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Pulkit Malhotra

Education

2019–2023 **University of California San Diego**,
Physics, Bachelor of Science.

2019 **RN Podar School, Mumbai**,
Science and Computer Science (CBSE), Class 12.
GPA – 85.00%

2017 **RN Podar School, Mumbai**,
Central Board of Secondary Education (CBSE), Class 10.
CGPA – 10 (95%)

Research Experience

May 2017–May 2019 **Team Leader**, CERN BL4S.
Beamline for Schools (BL4S) is an official competition powered by CERN, the European Organization for Nuclear Research, in Geneva, Switzerland. It is open for all high-school students around the world. The competition invites teams of high-school students to propose a scientific experiment that they want to perform.
We competed in BL4S 2018 against 195 teams from 42 countries, to secure a top spot and win a sponsored trip to Geneva, Switzerland and over a span of 15 days, executed our experiment at the T9 beamline of Proton Synchotron.

- Studied the interaction between charged particles and a magnetic field to learn about the anomalies in the Earth's magnetic field as a function of the variance of the cosmic ray detection rate.
- Observed muon behavior under varying electromagnetic field strengths to concur the effect of gravitational field on high-atmosphere cosmic muons.
- Worked with devices like the Delay-Wire Chamber, MicroMegas, Collimators, Scintillators, High-energy electromagnets.
- Learnt coding in ROOT, modular scientific software toolkit used by CERN and TDAQ, responsible for the online processing of live data, streaming from the ATLAS experiment at the Large Hadron Collider at CERN.
- Going to publish a paper in IOP (Institute of Physics) regarding the experiment and the information found after data analysis.
- Link to project proposal and video.

Aug 2017-September 2019 **Research Intern**, University Of Mumbai.
Did a research project under the guidance of Prof Siddharth Kasthurirangan on spectral and pictorial analysis of Total Lunar Eclipse images, gathered on 27 July 2018, in Jaisalmer, Rajasthan.

- The purpose of the experiment was to study the complex electrostatic environment that differs from the lunar sunlit side to the dark side due to showering of cosmic rays, photons, etc and the flow of lunar dust under the environment.
- Did analysis of the images taken under various filter detecting different spectrum and polarization.
- Learnt to use devices and analyze devices like Charge-coupled devices(CCDs), polarization and wavelength filters.
- Data analysis was done using Anaconda, an open-source software based on Python and R.
- Learnt and used Scientific Python Development Environment (SPYDER), which is a scientific environment written in Python, for scientists, engineers and data analysts. It offers a unique combination of a comprehensive development tool with capabilities of a scientific package.
- The project is in its final stages and a paper on it is going to be published.
- Link to photos(post intial processing and rotation) and codes used.

School Projects

September 2018- November 2018 **A heuristic verification of Lorentz Force on muons using CERN Beamline**, *Prof. Rajeev Maurya*.
- To study the deflection of muons in an artificially generated magnetic field
- A small data set gained from the CERN Beamline was used to do this project.
- Comparing the theoretical values of angle of deviation to the actual values of angle of deviation for verification of Lorentz Force
- Link to Project.

January 2018– March 2018 **Construction of cloud chamber to measure radon using isopropyl alcohol**, *Prof.Anjali* .
- Constructed a cloud chamber in school using isopropyl alcohol and dry ice.
- This was used to measure amount of radon in the environment
- As radon undergoes α-decay, so given the α particles in the environment, the number can be estimated.
- Link to Project

November 2018– Feb 2018 **On Time-Complexity of various Sorting algorithms**, *Prof.Manish Agarwal* .
- Used C++ to measure the computational complexity that describes the amount of time it takes to run an algorithm.
- Various sorting algorithms using different data sets.
- The result was further filtered using Big-O notation and ranked accordingly.
- Link to Project

Outreach

March 2017- March 2019 **The Eyries and Pyres of Thought**, *TED Orgagnization*.
- Started a newsletter in collaboration with the TED organization to explain advance topics in a simple manner for students all over the world.
- The newsletter covered topics like Analytic Philosophy, Cognitive Science, Relativity, Quantum mechanics
- Contributed articles for each issue on the topic of Relativity.
- Link to newsletters

March 2019 **National Training Program**, *Raising a Mathematician*.
- The purpose of the organization is to search and mentor young Mathematical talent throughout India. Guide them to hone their skills and thinking by giving them the right tools.
- Conducted a session titled **"Mathematics, Physics and Limitations of modelling our Nature"**
- Detailing how does Mathematics help to model Physics and How does Physics help to model mathematics and how there are inherent limitations to our study of nature
- Link to PPT

Awards and Achievements

December 2018 **Department of Atomic Energy**, *Government of India*.
- Felicitated by Chairman of Bhabha Atomic Research Centre, K.N. Vyas.
- Award for extraordinary contribution in representing India at European Council of Physics (CERN) BL4S.

Oct 2016 **International English Olympiad**, *SOF*.
- Secured international rank 9 in International English Olympiad, out of almost 10,000 participants

Aug 2018 **Martial Arts**, *Jiu Jitsu International, India*.
- Practiced Brazilian Jiu-Jutsu for 8 years to earn black belt given by Jiu Justu International 2017
- Won Bronze Medal in National Indian Karate Competition by World Funakoshi shotokan Organisation 2016
- Won Silver Medal in State-level karate championship 2016

July 2017 **Merit Certificate**, *RN Podar School*.
Merit Certificate for getting perfect 10 CGPA CBSE Board Examination Grade 10 2017.

July 2018 **AP Scholar with Honor**, *College Board*.
- Granted to students who receive an average score of at least 3.25 on all AP Exams taken and scores of 3 or higher on four or more of these exams.

Community Service

March 2016- March 2017 **Team Leader**, *I am the Change National Competition by India Today*.
- The purpose of the competition to combine education with technology to bring a change in the society.
- Educated the support staff of our school and neighborhood on financial literacy, making them aware of basic banking procedures
- To further increase the reach, we uploaded made and uploaded several videos on a Youtube channel which, has since gained over 6000 subscribers and 2 million views
- Won the award for "Best Display" in the competition
- Link to FB page and website

July 2017- April 2018 **Volunteer**, *Salaam Baalak Trust*.
- Salaam Baalak Trust is an Indian non-profit and non-governmental organization which provides a sensitive and caring environment to street and working children in India.
- I worked as a volunteer to teach underprivileged girls elementary and higher level mathematics covering topics like algebra, integers etc.

April 2015- April 2017 **Starting Member**, *Humans of Podar*.
- The purpose of the organization was to provide an interactive way to inculcate humanitarian values in young children. Stories from students would be shared on a social media platform.
- Conducted several different activities among the secondary (6,7,8,9,10th grades) on different moral values
- Link to FB page

Skills

Languages	Python(A), C/C++(A), SQL(B)
Frameworks	SPYDER, ROOT, MATLAB
WebD	HTML
Utilities	Anaconda, Git, Sublime Text, Jupyter Notebook
Communication	English(SRW), Hindi(SRW),Punjabi (SO), German(SO), Sanskrit (SO)

Relevant Courses

High-School AP Psychology, Mathematics (contains topics such as Linear Algebra, Differential Equations, Statistics, Coordinate Geometry, Combinatorics), Physics (Classical Mechanics, Optics, Thermodynamics, Electromagnetism, Atomic Physics), Chemistry(contains topics such as Physical Chemistry, Organic amd Inorganic Chemistry), CS (contains topics such as C++, Python, SQL, Computing Hardware

Leadership

March 2017- March 2018 **Chairperson**, *Podar Summit*.
- Podar Summit is a prestigious MUN event organized by the students of RN Podar School.
- Assistant Director of Human Rights Council 2017
- Director of All India Political Parties' Meet 2018

March 2015- Jan 2019 **Head Of Technology**, *Drishtikon*.
- Drishtikon is an annual event organized by students of RN Podar school to bring in a paradigm shift in moral perspectives
- Edited and made several presentations, videos and audios to be played during the event.

Extra Curriculars

2015-2019 **Quizzing**, *State and National*.
- Lead the school quiz team to win the district round Indian National Trust for Art and Cultural Heritage (INTACH) Heritage 2015
- Lead the quiz team to a inter-school Navy Wives Welfare Association (NWWA) Quiz

2015-2018 **Table Tennis**, *RN Podar School*.
Was part of the school table tennis team and competed in several district and state level tournaments

2015 - 2019 **TED-ED Club**, *Member*.
Was part of the school TED-ED club. We discussed and deliberated several different ideas pertaining different topics

References

Shyam Wuppuluri, *Research Associate*,
RN Podar School,
shyam.wuppuluri@gmail.com.

Markus Joos, *Technical coordinator*,
ATLAS, CERN,
markus.joos@cern.ch.

Siddharth Kasthurirangan, *Professor of Physics*,
University of Mumbai,
skrangan0@gmail.com.