Berkant Cünnük

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Education

University of Manitoba, Winnipeg/Canada September 2024 - Present
Mathematics GPA: 4.0/4.5
Master of Science

Boğaziçi University, Istanbul/Turkey September 2019 - July 2024
Mathematics GPA: 3.42/4
Honours, Bachelor of Science

Projects & Research Experience

Math project funded by the MMI Supervised by *Prof. Margherita Maria Ferrari*

Using computer vision to analyze R-loop imaging data 2024 Fall - Present

- We are developing a piece of software that can automatically detect and classify R-loops in Atomic Force Microscopy (AFM) images. It is developed using Python.
- This is also the thesis topic for my Master's in Mathematics.

**Summer School on Quantitative Molecular and
Cellular Biology** Supervised by *Prof. Margherita Maria Ferrari*

Tile-based DNA self assembly of Archimedean and Snark graphs 2025 Summer

- I worked on this project with a group of students in a summer school hosted at the University of Manitoba.
- It mainly focused on minimal tile and bond-edge types required to realize $(1,1)$-Blanusa snarks and the icosidodecahedron. The project manuscript can be accessed here.

A model to comare mass ivermectin treatment and
vector control policies for river blindness (Onchocerciasis) 2025 Winter

- I worked on this project during the Mathematical Biology graduate course I was taking at the University of Manitoba.
- It focuses on developing an ODE system to model the transmission of river blindness and compares efficiencies of possible prevention strategies. Results are not published yet.

Undergraduate math project Supervised by *Prof. Müge Taşkın Aydın*

An Approach to Calculating Kazhdan-Lustzig Polynomials 2023 Fall

- We developed a program to calculate these algebraic objects and wrote a permutations library form scratch for this specific purpose using C++. The program is *open source*, and it can be accessed from *here*.
- A detailed report explaining our implementation can be accessed *here*. It includes a brief introduction to the topic as well.

Independent math project

Finding all reduced words for a given permutation 2023 Spring

- This is a program that implements an algorithm created by two of my professors from Boğaziçi University. The relevant article can be found *here*.
- The program is *open source*, and it can be accessed from *here*.

Teaching Experience

University of Manitoba, Department of Mathematics
Teaching Assistant   2024 Fall - Present

Taught the following labs (some of them multiple times):

- MATH2030 *Combinatorics I*
- MATH1300 *Vector Geometry and Linear Algebra*
- MATH1500 *Introduction to Calculus*
- MATH1240 *Elementary Discrete Mathematics*
- MATH1210 *Techniques of Classical and Linear Algebra*

Other related duties:

- *Teaching Assistant*, Math Help Centre

Boğaziçi University, Department of Mathematics
Teaching Assistant   2024 Spring

Held office hours for the following courses:

- MATH 101-102 *Calculus I-II*
- MATH 111 *Introduction to Mathematical Structures*
- MATH 131 *Calculus of a single variable*
- MATH 132 *Calculus of several variables*
- MATH 201 *Matrix Theory*
- MATH 222 *Group Theory*

Boğaziçi University, Department of Mathematics
Teaching Assistant   2023 Spring

Attended Conferences & Seminars

Polymer Modelling and DNA Topology   Calgary/Canada
Banff International Research Station
Poster presented: *Using computer vision to analyze R-loop imaging data*

Math Grad Talks   Istanbul/Turkey
Boğaziçi University
Given talk: *A model to compare mass ivermectin treatment and vector
control policies for river blindness (Onchocerciasis)*

Graduate Mathematics Society Seminar Series   Winnipeg/Canada
University of Manitoba
Given talk: *A model to compare mass ivermectin treatment and vector
control policies for river blindness (Onchocerciasis)*

Operator Analysis on Function Spaces   Winnipeg/Canada
University of Manitoba
Poster presented: *Using computer vision to analyze R-loop imaging data*

Society for Mathematical Biology (SMB) 2025 Annual Meeting   Edmonton/Canada
Poster presented: *Using computer vision to analyze R-loop imaging data*

Maud Menten Institute (MMI) 2025 Highly Qualified Personnel Summit   Edmonton/Canada
University of Alberta
Poster presented: *Using computer vision to analyze R-loop imaging data*

Canadian Mathematical Society (CMS) 2025 Summer Meeting   Quebec City/Canada
Université Laval
Poster presented: *Using computer vision to analyze R-loop imaging data*

Maud Menten Institute (MMI) 2024 Highly Qualified Personnel Summit   Vancouver/Canada
University of British Columbia

Extracurricular activities

University of Manitoba Graduate Mathematics Society (GMS)   May 2025 - Present
UMGPS Representative

- Acting as second to the president of GMS
- Handling the duties between GMS and Graduate & Postdoctoral Association (UMGPS)
- Handling the duties between GMS and Graduate Students' Association
- All the previous duties from *Vice President Academic*

University of Manitoba Graduate Mathematics Society (GMS)   October 2024 - April 2025
Vice President Academic

- managing the GMS website
- organizing the biweekly held GMS Grad seminar series at the University of Manitoba, (reaching out to speakers, making announcements etc.)
- managing/scheduling the visits of invited department colloquium speakers (our last speaker was Dr. Harmony Zhan)

Grants & Fellowships

Maud Menten Institute (MMI)   September 2024 - Present
Research Accelerator Award

University of Manitoba   September 2024 - Present
International Graduate Student Entrance Scholarship (IGSES)

Tubitak-Bideb 2205   September 2019 - July 2024
Grants for Undergraduate Mathematics Students

TECHNICAL SKILLS

- **Linux server management**
    - I have experience maintaining both binary based (Debian, Ubuntu, RHEL, and their derivatives) and source based Linux distributions.
    - I have experience setting up proxy, mail, database, VOIP, and web servers.
- **Programming languages:** C/C++, Python, R, PHP
- **Computer algebra systems:** SageMath, MATLAB
- **Document creation software:** LaTeX, MS Office