

M. FAHIM HOQUE

fahimhoque116@gmail.com

PERSONAL DATA

Nationality:

Bangladeshi

Home Address:

B/396, Shahid Baki Road, Malibagh Chowdhury Para, Dhaka - 1219, Bangladesh.

Research Interests:

Time Dependent Backgrounds in String Theory, String Cosmology, Dark Energy models

EDUCATION

Bachelor of Science (Senior Year), Brac University

Fall 2022-ongoing

Major in Physics

CGPA: 3.87 (out of 4.00)

Relevant Coursework:

Physics: PHY419 Black Holes, PHY413 General Relativity, PHY403 Cosmology and Astrophysics, PHY 401 Particle and Reactor Physics, PHY305 Quantum Mechanics 3, PHY304 Quantum Mechanics 2, PHY303 Quantum Mechanics 1, CSE482 Quantum Computing 2, PHY 301 Classical Electrodynamics, PHY 204 Classical Mechanics and Special Theory of Relativity,

Mathematics: PHY405 Mathematical Physics, MAT 323 Dynamical Systems, MAT301 Group Theory, MAT221 Real Analysis.

Co-Curricular Activities:

- Organised and attended reading groups for QFT based on David Tong's and Michele Cicoli's notes and for String Theory based on David Tong's notes.

Awards:

Recipient of the Vice-chancellor's and Dean's List for academic excellence in multiple semesters.

Received 25% Merit based scholarship for academic results.

International Advanced Level (IAL)

2022

Universal Tutorial

International O-Level

2019

Universal Tutorial

PROJECTS AND RESEARCH:

Undergraduate Research Intern | BRAC University

November 2025 - Ongoing

Supervisor: **Professor Mahbubul Alam Majumdar**, Dean, School of Data and Sciences.

Co-Supervisor(s): **Dr. Ratul Mahanta**, USTC, Hefei and **Ahmed Rakin Kamal**, Masaryk University.

For this project, I am working in a group where we are working on "Time Dependent Backgrounds in String Theory". I, in particular, am working on doubly warped time-dependent backgrounds and their solutions, inspired from the solutions generated by GKP. Additionally, I am investigating the effects of these solutions on early and late universe cosmology. This project will serve as the foundation of my undergraduate thesis. This work is supported by the BRAC University Research Seeds Grant Initiative (RSGI 2025).

Research Intern | ICTP PWF: Physics for Bangladesh

July 2025 - October 2025

Supervisor: **Ahmed Rakin Kamal**, PhD Researcher, Masaryk University, Czech Republic.

For the internship, I studied the cosmological constant problem and how observational data accounts for a dynamic dark energy model. I then studied the viability of Quintessence as source of dynamic dark energy. Throughout the

project, I dealt with Lagrangian and Hamiltonian Mechanics, Friedmann equations and phase space evolution. I reviewed a few papers and collected information from them, which can be found [here](#). The internship report titled "Quintessence" can be found [here](#).

Research done as part of coursework

For **PHY403 Cosmology and Astrophysics**, I wrote and presented an analysis and review paper on "*Linear perturbations in Horndeski theories with spatial curvature*" by Serena Gambino and Francesco Pace. The paper can be found [here](#).

For **PHY419 Black Holes**, I wrote and presented an analysis and review paper on "*How does information emerge from a black hole?*" by Suvrat Raju. The paper can be found [here](#).

EXPERIENCES AND VOLUNTEERING ENDEAVOURS

Co-organizer and Participant | *Jamal Nazrul Islam Memorial Winter School*

January - February 2025

Organized by BRAC University and ICTP Physics Without Frontiers Bangladesh

I participated in the [ICTP PWF Jamal Nazrul Islam Memorial Winter School 2025](#), where I attended sessions held on advanced topics in string theory, cosmology and black hole information paradox. Alongside, I helped with the recording, editing and photographing of the sessions held and helped with other miscellaneous logistical work.

Organizer | *Merul Badda Talks in Math and Physics*

September 2024 - ongoing

Organized by School of Data and Sciences, BRAC University

As part of the [The Merul Badda Talks in Math and Physics](#) I help in hosting a weekly series of lecture and talks delivered by professors, researchers and student from all across Bangladesh and abroad, to help familiarize Bangladeshi students with ongoing research in physics and maths. I helped with documenting, editing, photographing and conducting the sessions.

Volunteer | *Bangladesh Physics Olympiad*

Served as invigilator and examiner for national and regional olympiads

WORKSHOPS AND CONFERENCES

PWF Bangladesh: School on Quantum Field Theory (online school)

Fall 2025

Participated in lectures and completed problem sets on challenging topics in quantum field theory from renowned academics.

PWF Bangladesh: School on General Relativity (online school)

28 May - 15 July 2025

Participated in lectures and completed problem sets on challenging topics in general relativity and cosmology from renowned academics.

Centennial Celebration of Bose-Einstein Statistics: A Legacy of Dhaka

2024

Organized by University of Dhaka

SKILLS

Languages: Bangla (Native), English

Programming: Mathematica, Python (NumPy), Maple

Document Creation: Microsoft Office Suite, LaTeX

REFERENCES

Professor Mahbubul Alam Majumdar

Dean, School of Data and Sciences, BRAC University.

Email: majumdar@bracu.ac.bd

Dr. Ratul Mahanta

Postdoctoral Fellow, Peng Huanwu Center for Fundamental Theory, Hefei, China.

Email: ratul.mahanta@ustc.edu.cn

Sayed Tashnuba Jahan

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Ahmed Rakin Kamal

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