

Khadeejah Motiwala

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EDUCATION

Institute of Space Technology (IST)

B.S. Space Science

Islamabad, PK

Sep 2016 - Oct 2020

Major: Astronomy & Astrophysics, *cum laude*

CGPA: 3.53/4.00 Major GPA: 3.78/4.00 | Top 3

Electives: Special Relativity, Quantum Mechanics II, Particle Physics, Solar Physics

Thesis: Development of a simulation tool for the relativistic and propagation effects in Gamma-ray Bursts

- Developed the algorithm and wrote the code for a simulation tool to study the high-latitude curvature effect, and the effect of relativistic beaming on signal emitted by a shell in Gamma-Ray Burst (GRB) ejecta
- Performed simulations for various emission profiles which showed a dependence of observed signal profile on size of emission region and Lorentz factor

This work won an award for Best Undergraduate Project (2020)

Semester projects:

- Created a flight booking system in C++ and its database in SQL for Geospatial Databases module
- Worked with the IST Astronomy Group on the operation of a 16-inch reflector telescope
- Digitized Pakistan's major lakes in ArcMap and built a Geo-information System (GIS) database

RESEARCH EXPERIENCE

Space and Astrophysics Research Lab (SARL), National Center of GIS and Space Applications (NCGSA)

Research Assistant

Islamabad/Karachi PK

Sep 2020 - Present

- Studied and simulated propagation effects in high-latitude emission in GRBs (*manuscript under review*)
- Developed a software tool for the calculation of errors in spectral energy distributions (SEDs) from spectral analyses of GRBs (*manuscript under preparation*)
- Calculated the transformation of luminosity from the comoving frame of reference to the observer frame of reference in relativistic jets using probability density functions (*manuscript under preparation*)

Department of Astronomy & Astrophysics, IST

Research Intern, Saeeda Sajjad, Ph.D.

Islamabad, PK

May 2019 - Sep 2019

- Investigated the effects of various parameters on the behavior of different spectral models used in high-energy astrophysical data analysis
- Conducted a study on the detection mechanism of the Fermi Large Area Telescope (LAT) and methods of gamma-ray astronomy

RELEVANT WORK EXPERIENCE

Cosmic Space Systems Private Ltd.

Project Coordinator

Karachi, PK

Sep 2020 - Oct 2020

- Developed teaching resources and organized astronomy-based activities for school children as part of World Space Week 2020

Rawat government schools

Volunteer teacher: Science and Math

Rawalpindi, PK

Sep 2016 - Sep 2019

Hijrat Colony Street School

Volunteer teacher, founding team

Karachi, PK

Jun 2018 - Jul 2018

SCHOLARSHIPS & AWARDS

- **Senior Year Gold Medalist**, Institute of Space Technology, Islamabad Oct 2020
- **Graduated *cum laude***, Institute of Space Technology, Islamabad Oct 2020
- **Best Undergraduate Project**, Institute of Space Technology, Islamabad Sep 2020
- **IST Merit Scholarship**, Institute of Space Technology, Islamabad Sep 2016 - Sep 2020

PRESENTATIONS & TALKS

- ***"Development of a simulation tool for the relativistic and propagation effects in Gamma-ray Bursts"***, Institute of Space Technology, Islamabad Sep 2020
- ***"Astronomy 101"***, The Westminster School, Islamabad Dec 2019

LEADERSHIP & MANAGEMENT

- **Editor, Founder**, IST Space Society blog Sep 2018 - Mar 2020
- **Event Manager**, Space Blogging, World Space Week Oct 2019
- **General Secretary**, IST Environmental Society Sep 2018 - Mar 2019
- **Founder, Moderator**, IST Book Club Sep 2017 - Mar 2019

SKILLS

Programming Languages: Python, C++, MATLAB, SQL & R

Libraries and Software: CERN PYROOT, NumPy, Matplotlib, LaTeX, ArcMap, MySQL & MS Excel

Languages: English & Urdu