 Biological Modeling A+
MATH 428 Galois Theory A
MATH 424 Honors Real Analysis A
MATH 423 Differential Geometry (current)
CS 125 Intro to Computer Science A

Coursera certificates:

Foundations Using R, Data Visualization, Machine Learning, Pattern Discovery in Data Mining

PUBLICATION/PREPRINT

"The Twelfold Way of Non-Sequential Lossless Compression", Illinois Information Theory Students, Sourya Basu, and Lav R. Varshney: <https://arxiv.org/abs/2011.04069>

RESEARCH EXPERIENCE

Intersecting Cylinders

Sep 2020 - present
Urbana, IL

Illinois Geometry Lab Project led by Prof. Adolf Hildebrand

- Discovered recursive formula for n -dimension intersecting cylinders
- Discovered and proved formulas for the volumes of arbitrary number of n -dimension intersecting square prisms
- Constructed an alternative proof with generating functions

Gauss Sums

Jan - May 2020
Urbana, IL

Illinois Geometry Lab Project led by Prof. Adolf Hildebrand

- Visualized exponential and cubic sum Gauss walks and generated interesting gifs with Mathematica
- Discovered patterns of spirals in exponential sum Gauss walks
- Discovered and proved patterns in ending points of cubic sum Gauss walks

Abiotic Ecosystem Stability

Dec 2019 - Present
Urbana, IL

Research Project Led by Prof. James O'Dwyer

- Derived criteria for stability of an ecosystem with competition and mutualism

- Evaluating stability of consumer-producer-resource systems

Combinatorial Game Theory

Jun - Aug 2019

Illinois Geometry Lab Project Led by Dr. Elliot Kaplan

Urbana, IL

- Utilized the surreal number system to simplify three-player games and compare the advantages possessed by individuals
- Proved that there exists no "zero" element except zero itself in a general game class
- Evaluated games to disprove three conjectures proposed by K.Greene

COURSE PROJECTS

Information Theoretic Analysis of Genome-Wide Association Studies

December 2020

ECE 563(Information Theory) course project led by Prof. Lav Varshney

Urbana,IL

- Formed the results into a final paper

Model of Calcium Homeostasis in Human Body

December 2019

GEOG 468(Biological Modeling) course project led by Prof. Bruce Hannon

Urbana,IL

- Created a dynamic computational model of the flow of calcium upon dietary intake to the gastrointestinal tract, kidney, and bone
- Calculated optimal time for patients that have chronic kidney diseases to take dialysis
- Presented slides "Model of Calcium Homeostasis"

CONTRIBUTED TALKS

Undergraduate Mathematics Symposium at UIUC

December 2020

Presenter

Urbana,IL

- Co-presented slides "Calculus, Geometry, and Probability in n Dimensions"

Undergraduate Mathematics Symposium at UIUC

May 2020

Presenter

Urbana,IL

- Co-presented slides "Randomness and Patterns in Gauss Sums"

Undergraduate Research Symposium at UIUC

April 2020

Lead Presenter

Urbana,IL

- Co-presented a poster "Randomness and Patterns in Gauss Sums"
- Co-created a video to explain the poster

Undergraduate Mathematics Symposium at UIUC

August 2019

Presenter

Urbana,IL

- Co-presented a 15 minutes talk "Three-Player Partisan Games"

WORK EXPERIENCE

Exam Proctor and Grader

Urbana,IL

University of Illinois at Urbana-Champaign

Fall 2019 - present

- Proctoring and grading proficiency exams for UIUC Math department

PROGRAMMING SKILLS

Mathematica, R, Python, Stella, Java, Html