ASHIFUL BHUIYAN

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Toronto, ON

SUMMARY

Dedicated professional with a robust foundation in mathematical physics and computational methods. Experienced in numerical modeling, simulation-based research, and machine learning applications in physics. Proven ability to lead academic initiatives, demonstrated by co-founding a successful tutoring business. Skilled in data analysis, digital media, and academic support. Committed to advancing knowledge through rigorous analysis, innovative research, and collaborative problem-solving.

RESEARCH FOCUS

Interested in the application of applied mathematics and machine learning to physics. Focused on data-driven modeling of physical systems, numerical methods for differential equations, and exploratory simulation-based research. Particular interests include gradient-based optimization, backpropagation, and computational techniques for analyzing high-dimensional dynamics in physical models.

EDUCATION

York University — Toronto, ON
. — Sept 2024 – Present
Selected Coursework: Data Science (A+), Elementary Particle Physics (B+)

Trent University — Peterborough, ON
Honors B.Sc. in Mathematical Physics — May 2019
Minor in Biology
Selected Coursework: Statistical Mechanics (A), Advanced Numerical Methods (A), Combinatorics (A-)

EXPERIENCE

Gifted Center — Toronto, ON
Director & Co-founder — *Sept 2024 – Present*

- Founded and lead a tutoring organization focused on STEM education for high school and university students.
- Designed academic programs and resources across mathematics, physics, and science curricula.
- Provided direct instruction in subjects including calculus, mechanics, statistics, and academic writing.
- Led website development, client communication, and digital outreach; supported dozens of students in achieving grade improvements and university readiness.

Zylor Education — Toronto, ON
Tutor — *Feb 2024 – Present*

- Delivered personalized tutoring in mathematics and science aligned with Ontario high school curriculum and university prerequisites.
- Designed custom lesson plans targeting conceptual gaps and exam preparation for students across diverse ability levels.
- Helped students move from failing grades to 80–100% scores; documented progress and maintained regular contact with parents and guardians.
- Designed customized learning strategies focused on enhancing analytical problem-solving skills, mathematical reasoning, and conceptual understanding in STEM subjects.

Air Canada Toronto, ON
Station Attendant *Aug 2022 – Feb 2024*

- Maintained operational safety in a fast-paced environment, ensuring timely service delivery.
- Strengthened communication, reliability, and attention to detail through team-based tasks.

Nordia (Canada Post Contract) Peterborough, ON
Customer Service Agent *Aug 2019 – Aug 2021*

- Provided support for Canada Post customers in mail tracking, insurance claims, and service inquiries.
- Operated under strict confidentiality protocols and maintained high call resolution rates.

PROJECTS

Two-Body Decay Simulation (π^0)
Simulated the decay process $\pi^0 \to \gamma\gamma$ using Python. Generated synthetic data using a uniform distribution and applied two-body kinematic analysis in both rest and lab frames. Used these results to explore momentum conservation and relativistic invariance.
github.com/AshifulBhuiyan/Two-Body-Decay

Collider Event Analysis – Estimating Neutrino Species
Analyzed proton-proton collision data to estimate the number of neutrino species. Processed datasets using Python to reconstruct missing energy and mass distributions. Applied statistical techniques to fit energy spectra and infer the number of undetectable decay products based on conservation laws.
github.com/AshifulBhuiyan/Analyzing-Collider-Events

Music Popularity Prediction from Spotify Audio Features
Developed models to estimate the popularity of songs using over 2 million entries from the Spotify API. Applied data cleaning, clustering, and feature engineering to extract signals from audio features (e.g., tempo, loudness). Benchmarked models including AdaBoost, Random Forest, and Neural Networks; achieved 86% recall on top-performing tracks. Integrated a pricing tool to estimate royalties based on the predicted popularity.
huggingface.co/ConquestAce/Spotify-Popularity-Predictor

Partition Numbers and Integer Partitions
Presented as part of a Combinatorics course. Covered integer partition theory, Young diagrams, generating functions, and asymptotic formulas. Included results from Euler, Ramanujan, and Ken Ono, with applications to statistical mechanics and number theory.
View presentation (PDF)

Applied Machine Learning Projects in NLP and Generative AI
Conducted multiple exploratory projects applying machine learning to language and image generation tasks. Fine-tuned lightweight language models (LLMs), trained and customized Stable Diffusion models for creative image synthesis under low-resource constraints. Created deep reinforcement learning agents in OpenAI Gym environments, using policy gradients to optimize performance.

EXTRA-CURRICULAR

Gzowski College Cabinet 2015-2018
Sustainability Ambassador *Peterborough, ON*

- Led campus-wide sustainability initiatives and mandatory risk-assessment training while collaborating with cross-disciplinary student teams to promote environmental awareness.

Kawartha Muslim Religious Association 2017-2018
Media Coordinator *Peterborough, ON*

- Produced digital media, managed website content, and organized outreach events to enhance community engagement.