ADITYA RAO

I am an undergraduate student attending the University of Toronto (2025). My goal is to continuously build my skills in academia and in industry primarily in Physics and Research & Development. I am currently pursuing a Hons. BSc. for a Physics Specialist with a Mathematics Major and Computer Science Minor. My key areas of interest in academia include Device Physics, Engineering Physics, Quantum Computing (with hardware/software applications), and Electronics.

CONTACT

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SKILLS & AREAS OF INTEREST

Physics & Mathematics

- **Particle Physics**
- **Electrodynamics**
- **Electronics**
- **Quantum Mechanics**
- **Quantum Information**
- **Linear Algebra & Algebra**
- **Special & General Relativity**

Programming

- **Python**
- **Java**
- **C++, Julia**
- **JavaScript, HTML, CSS**
- **NASM x86 Assembler**

Engineering, Manufacturing & Simulation

- **Autodesk Fusion 360**
- **Sketchup**
- **Blender 3D**
- **Ansys**
- **Autodesk CFD**
- **Soldering**
- **Welding & Machining**

Software & Tools

- **Data visualisation**
- **Data handling/analysis** (e.g. numpy, scipy, pandas, etc.)
- **Git**
- **APIs & Postman**
- **Cryptography & Security**

CERTIFICATES

Quantum Computing @ LQC, UMD [2024]
Cambridge International Certificate of Secondary Education (4.0) [2019]
International Baccalaureate Diploma Program (38) [2021]

WORK HISTORY

08/2023-**Current**
University of Toronto Math, Toronto
Instructor
Taught and teaching a courses on Mathematics, Physics, Computer Science at the University of Toronto for Grade 5/6, 7/8, 9/10, 11/12.

08/2022-12/2022
University of Toronto Physics, Toronto
Software Engineer & Researcher
Worked on data catalogue software for SNOLAB SuperCDMS (Cryogenic Dark Matter Search) as part of the University of Toronto Physics Dept. in collaboration with Stanford.

08/2022-**Current**
Independent
Teacher
Taught elementary to high school students (individual and groups) Math, Physics, and CS for various curriculum.

01/2022-**Current**
By The Cover, Toronto
Founder
Founder of a B2C/B2B market research application utilizing visual metrics to quantify emergent properties in book cover design.

02/2022 - 06/2022
Cryisor, Toronto
CTO and Co-founder
Cofounder of a fintech startup. Accepted into one of the biggest incubators in Canada (Hatchery - NEST).

06/2018 - 09/2018
Zeta, Bangalore
Machine Learning Intern
Worked in the ML department of a fintech banking startup. Worked with database optimization and model training specifically with kmeans clustering.

EDUCATION

09/2021 - 04/2025
University of Toronto
Honours Bachelor of Science
Currently pursuing a Physics Major, Math Major, and CS Major

09/2019 - 04/2021
The British School, New Delhi
International Bachelorette
Completed the IB system with a 39, high level courses in Mathematics Analysis and Approaches, Computer Science, and Physics

ACHIEVEMENTS, HONOURS AND AWARDS

- Principal's Award [April 2019]
- Certificate of Distinction and Excellence for IGCSE Final Results [April 2019]
- TBS Hackathon Winner 3 years consecutively [2018, 2019, 2020]
- UKMT - Bronze, Silver, Gold [2019, 2020, 2021]
- Best Delgate Award Model UN [2018]
- F1 in Schools Awards [2019, 2021]
- British Physics Olympiad (BPHO) Distinction [2020]

GENERAL SKILLS

Algorithmic Thinking | Machine Learning | Simulation | CAD/CAM | Research & Development | Project Management | Leadership

PHYSICS, SCIENCE, & AERODYNAMICS

IB Physics HL Extended Essay [2021]

Investigated the Chord Thickness ratio on cambered and symmetric airfoils using Computational Fluid Dynamics and a Homemade Wind tunnel.

BPHO Distinction [2019]

Formula One in Schools [2018, 2020]

Two time national finalist for two different teams in the F1 in Schools competition. Designed and manufactured and aerodynamics, CO2 powered race car utilizing CAD (Autodesk Fusion 360, Blender), CAM, and CFD (Autodesk) tools
2018 Season:
National finalists Best Sponsorship Award for designing an aerodynamic, CO2-powered race car. Sponsored by: Tata Power, Tata Communications, Ahoy
2020 Season:
Top-10 national finalists. Sponsored by: Microsoft, Selan Oil, Bharat Forge

AESI Bangalore Research Paper [2019]

Member of UTFR Engineering Team [2021+]

Member of UTAT Engineering Team [2021+]

COMPUTER SCIENCE, & TECHNOLOGY

1st Place Winner TBS Hackathon "COVID-19" [2020]

Designed an and started developing an app to limit COVID-19 spread in stores while helping increase grocery store efficiency.

1st Place Winner TBS Hackathon "Transportation" [2019]

Designed an algorithm and app to manage traffic as well as assisted in the creation of relevant simulations.

1st Place Winner TBS Hackathon "Smart Habitat" [2018]

Designed a smart machine, was in charge of physical design (using CAD software) programming of OCR software using Python.

Certificate of Merit [2018]

Awarded a certificate of merit for encryption algorithm developed.

SEA Winners of Young Founders Summit [2019]

Sponsored by Facebook. Our startup idea involved designing a GPS enabled band smart navigation app focused on Women's Safety (Nov 2018). We were unable to go to global finals in LA due to clashes with our 10th grade IGCSE certification exams.

Hackathons and Code Jams

Participated in a host of hackathons and code jams including: Google Code Jam; EdBrand Hackathon; SwampHacks VIII; Toronto Hacks; Reply; and more.

MATHEMATICS

UKMT [2018, 2019, 2020]

Achieved Bronze, Silver, and Gold over 2018, 2019, and 2020 in the United Kingdom Mathematics Trust Olympiad. Invited to Pink Kangaroo.

Distinction in CSMC [2019, 2020]

Distinction in ASMA [2020]

Presenter at TBS Math & Science Symposiums

UNIVERSITY COURSES

Physics

- *Foundations of Physics I & II* [PHY151F, PHY152F]
- *Quantum Mechanics* [PHY256F]
- *Electricity and Magnetism* [PHY250S]
- *Thermal Physics* [PHY252S]
- *Mechanics II* [PHY254S]
- *Electrodynamics* [PHY350F]
- *Practical Physics I* [PHY224F]
- *Practical Physics II* [PHY324F]
- *Quantum Informatics* [PHY365S]
- *Electronics Lab* [PHY405S]
- *Relativistic Electrodynamics* [PHY450S]
- *Quantum Measurement* [PHY2205S] (Audit, Graduate)

Mathematics

- *Analysis I* [MAT157Y]
- *Algebra I & II* [MAT240F, MAT247S]
- *Multivariable Calc.* [MAT235Y]
- *ODEs* [MAT244F]
- *Mathematics and Law* [APM306Y]
- *Complex Analysis* [MAT334]
- *PDEs* [APM346]

Computer Science

- *Intro to programming* [CSC108F]
- *Intro to Computer Science* [CSC148S]
- *Intro to Theory* [CSC165S]
- *Systems Architecture* [CSC207F]
- *Theory of Computation* [CSC236F]
- *Machine Learning* [CSC311S]

Misc.

- *Introduction to Sociology* [SOC100F]
- *Crime Film Traditions* [CIN216S]
- *History and Philosophy of Science* [HPS100F]
- *Confronting Global Change* [ESS205S]

LEADERSHIP

- **Vice President** *UTTC* [2022-2025]
- **CTO** *Cryisor inc.* [2022]
- **Founder** *Hammocks* [2022-2024]
- **Founder** *By The Cover* [2022-2024]
- **Co-Leader and Co-Founder** *TBS Mathematics Club* [2020-2021]
- **Co-Chair** *TBS Intra-MUN and BSMUN* [2020]
- **Executive Production Team** *TEDx* [2019]
- **Organizer** *Round Square* [2019]
- **Volunteer & Project Coordinator** *Visionaries India* [2020]
- **Volunteer & Project Coordinator** *Annapurna Project* [2019]
- **Volunteer & Project Coordinator** *Very Special Arts India* [2018]

PUBLICATIONS

These are a list of conceptual/philosophical documents I have written, click on the “G-Drive” text to access a copy on google drive. All of these are my own intellectual property, any external sources used are cited in the works cited section of each document. There are more non-formal work on my website which can be requested if need be.

Investigating Locality in Quantum Systems

A. Rao

2024 Accepted for publication to JURPA (American Physical Society) G-Drive

Investigation into the chord-thickness ratio of cambared and symmetric aerofoils on lift generation

A. Rao

2021 IB Physics Extended Essay G-Drive

The effect of temperature on batteries

A. Rao

2021 IB Physics Internal Assessment G-Drive

An Investigation into prime numbers

A. Rao

2021 IB Mathematics Internal Assessment G-Drive

A look into machine learning, gradient decent, and the tanh vs. sigmoid activation functions

A. Rao

2021 IB Mathematics Internal Assessment G-Drive

Examining the Tet Offensive as a key turning point in the Vietnam War

A. Rao

2021 IB History Internal Assessment G-Drive

TALKS & LECTURES

These are a list of the talks, lectures, and classes I have taught in the past. Should there be an available recording, it is linked. Otherwise, an abstract is included for each entry.

No Cloning Cats and Cracking Quantum Safes [Talk]

A.K. Rao

2024 Talk on Quantum Computing and Quantum Cryptography given *St. Mary Catholic School*, `Toronto, ON, Canada`

Introduction to Quantum Computing and Quantum Cryptography [Talk]

A.K. Rao

2024 Talk on Quantum Computing and Quantum Cryptography given *King City Secondary School*, `King City, ON, Canada`

Intermediate Hardware Programming

A.K. Rao

2024 Course taught to grade 9 and 10 for the University of Toronto `Toronto, ON, Canada`

Competition Mathematics

A.K. Rao

2024 Course taught to grade 11 and 12 for the University of Toronto `Toronto, ON, Canada`

Competition Mathematics

A.K. Rao

2024 Course taught to grade 4 and 5 for the University of Toronto `Toronto, ON, Canada`

Introduction to University Physics

A.K. Rao

2023 Course taught to grade 9 and 10 for the University of Toronto `Toronto, ON, Canada`