

# NICHOLAS C. HAYEK

[nicholas.hayek@mail.mcgill.ca](mailto:nicholas.hayek@mail.mcgill.ca) | (330) · 888 · 2942 | [Website](#)<sup>1</sup> [GitHub](#)<sup>2</sup> [LinkedIn](#)<sup>3</sup>

## EDUCATION

McGill University

Montreal, QC

B.A. Honours Mathematics and Computer Science

08/2022 - 05/2026

- **GPA: 3.81/4.0**
- Coursework: Algorithmic Game Theory, Quantitative Risk Management, Machine Learning, Stochastic Processes, Galois Theory.
- Awards: D. Lorne Gales Scholarship, Tomlinson Engagement Award for Mentoring, Dean's Honour List.

## WORK EXPERIENCE

Department of Mathematics & Statistics, McGill

Montreal, QC (In Person)

*Course Assistant*

08/2025 - present

- Run a weekly problem seminar for 330 students in Advanced Calculus for Engineers.
- Review and grade homework assignments for 80 students in Honours Algebra I.

Indiana University, Indianapolis (IUI) REU Program

Indianapolis, IN (In Person)

*Biomath Modelling Research Intern*

06/2024 - 08/2024

- Modeled corticostriatal brain networks involved in binge alcohol drinking in rodents using a continuous-time neural network.
- Verified results from literature and analyzed model dynamics to gain insights into the biological mechanisms of addiction.
- Presented findings at the Indiana Undergraduate Math Research Conference and at the IUI Summer Research Symposium. Mentored by Prof. Alexey Kuznetsov with help from the Indiana Alcohol Research Center.

## ACADEMIC PROJECTS

Migraine Calendar

11/2025

- Developed a [web application](#)<sup>4</sup> to track migraines using Firebase, Svelte, and JavaScript. Data is secured using a client-side, key wrapping encryption scheme. The app allows users to make accounts, create and customize calendars, and submit daily logs.

Honours Thesis in Algebraic Number Theory

05/2025 - 08/2025

- Researched supersingular elliptic curve isogeny graphs (SIGs) over finite fields and their applications to cryptography.
- Implemented SIGs and supersingular  $j$ -invariant finders in Python, as well as a hash function based on traversals along SIGs, which may be used to encrypt messages. Report [here](#)<sup>5</sup>. Mentored by Prof. Henri Darmon.

Stable Matching Visualizer

07/2025

- Developed an [interactive simulator](#)<sup>6</sup> of the Gale-Shapley deferred acceptance algorithm, in JavaScript.

Director of the *McGill Undergraduate Mathematics Research Journal*

08/2024 - 05/2025

- Initiated and oversaw the re-establishment of McGill's peer-reviewed, undergraduate math research journal, which has been inactive since 2014. Recruited editorial and grad student review teams, fundraised, and assisted in editing and publishing.

Virtual Musical Instrument Development

12/2024 - 01/2025

- Developed a VST/AU virtual musical instrument based on over 350 self-recorded clips of a Steinway Model B.
- Build in C++ with 4 channels of audio. Implemented adjustable attack, decay, sustain, and release parameters and velocity-based sample selection. Users can play live or recorded music using a piano keyboard controller. Link [here](#)<sup>7</sup>.

Math Transcriptions

01/2023 - present

- Typeset guides in linear algebra, probability, discrete math, group theory, and representation theory, among others, in LaTeX.
- ~150 downloads per month by students. Example [here](#)<sup>8</sup>.

## SKILLS AND ADDITIONAL INFORMATION

Computer .....Python, Java, C, C++, OCaml, Linux, Assembly, JavaScript (Svelte),  
Data Science (Matplotlib, Pandas, NumPy, SciPy), LaTeX

Extracurricular Activities .....Student Researcher at the [McGill AI Lab](#) (2025)  
Vice President at the [Society of Undergraduate Mathematics Students](#) (2024-26)  
Member at the CKUT Radio Station, *The McGill Tribune*, and Book Club

GRE .....170/165 Quant/Verbal

Languages .....English (native)

Interests .....Jazz piano, web development, reading

---

<sup>1</sup> <https://nicholashayek.com/>

<sup>2</sup> <https://github.com/hayekn>

<sup>3</sup> <https://www.linkedin.com/in/nicholas-hayek-b24b1a243/>

<sup>4</sup> <https://nicholashayek.com/goodcalendar/>

<sup>5</sup> <https://nicholashayek.com/tex/MATH/470/470report.pdf>

<sup>6</sup> <https://nicholashayek.com/matchmaker/>

<sup>7</sup> <https://nicholashayek.com/proj.html>

<sup>8</sup> <https://sumsmcgill.ca/wp-content/uploads/2025/10/Algebra-4-Notes.pdf>