S M Rafee Adnan

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Education

August, 2023 – Present	**M.S. in Physics & Astronomy**, *University of Louisville*, Kentucky.
November, 2021 – March, 2022	**M.S. in Physics**, *Shahjalal University of Science and Technology (SUST)*.
April, 2014 – September, 2021	**Bachelor of Science in Physics**, *Shahjalal University of Science and Technology (SUST)*.

Research Experience

August 2023 - Present	**Graduate Student Researcher** Advisor: Prof Benne Holwerda Measuring the scale height of the Milky Way using Open Clusters; explore various properties of open clusters e.g MZ relationship; modelled strong lensing system with GAMA footprint.
February 2023 - November 2024	**Student Researcher** Advisor: Dr Anowar Shajib Utilized HST imaging data to model strong lensing systems; investigated the relationship between the environment and the internal structure of the massive elliptical galaxies (deflectors); created the pipeline which was used to determine the local galactic density. ⬈
November 2021 - November 2023	**Student Researcher** Advisor: Prof Syed Badiuzzaman Faruque Conducted a study on 75 open star clusters and employed unsupervised machine learning algorithm for member star selection; measured the MZ relationship with Bayesian Statistics

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Publications

○ **Rafee Adnan, S. M.**, Jobair Hasan, M., Al-Imtiaz, A., Robin, S. H., Shwadhin, F. R., Shajib, A. J. et al (2024). *Investigating the relation between environment and internal structure of massive elliptical galaxies using strong lensing.* (Submitted to A&A) arXiv:2412.00361

○ Holwerda, B. W., Robertson, C., Cook, K., Pimbblet, K. A., Casura, S., Sansom, A. E., Patel, D., Butrum, T., Glass, D. H. W., Kelvin, L., Baldry, I. K., De Propris, R., Bamford, S., Masters, K., Stone, M., Hardin, T., Walmsley, M., Liske, J., & **Rafee Adnan, S. M.** (2024). *The Galaxy Zoo catalogs for the Galaxy And Mass Assembly (GAMA) survey.* (accepted for publication in PASA) arXiv:2410.19985

○ **Adnan, S. M. R.**, Al-Imtiaz, A., & Roy Pronoy, S. et al (2023). *Exploring the Mass-Metallicity Relation in Open Clusters inside the Milky Way.* Metal Production and Distribution in a Hierarchical Universe – II (metals2023), ESO Santiago, Chile. (Digital Poster) zenodo:10117210

Presentations

June 2024	**AstroAI Workshop 2024**, Harvard & Smithsonian (CfA), Cambridge, MA "Exploring the Mass-Metallicity Relation in Open Clusters inside the Milky Way"
March 2024	**KAAS Meeting 2024**, Shawnee State University, Portsmouth, OH "Exploring the Mass-Metallicity Relation in Open Clusters inside the Milky Way"
November 2023	**Metal Production and Distribution in a Hierarchical Universe – II**, Santiago, Chile "Exploring the Mass-Metallicity Relation in Open Clusters inside the Milky Way"

Teaching

- Lab instructor:
  - PHYS 108 - Elementary Astronomy Lab (Fall 2023)
  - PHYS 224 - Fund of Phys Lab II: Elec&Mag, Optics & Modern Physics (Fall 2024)
  - PHYS 295 - Intro Lab I: Mechanics & Thermodynamics (Spring, Fall 2024)
- Graduate Teaching Assistant:
  - PHYS 107 - Elementary Astronomy (Fall 2023, Spring, Fall 2024)
  - PHYS 195 - Intro Special Topic: Eclipse (Spring 2024)
- One of the 16 mentors in INTRO-2-ASTRO 2023 ⬈
- One of the 18 hands-on session helpers in 2022 Sagan Summer Workshop

Attended Workshops

July 2024	Code/Astro 2024
	Organized by CIERA, Northwestern University, Chicago, IL
July, 2022	2022 Sagan Exoplanet Summer Hybrid Workshop
	Hosted by The NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA
February, 2022	Dawn Winter School 2022
	Hosted by The Cosmic DAWN Center - Niels Bohr Institute, University of Copenhagen, Denmark
August, 2021	International Virtual Course on Astrostatistics and Machine Learning
	Organized by Astronomy Study Program, Institut Teknologi Bandung (ITB) and National Astronomical Research Institute of Thailand (NARIT)
November, 2020 – February, 2021	Kathmandu Astrophysics School (KAS20)
	Organized by University of Melbourne, Australia.
September, 2020	Summer School on Galaxies and Cosmology (SSGC)
	Organized by Astronomy Research Division, Institut Teknologi Bandung (ITB), Indonesia
September, 2018	Introduction to Astronomical Databases and their uses
	Organized by Maqsudul Alam Science Laboratory in association with The Haus der Astronomie (HdA) and Max Planck Institute for Astronomy, Heidelberg, Germany.

Projects

LunarVR This outreach project is a VR experience that enables the public to explore the Moon. ⬈

Immersia We tried to re-innovate the way of learning using the VR technology. Using our application, high school students in Bangladesh can immerse themselves virtually in the lab and learn with audio-visual interaction.

Astropixel This open source python package was made with the goal of making pixel art out of real astronomical data. ⬈

IVC on Astrostatistics and ML
- Using HDBSCAN to separate the members of m67 from the background stars and analyzing the characteristics of the star cluster. ⬈
- Using Data Compensated Discrete Fourier Transform(DCDFT) to determine the period of a variable star. ⬈

Awards & Grants

ICT Innovation Fund 2019-20 **Funded Project: Immersia,** was granted a fund of 18,000 USD by ICT Division of Bangladesh Government to promote innovative ideas and its implementation.

NASA Space Apps Challenge 2018 **Global Winner (Category: Best Use of Data)**. Out of 1395 teams and 18,000 participants from around the world.

National Science Festival 2011	**Secured 3rd Place in Project Display (Physical)** for displaying a project regarding linear magnetic accelerator.
Junior Govt. Scholarship 2008	Obtained Scholarship for securing merit position in the Government Board Examination.

Extra Curricular Activities

Hospitality & Communication Secretary
September, 2023 – September, 2024
Bangladeshi Student Association (BSA) of UofL
- I helped organize major events over the year that represented Bangladesh's culture and heritage at the University of Louisville.

General Secretary
July, 2018 – June, 2019
Copernicus Astronomical Memorial of SUST (CAM-SUST) ⬈
- Only official astronomical organization of Shahjalal University of Science and Technology.
- I was a general member, field education director, organizing secretary of this organization in 2014, 2015 and 2016 respectively.

Boy Scout
January, 2006– December, 2010
Dhaka Residential Model College Scout Team
- Attended 11th Annual Training Camp 2008, held in *National Scout Training Center, Gazipur*.
- As a scout I was involved in various voluntary social services during this period.

Skills

Programming Languages	Python, C, C++, SQL, ADQL
Softwares	LaTeX, TOPCAT, Microsoft Excel, Blender
Operating Systems	macOS, Linux, Windows

References

- Available upon request.