

Degree:

Bachelor of Computer Science
Artificial Intelligence and Machine Learning Stream
Minor in Statistics, Minor in Music
Co-op Program

Carleton University, Ottawa ON

Entrance Scholarship
Faculty Scholarship

Technical Skills and Qualifications

Programming proficiencies:

Extremely Proficient in:

Java, C++, C, JavaScript(also Rhino),
Scheme(Lisp), Prolog, SQL(SQLite)

Also had worked with:

Python, Lua, Lean, Coq, React-Redux

Web Design:

Extensively worked with HTML5, JS,
Node.js, CSS - usage of canvas, local
storage, cookie, as well as countless
server-side modules, database, etc.

Numerous projects, well-established
sense of front-and-backend design,
cognition and program organization.

Use of Linux, bash, Virtual Box,
VMware, SSH; VS code and git.

Mathematics and Statistics:

Multivariable Calculus, Multilinear
Algebra, Tensor Analysis, Differential
Geometry, Symplectic Geometry

Measure Theory, Various applied
distributions, Fourier Analysis, Digital
Signal Processing and Wavelets

Group, Rings, Fields, Commutative
Algebra, Algebraic Geometry

ODE, PDE, Functional Analysis,
Distribution Theory, Variational
Calculus

Mathematics and Statistics facilities:

Wolfram Mathematics, Matlab, Magma;
Pytorch, SPSS, Excel.

Fluent in English; A1 level German

(Inquiries, elaborations are welcome ~)

Zhihao Xu

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<https://github.com/mcxzx>¹

mcxzx.github.io/portfolio_mcxzx.github.io/²

2nd Year Standing

September 2023 – Present

CGPA: 11.73 (A+)

Major CGPA: 11.80 (A+) Available 8 months beginning December 2025

Major Projects in Retroverse Chronology

Task-Stack Application

Designer, Programmer

April 2025

Server based website, with hashed authentication, access
privilege hierarchy and hierarchical database, which
minimality forces surprise coincidence with Linux fs and
access control.

Organized based on study of cognitive psychology, which
reveals memory and motives of neuro-system emerges
effectively as parallel stacks with rare branches. Aftermath
being my constant usage.

I-CUREUS Undergraduate Research in Homological Mirror Symmetry (HMS)

Research in Mathematics

May 2024 – August 2024

Researched in HMS, a popular mathematical program relating
Symplectic Geometry of an object to Algebraic Geometry of
the mirror object, initially discovered by string theorists.

Created Area invariant formulation for explicit calculations of
the Lagrangian Moduli Space and its Fukaya category,
attained several results regarding this formulation, made
many connections to several other existing results, and
provides a more heuristic approach to SYZ-conjecture.

General Relativity Visualization Project

Independent Project

July 2021 – February 2022

Developed a program in Java to allow realistic ray-tracing
rendering of universe according to general relativity's
geometric optics approximation.

Implemented differential geometry package, a semi-classical
treatment of light and corresponding Runge-Kutta method
solving geodesic ODE to allow physically accurate emulation
of light spectrum propagation in curved spacetime manifold.

RPG modpack for Minecraft Bedrock Edition

Programmer, Manager, "Marketer"

June 2017 – February 2020

Continually developed a complex RPG mudpack in JS with
Java Rhino engine for Minecraft and Block Launcher
environment, inspired by Aether mod in Java Edition.

Beside standard items, weapons and mobs, implemented
dimension transitions using I/O and Minecraft level.dat

Wrote terrain generation with modified Perlin noise. Also
developed an entity-based block interface to enable
unsupported designs and imaginations.

¹ Is of less use, project of value as GR Visualization, graphical portfolio and task stack is there. ² Portfolio is a media art graphical demonstration.

APPENDIX: Minor Projects

Course Projects:

Numerous projects in Java concerning OOP principles and modular UIs.

Several projects in C concerning pointers, structs, dynamic mem., I/O, multithreading, IPCs, memory mappings, kernel modules, access of physical memory, and briefly on containerizations.

Graph topology visualizer (Java)

Mandelbrot Fractal Drawer (Java)

Numerous local and server-based website projects:

Graphical Portfolio Website, Visualization simulation, tensor processing with MathML, Chat Server, etc.

Tensor Calculation Package in Mathematica

Researches and Experiments in human cognition and perceptions through musical phenomena:

Several prolongational reduction of works from 1804 to 1968

Several original compositions

Inter and Intrapersonals

Open to new knowledge and experiences

Passionate for communication, sharing, aware of emotions and willing to help

Metacognitive of self, reflective of self's progress, and seeks improvements

Communicate and convey dense or rigorous information pedagogically, conscious on recipients' attention span and emotion as practiced in many mentor activities

Good ability to make associations and dwell on purposeful abstractions

Inclinations to think, concept and device better formulations and solutions, both aesthetically and in efficacy

Work and Volunteer Experience

I-CUREUS Undergraduate Research in Homological Mirror Symmetry (HMS)

Carleton University, Ottawa, ON

May 2024 – August 2024

Worked with a Professor weekly along with many self-directed investigations and researches to develop mathematical tools for HMS.

Participated in FUSION skill development program and enhanced the ability of metacognition, of actively self-evaluate, reflect and carry out solutions in various work and study related tasks.

Auxilium Mentor of Mathematics and Physics

Kanata, Ottawa, ON

February 2022 – April 2022

Delivered many one to one sessions teaching mathematics and physics with a student in IB program; increase student's understanding to course materials as well as introducing a boarder picture to disciplines and facilitate student's interest.

Prepared detailed and cognitively friendly teaching materials, invented a few pedagogical strategies, set up an interactive teaching environment using discord, slides and jamboard.

Communicated with the student to check progress, identify problems, strengths and weaknesses, provided appropriate feedback, tips and advice, adjusted teaching materials and strategies correspondingly, and created detailed document tracking the learning progress and outcomes.

Organizing Member of Math Club

Earl of March S. S., Ottawa, ON

January 2021 – April 2022

Collaborated with other organizing members and organized many meetings, lectures and events on many topics of mathematics, both within and outside of curriculum.

Brainstormed topics and agendas for meetings, provided ideas and contents and presented them according to logical and cognitive order.

Frequently communicated with members during the meetings providing positive feedback, hints and help to make sure the contents were delivered and understood by everyone.

Classroom IT Manager and Student Representative of Information Technology Class

Jincheng Foreign Language School, Chengdu, China

September 2017 – June 2019

Work with School staff to make sure classroom IT devices runs properly, and assists teachers in using such devices.

Helps Information Technology teacher in class organization, activities and provides explanation and clarification for students.

Library Presentation Volunteer

Chengdu Library, Chengdu, China

2012 – 2013

Prepare and presents books and organizing amusing and educative activities for kids between age 5 to 7.