Yuze Fu

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About me

My primary research interests are Algebraic Number Theory and Probabilistic Graph Theory in Mathematics, and Randomized Algorithms and Machine Learning Theory in Computer Science.

Education & Training

Honours Bachelor of Science | University of Toronto | 01/09/2023 - Current | Toronto, Canada

Double Majors in Mathematics and Computer Science

CGPA: 3.99

2024, 2025 Dean's List

Math Courses: Group Theory, Number Theory, Graph Theory, Linear Algebra, Multivariable Calculus, Probability, Numerical Analysis, Statistics, Discrete Math

CS Courses: Machine Learning, Operating Systems, Data Structures, Databases, Computer Organization, System Programming, Computation Theory, Software Design

Elective Courses: Microeconomics, Macroeconomics, Modern Physics, Linguistics

Honours and Awards

University of Toronto Scholars (2024) | University of Toronto

The scholarships are awarded to outstanding undergraduate students who have completed the first, second, or third year of their program. There are approximately 20 scholarships at each level.

First Place in 2025 DS3 Datathon | Data Science & Statistics Society (Student Club)

Led a team of 4 students, competing with 30 teams for 5 days to solve 3 real-world problems related to data science

Used machine learning models like Random Forest and Convolutional Neural Network (CNN)

Second Prize in the National Olympiad in Informatics (NOIP2020) | China Computer Federation (CCF)

Work experience

Teaching Assistant | University of Toronto | 31/08/2024 - Current | Toronto, Canada

Courses: Discrete Math (CSCA67), Linear Algebra (MATA22), Computation Theory (CSCB36)

Conducted weekly tutorials to reinforce course concepts through exercises and guided problem-solving

Held weekly office hours to support students, answering questions and clarifying complex topics

Assisted in grading quizzes, assignments and exam, providing feedback to enhance student performance

Research Assistant | Rotman School of Management - University of Toronto | 01/06/2025 - 01/08/2025 | Toronto, Canada

Researched and implemented NLP pipeline for misinformation pattern analysis using transformer models

Applied sentence embeddings and cosine similarity for efficient candidate pair filtering across tweets and fact-checks

Leveraged LLM capabilities for nuanced claim relationship classification (Same/Opposite/Different claims)

Optimized system performance through similarity threshold tuning and incremental processing strategies

Academic Director | Google Developer Group (Student Club) | 01/09/2024 - 01/04/2025 | Toronto, Canada

Organized an AI workshop on generative models for photo enhancement, handling materials and promotion.

Co-planed "Build with AI", a conference with 500+ registrations, emphasizing AI demos and networking opportunities

Created an interactive emotion-matching game, which enhanced engagement during the event

Projects

Machine Learning-Driven NSI Forecasting for Toronto Neighborhoods | 01/11/2025 - 01/12/2025

Tools: Python, sklearn, PyTorch, SARIMA, Latex (for report)

Developed predictive models for monthly neighborhood safety using 100K+ crime records, achieving 0.0527 RMSE (best) through LSTM architecture that captures 12-month temporal patterns across 159 Toronto neighborhoods

Engineered Neighborhood Safety Index (NSI) using severity-weighted crime aggregation and temporal features (lagged values, rolling averages) to transform raw incident data into actionable safety metrics

Compared 6 ML approaches (Ridge, KNN, FNN, LSTM, SARIMA) through systematic hyperparameter tuning; LSTM achieved 82.95% R^2 while Ridge Regression provided interpretable coefficients for policy applications

Virtual Memory and File System Implementations for Operating System | 01/05/2025 - 01/08/2025

Tools: C, Pintos, Docker

Threads: Used Multilevel Queue Scheduling and Priority Donation to optimize Context Switching

User Programs: Implemented all basic system calls triggered by interrupts through Stack

Virtual Memory: Created Supplemental Page Table, Frame, Swap and Eviction Algorithm to support paging

File System: Chosed Multilevel Indexed File to support flexible file operation and implemented Directory

Sychronization: Tried both Lock and Semaphore to deal with different situations

Fungi Image Classification & Denoising | 01/03/2025 - 05/03/2025

Tools: Python, PyTorch, CNN

Developed a classifier achieving 93.8% accuracy on a 5-class, 3,000+ image fungi dataset using GPU acceleration.

Implemented a denoising autoencoder with transposed convolutions to preprocess corrupted images.

Built a custom data pipeline with augmentation for memory-efficient loading and batch processing.

Performed noise analysis and statistical characterization to optimize preprocessing and enhance performance.

Firefighters - Assembly Platform Game | 01/03/2025 - 01/04/2025

Tools: Assembly, Computer Organization, MARS

Move the firefighter to save injured people withoug touching the fire, and approach the exit as you can

Implemented Bitmap for display, MMIO Simulator for input

Actively used registers for efficient operation, and stack for function calling

Linux OS Monitoring Tool & FD Table Creator | 01/02/2025 - 01/04/2025

Tools: C, Linux, System Programming

Demonstrated real-time RAM usage, CPU usage by line charts and File Descriptor table

Captured information from Linux OS files and created diagrams, such as reading CPU usage time from "/proc/stat", then calculating the real-time usage into 100%, and plotting onto the chart

Implemented pipes to enhance the performance by concurrency, and reinstalled signal handlers to fit the needs

Modular codes with the use of makefile, and detailed documentation including README and docstring

Automatic Lawn Sprinkler Irrigation System | 01/07/2021 - 01/08/2021

Tools: Python, scikit-learn, KNN, OpenCV, pillow, Word (for report)

Engineered a smart sprinkler system using a KNN machine learning model (Python, OpenCV) to analyze lawn images and enable targeted, water-efficient irrigation.

Achieved 80%+ accuracy in classifying lawn hydration levels by processing RGB image data and implementing grid-based analysis.

Designed end-to-end system architecture from image capture to sprinkler control

Volunteering

Notetaker | 01/09/2024 - Current | University of Toronto

Accessability Services at University of Toronto

Courses: Probability (STAB52), Computation Theory (CSCB36), Group Theory (MATC01)

Take lecture notes for students with accessibility problem.

Summer School Teaching Assistant | 01/07/2025 - Current | University of Toronto

The summer school hosted by University of Toronto for high school students

Helped Professors to hold seminars about computer science topics

Answered students' questions and provided information about university lives

Course Representative | 01/09/2024 - Current | University of Toronto

The Association of Mathematical and Computer Science Student

Courses: Discrete Math (CSCA67), Intro to Computer Science (CSCA08)

Design review materials and hold review seminars before exams to help students prepare