Fahim Rajit Hossain Shwadhin

75-A/W, University of Rajshahi, Bangladesh-6205
01781259313 farahoshwadhin.13@gmail.com linkedin.com/in/fahim-rajit-hossain/ https://rajit13.github.io/

Education

Bangladesh Army University of Engineering and Technology - BAUET **2019 – Present**
Bachelor of Science *in Electrical and Electronic Engineering* *Natore, Bangladesh*

- Thesis Title: A Low-cost Radio Telescope model for 21 cm H-line Detection.
- Thesis Advisor: Afzal Hossen

Relevant Coursework

- Electrical and Electronic System (EEE 2011)
- Introduction to Astrophysics (ASTRO 142)
- Power Electronics (EEE 4273)
- Data Driven Astronomy (Coursera)
- Astronomical Techniques (Online)
- Mathematical Methods of Physics
- Introduction to Electricity and Magnetism
- PHY 432: Astrophysics

Skills and Interest

Programming Languages: Proficient in Python (NumPy, SciPy, Matplotlib, AstroPy, Pandas), MATLAB, with basic proficiency in C, C++, HTML/CSS, ADQL
Software:/Frameworks: LaTeX, GitHub, WordPress, Inkscape, LENSTRONOMY, TOPCAT, SAOImage DS9.
Astronomy: Observation, Photometry and Data Collection with CCD/Telescopes, Modelling with Bayesian Statistics (MCMC), 21 cm H-line, Astronomy Olympiads.
Languages: English(Fluent), Bengali(native), Hindi(working proficiency)

Research and Technical Experience

Summer Astrophysics Intern **May 2020 – August 2020**
Supervisor(s): Dr. Aurora Kesseli *Leiden/ESA Astrophysics Program for Summer Students (LEAPS) 2020*

- Worked with high-resolution spectroscopic archival data of Exoplanet WAST 76-b from Calar-Alto Observatory. Wrote a program in Python to analyze, plot, and perform basic spectral time series analysis.
- Using the Cross-correlation method created a model for the atmosphere of the exoplanet for detection of special species such as TiO, VO, and water molecules. With a novel model of HRCRS detected very little sign of TiO.
- Compared results from high-resolution spectroscopy with previously gathered results from low-resolution spectroscopy to confirm the significance of both results ultimately verifying the importance of multi-resolution works.

Research Project **February 2023 – Present**
Supervisor: Dr. Anowar J. Shajib *BDLensing*

- Part of a research group that focuses on modeling galaxy-scale strong lensing systems using *LENSTRONOMY* software. The first author to be of the subsequent journal paper.
- Worked with HST data to create a Sérsic profile and simulate how the mass is distributed in the lens galaxy and compare it with the light distribution to investigate the alignment between dark matter and baryonic matter in massive elliptical galaxies

Summer School Participant **August 2021**
Dunlap Astronomical Instrumentation Summer School *University of Toronto*

- Participated in a week-long virtual summer school on Astronomical Instrumentation and Research Methodology.
- Worked with CCD data for Image Analysis with virtual lab tour at the Dunlap Institute.

Research Project **February 2023– Present**
Supervisor: Dr. Khan Muhammad Bin Asad *Astronomy Research Group, IUB (ARGI)*

- Working on modifying the existing antenna model for better radio observation of 21-cm signal from the center of the Milkyway Galaxy and with better affordability. The project is named "Jagadish Horn Radio Telescope (JHoR)." The extension of this project is adapted for my undergraduate thesis.

Leadership / Extracurricular

International Olympiad on Astronomy and Astrophysics (IOAA) **2018 – Present**
Bangladesh Team Leader *IOAA*

- Led Team Bangladesh as a team mentor on several editions of IOAA resulting in the first-ever silver medal along with the best prize for group contest awarded to Bangladesh.
- Prepared and moderated questionnaire and graded student responses as one of the youngest members of IOAA and similar international Olympiads like GeCAA/OWAO Jury Board.
- Participated in International Board Meeting of IOAA as Bangladesh representative. Worked under local Astronomy Organizations like Planetariums and Observatory in India, China, Hungary, and Poland.

Bangladesh Olympiad on Astronomy and Astrophysics (BDOAA) **2018 – Present**
Co-founder *Bangladesh*

- Part of the founding committee of the first internationally recognized Astronomy and Astrophysics Olympiad in Bangladesh. Yearly participants over 700 students nationwide.
- Responsibilities includes - creating a balanced problem-solving astrophysics curriculum, social outreach, creating problem sets for tests, training the national team, and event coordinating nationwide
- Published 100 blog posts and compiled more than 6 note sets on Physics, Astronomy, and Earth Science at https://bdoaa.org/blog/.

Publications

Jyotirbigganer Joto Kichu (All About Astronomy): First-ever Bengali Astronomy textbook focused on Introduction to Astronomy and International Olympiads co-authored with **Md. Mahmudunnobe.** To be published by: https://www.adarsha.com.bd/ ISBN: to be added

Detecting TiO in the spectrum of the hot Jupiter WASP-76b: Published my research results on an online seminar at a University in Bangladesh is the first ever undergrad to do so in Astrophysics. See: https://rajit13.github.io/research.html#leaps

Service and Outreach

Bangladesh Olympiad on Astronomy and Astrophysics: Academic Coordinator **2017 – Present**
The aim of BDOAA is to provide rigorous training in Astronomy and select Bangladeshi students to the IOAA and encourage Astronomy and Astrophysics education across the country.

Dur Bishwer Nagorik – Citizens of the universe: Observer and Volunteer **2023**
Durbin is an observational group that will travel around Bangladesh to do Astrophotography of planets, nebula, stars, galaxies, and other exciting astronomical objects. The program is aimed at astronomical outreach via public events consisting of telescopes.

National Earth Science Olympiad: Academic Team Member & Volunteer **2016 – 2019**
Bangladesh Youth Environmental Initiative (BYEI) organizes the National Earth Olympiad (Bangladesh) that selects the National Team for Bangladesh at the International Earth Science Olympiad (IESO). The programs focus on environmental sustainability and awareness among young students.

Smartians of Science, Rajshahi: Mentor for Physical Science Competitions and Olympiads. **2019 – Present**

Awards and Scholarships

Winner **2018**
Win A Telescope Project Contest, IAU100 *International Astronomical Union*

- Awarded for best astronomical outreach project model in Bangladesh.

Bronze Medal **September, 2017**
11th International Earth Science Olympiad *Nice, France*

- Awarded for excellence in the theoretical and the field components of this international high school science competition.

Diploma **December, 2016**
10th International Olympiad on Astronomy and Astrophysics *India*

- Awarded for excellent performance in both the individual and the group sections of this international competition.

Champion **2017**
National Earth Science Olympiad *BYEI*

- Became overall champion at the national high school Olympiad focused on Earth and Climate Sciences.