

SHARJEEL AHMAD

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Education

Lahore University of Management Sciences (LUMS)

Sep 2020 – May 2024

Bachelor of Science in Physics

Lahore, Pakistan

cGPA: 3.75/4.00 ; sGPA: 3.72/4.00

Graduate-level courses: *Introduction to Quantum Information Science and Technology, Introduction to Quantum Field Theory, Machine Learning in Physics, Quantum Optics, Computational Physics, Relativistic Electrodynamics*

Research Experience

Senior Year Project

Fall 2023 – Present

Supervisor: Dr Adam Zaman

LUMS

- Currently doing literature review on the **Lindblad Master Equations** and **Liouville's Theorem**
- Applying a variation of Kubo Formulation to study the **Time Evolution** of particular **Open Quantum Systems** such as driven **Spin-Boson** systems
- Studying various **Perturbation Theories** which are commonly applied in Open Systems as well as **Heat Transport** equations

Directed Research Project

Spring 2023

Supervisor: Dr Adam Zaman

LUMS

- Carried out **literature review** to compile a **report** on the fundamental principles of **Quantum Linear Response Theory**, and its potential uses in solving out of equilibrium Quantum Systems

Approximate Quantum Fourier Transforms (AQFT)

Spring 2023

Supervisor: Dr Sabieh Anwar

LUMS

- Investigated the use of AQFTs in various **Quantum Algorithms** including Periodicity Estimation, Shor's Factoring and Quantum Addition
- Presented a **report** showcasing the advantages of AQFTs in reducing **Decoherence** by reducing the number of gates required to carry out the algorithm
- Utilized **Qiskit** (python) to verify theoretical findings under various initial conditions

Plastic Detection using Liquid Crystals

Summer 2023 – Present

Research Assistant under Dr Ammar Ahmed

LUMS

- Collaborated with the life sciences department to utilize the **Nematic Liquid Crystal '5CB'** to differentiate various plastics found in the local environment through **Optical Birefringence**
- Submitted a **presentation** which analyzed the collected data through **Rotational Analysis** in a **Polarized Microscope** on the plastic samples coated with 5CB
- Currently working on creating a roughness profile of the various plastic samples by taking **2D Fast Fourier Transforms** of the captured images in **MATLAB**

Topological Defects and Photo-lithography in Liquid Crystals

Spring 2021 – Spring 2023

Research Assistant under Dr Ammar Ahmed

LUMS

- Conducted experimental research on **Lyotropic** and **Non-Lyotropic Liquid Crystals** and their applications in bacterial transport
- Employed **Auto-CAD** to generate micropatterns on a photo-lithography mask for the **Functional Materials and Optoelectronic Devices** group which is still used today

Honors & Awards

Dean's Honor List

Fall 2020 – Present

- Awarded for maintaining a **cGPA greater than 3.6** in each semester

LUMS

Chandrasekhar Honorific Fellowship

Fall 2022 – Present

- Awarded twice for **academic excellence in basic science** from a cohort of 60 candidates

LUMS

50% Merit Scholarship

Fall 2020 – Fall 2022

- Awarded for being in the **Top 10 freshman and sophomore undergraduate students** in the LUMS School of Science and Engineering

World Schools Debating Championship

Jul 2019, 2020

Two time Member of national team

Thailand, Online

- Selected to serve in the **National Team** out of a pool of **300 candidates** from all across Pakistan
- Ranked as the **8th Best Speaker in the world** in the English as Second Language Category

120% Merit Scholarship

Sep 2018 – 2020

- Awarded for the entirety of high school A Levels program based on **outstanding academics** and extracurriculars

Highest Achiever Award

May/Jun 2018

Top in School

The Lahore Alma

- Awarded for obtaining the **best grades in high school** in my CAIE O Level Batch

All Pakistan Junior National Debating Championship

Feb 2017, 2018

Two time Runners Up

Karachi/Lahore, Pakistan

- Reached the **Finals in two consecutive years** amongst **40 competitive teams** from across Pakistan

Course Projects & Presentations

On Recurrent Neural Networks in Unsupervised Deep Learning

Fall 2023

PHY 603 - Machine Learning for Physics

On Path Integral Quantization in Scalar, EM and Spinor Fields

Spring 2023

PHY 539 - Introduction to Quantum Field Theory

On Chaos in Simple Chua Circuits

Spring 2023

PHY 300 - Experimental Physics Lab II

On Quantum Nature of Light

Spring 2023

PHY 300 - Experimental Physics Lab II

Professional & Volunteer Work

Lahore Grammar School Defence Campus

Oct 2021 – Present

Parliamentary Debates Coach

Lahore, Pakistan

- Hired as a **full-time debates coach** to teach over a **100 high-school students** logical analysis, critical thinking and persuasive speaking
- Assisted the LGS Defence Debates Team in reaching the **Final** of All Pakistan Senior Debating Championship 2022 for the first time in **seven years**

Community Service Society - Bloodlink

Fall 2021 – Fall 2022

Volunteer

Lahore, Pakistan

- Introduced a **Digitization Framework** to reduce donor response time and alleviate the need for manual oversight
- Maintained a **24-hour helpline** on designated days, connecting hundreds of patients with blood donors

Pakistan National Debate Team

Jan 2023

Team Selector

Lahore, Pakistan

- Worked with a panel of selectors to choose a 5-person national debate from **over 300 applicants**

Skills & Interests

Skills: Python, MATLAB, C++, LaTeX, AutoCAD, Powerpoint

Interests: Public Speaking, Tennis, Mixed Martial Arts, Poker, Fantasy Novels