

Summary

Recently graduated student with an extensive research and teaching experience in Physics, as well as exceptional academic credentials. Blends teaching and student management experience with robust academic training at the University of Toronto and the University of Edinburgh to offer solid skills in teaching and research activities. Incorporates a background in student recruitment outreach and tutoring to provide employers with proven organisation and communications expertise.

Education

- King's College London** LONDON, UNITED KINGDOM
Master of Science, Theoretical Physics 2024 – 2025
Incoming student for academic year 2024-25. Topics of study will include Particle Physics, Quantum Field Theory, Gauge Theories and more.
- The University of Edinburgh** EDINBURGH, UNITED KINGDOM
Postgraduate Diploma, Theoretical Physics 2022 – 2023
Topics of study included Advanced Cosmology, Particle Physics, Quantum Field Theory, Symmetries of Particles and Fields, Gauge Theories in Particle Physics, General Relativity and Introductory Bosonic String Theory.
Awarded qualification November 2023. Percentage: 60.8%
- University of Toronto** TORONTO, CANADA
Honours Bachelor of Science, Specialist, Physics and Astrophysics 2018 – 2022
Studied diverse topics in Physics, Mathematics and Astrophysics including Thermal Physics, Planetary Physics, Classical and Quantum Mechanics, Scientific Computing, Electromagnetic Theory, Abstract Linear Algebra, Group Theory, Ordinary and Partial Differential Equations. Picked up multiple technical skills.
Graduated June 2022 with High Distinction. CGPA: 3.68/4.00
- Fahaheel Al-Watanieh Indian Private School** KUWAIT
All India Senior Secondary School Certificate *Graduated 2018*
Focus on Physics, Chemistry, Mathematics, English and Computer Science according to the syllabus of the Central Board of Secondary Education, India.
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Skills

- Technical expertise:** *Languages:* Proficient in programming Modern Fortran, C and C++ for parallel computing on CPU and GPU. Experience working with OpenMP, MPI, and CUDA for parallel computing on a single workstation or cluster. Proficient with Python and working knowledge of R and Julia. Proficient working with MySQL, L^AT_EX and Beamer, and shell scripting in Bash and Zsh.
Operating Systems: macOS, Windows, Linux (CentOS on High Performance Computing clusters like Niagara and Graham, Ubuntu)
- Natural languages:** Hindi (*mother tongue*), English (*full professional proficiency*), Urdu (*Good working proficiency*), Arabic (*elementary proficiency*) and French (*beginner*).
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Research Experience

- Bridging Gravity and Quantum Mechanics: A Study of Gravity Induced Entanglement* EDINBURGH, UK
Supervisor: Dr. Suddhasattwa Brahma *March – Aug 2023*
We carried out an original thesis project in the field of quantum gravity. Recent studies have shown that if gravity was indeed quantizable, it could be tested using quantum entanglement. This project focused on further exploring this avenue of research, and included linearization and canonical quantization of Einstein's equations using quantum field theory, and computation of two measures of entanglement, Entanglement Entropy and Concurrence, for two Quantum Harmonic Oscillators interacting with each other only under the influence of gravity.
- Determining the Faraday Depth Structures of Active Galactic Nuclei* TORONTO, CANADA
Supervisors: Prof. Bryan Gaensler & Dr. Luke Pratley *Academic Year 2021-22*
We carried out an original thesis research project in the field of Radio Astronomy and Cosmic Magnetism. Implemented multiple methods like RM CLEAN, QU-fitting and the novel method, non-parametric QU-fitting using Python to reconstruct broadband signals and determine Faraday Depth Structures from multiple active

galactic nuclei (AGNs) and compare these methods. We used parallel computing on High-Performance Computing (HPC) clusters under Digital Research Alliance of Canada, like Niagara and Graham, to complete our calculations.

Time Series Analysis on Long Term Measurements of Variable Stars in GCs

TORONTO, CANADA

Supervisor: Prof. John R. Percy

May – Aug 2021

We carried out an original research project in the field of variable stars and stellar evolution under the University of Toronto Work-Study Program in the David A. Dunlap Department of Astronomy & Astrophysics. The project entailed time series analysis, with existing software, on long-term measurements of variable stars in Globular Clusters (GCs) using data from the AAVSO and the ASAS-SN databases. Results were published in a peer-reviewed journal.

Simulating Transit Timing Variations of Exoplanets with REBOUND

TORONTO, CANADA

Supervisor: Prof. Hanno Rein

May – Aug 2021

We carried out an original research project in the field of Exosolar planets and Transit Timing Variations (TTVs). We used the N-body integrator REBOUND to simulate the TTV data for TRAPPIST-1, by using N-Body simulations for the exoplanets of that system.

Teaching Experience

University of Toronto

TORONTO, CANADA

Teaching Assistant: MATA35, Calculus II for Life Sciences

Jan – May 2021

Facilitated a 1-hour tutorial session each week for approximately 20 students. Sessions included working through assignment problems, administering quizzes and demonstrating key problem-solving methods. Managed a detailed record of students' performance and attendance.

Teaching Assistant: PHYA11, Physics I for Life Sciences

Sep – Dec 2020

Facilitated a 2-hour tutorial session each week for approximately 20 students. Sessions included working through problems in small groups, working on lab activities and demonstrating key problem-solving methods. Managed a detailed record of students' performance and attendance.

Environmental and Physical Sciences Students' Association, UTSC

Toronto, Canada

Physics Aid Center (PAC) Tutor

Sep 2019 – April 2021

Volunteer tutor at the Departmental Association's Physics Aid Center. Guided students in introductory physics courses through difficult concepts and problems presented in class. Worked 3 – 6 hours per week throughout the semester.

Publications

- Percy, John R., and Gupta, Prateek. "Pulsating Red Giants in a Globular Cluster: 47 Tucanae." *Journal of the American Association of Variable Star Observers*, vol. 49, no. 2, December 2021. <https://app.aavso.org/jaavso/article/3789/>

Academic Awards

- British Council Scholarship for GREAT - The University of Edinburgh
- UTSC Dean's List Fall 2022
- DPES Student Leadership and Excellence Award 2021
- UTSC Dean's List Fall 2021
- UTSC Dean's List Fall 2020
- UTSC Dean's List Summer 2019

Public Outreach

Office of Admissions & Student Recruitment, UTSC

Toronto, Canada

International Student Ambassador

Jan – April 2020

Assisted the Office of Admissions and Student Recruitment in their outreach to applicants around the world. Acted as a friendly mentor that helped bridge the knowledge gap between expectations and reality when it comes to studying at U of T Scarborough.