

SCIENCE STEM SCHOOL 2023-24

PAKISTAN's COOLEST SCIENCE SCHOOL



In collaboration with



Hosted by





THE STEMX ADVANTAGE

STEMx, in collaboration with Pakistan Innovation Foundation and partners, puts together the **STEM Advantage+ Programme** for partner schools. STEM Advantage+ is an year-round capacity building programme with a practical curriculum of hands-on, multi-disciplinary, and holistic learning to find and groom young learners who may be inspired to one day become talented scientists, engineers, innovators, tinkerers-makers and builders.

STEM Advantage+ offers students a series of curated online interactions with leading scientists and innovators from across Pakistan (and around the world) culminating into hands-on bootcamps and summer internships at leading universities around the country.

"STEMx is like taking AP-Physics, just a lot more experiential and so much more fun!"

- A STEM Alum

As part of our 2023-24 calendar, **STEMx carried out its Winter Science STEM School @ LUMS** from Dec 28, 2023 to Jan 4, 2024. 36 students selected from across the country - including 25 from STEM Advantage+ partner schools - attended the 8-day bootcamp. In order to qualify, students had access to two waves of 12 qualifying talks each to learn from and attempt quizzes on during Oct-Dec 2023.

These STEM bootcamps were **intense exercises in hands-on STEM learning, real-world problem solving**, and in-person interaction with leading figures and scholars in relevant areas. They offered the participating students a learning experience that was innovative, academically rigorous, multidisciplinary, but above all, **FUN!**



QUALIFYING FOR SCIENCE STEM SCHOOL @ LUMS

OCT 27, 2023

STEM Advantage+ launched

1

OCT 27 - DEC 5

STEM Talks

2

DEC 10

Quizzes
Deadline

3

DEC 10-16

Additional Wave
to Qualify, and
Interview call 1

4

DEC 21, 22

Interview call 2

5

DEC 23

First list of Finalists
for Science STEM
School,

6

Dec 27

Arrivals for STEM
School @ LUMS

7

Jan 4, 2024

STEM School @
LUMS Cconcludes

8

THE SCIENCE STEM SCHOOL FACULTY & THEMES



Dr. Muhammad Faryad (Physics)

Associate Professor of Physics,
SBASSE, LUMS



Dr. Shaper Mirza (Biology)

Associate Professor,
SBASSE, LUMS



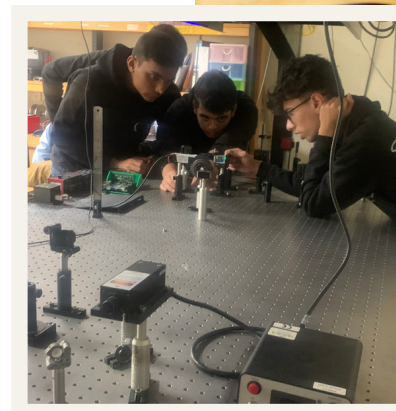
Dr. Imran Akhtar (Aeronautics)

Professor & HOD of Mechanical Engineering
NUST College of EME



Dr. Farah Nadeem (Maths+CS)

Assistant Professor,
School of Education (SOE), LUMS



Dr. Sabieh Anwar

Dean, SBASSE, LUMS
Co-Director, STEM School



Dr. Athar Osama

Founder, STEMx
Director, STEM School



Physics

Quantum random number generator

In this project, students generated a truly random string of numbers through photon isolation, using the inherent spontaneous nature of quantum mechanics as the entropy source.



Physics

Grover search algorithm

Students used Qiskit, IBM's quantum SDK, and NumPy to implement Grover's search algorithm in Python. They built and simulated quantum circuits, showcasing quantum gate manipulation and qubit measurements.



Biology

Finding a killer dose for AMR and spreading awareness

The students extracted plasmid from resistant bacteria, introduced it into non-resistant bacteria, and conducted antibiotics susceptibility testing and agarose gel electrophoresis to analyze the data.



CS + Maths

AI Text summarization tool through machine learning

Students were instructed to set up an automated text summarizer using a pertained LLM, and then to improve the model performance using multiple techniques.



Aeronautics

Building an RC airplane

Students worked on designing and building a plane model out of depron sheets and then wiring it with controls to eventually fly it. They also learned the theory of flight and carried out a range of experiments to understand various elements of the theory.



STEM SCHOOL STUDENT PROJECTS

MEET THE SCIENTISTS



Dr. Safwan Akram

Prof. of Biosciences & Enterprise,
Teesside University
United Kingdom



Zafar Khan

Co-Founder and CTO,
Truckistan Technologies



Nauman Shaikh

Lead, Machine Learning
Motive.AI



Dr. Faisal Khan

Director, Precision Medicine Lab
Head, Centre for Genomic
Sciences, Rehman Medical
Institute, Peshawar



Dr. Hammad Naveed

Professor & Director
National University of
Computer and Emerging
Sciences



Dr. Sabieh Anwar

Dean, Syed Babar Ali School of
Sciences and Engineering, LUMS



Dr. Naweed Syed

Professor and Head of
Department of Neurosciences,
University of Calgary, Canada



Nazar Khan

Freshman at Stanford University
3 Times STEM Alum



Dr. Nasir Raza Awan

Head of (Neuroscience),
Sharif Medical Complex and
Resident Scientist, LUMS



Dr. Irfan Chaudhary

Educationist & Assoc. Prof.,
University of Engineering and
Technology Lahore

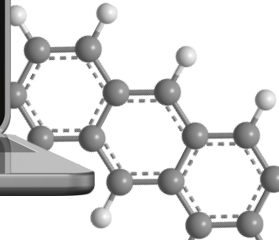
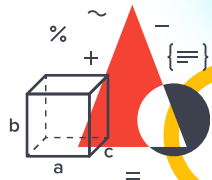
Quantum Physics
and Computing

Synthetic Biology

Neurosciences

Artificial
Intelligence

Hard Problems
in Mathematics



WINNERS TESTIMONIALS



Realizing the importance of self-directed learning, STEM School has motivated me to go beyond traditional education. Recognizing that not everything is taught in schools, I've expanded my knowledge by starting a machine learning course and exploring articles on neuroscience. I firmly believe that future success goes beyond degrees, prompting me to take charge of my learning. This shift has not only refined my career choices but also affirmed that pursuing neuroscience alongside my aspiration to become a neurosurgeon is a viable and exciting path. Thanks to STEM School, I am more confident and enthusiastic about exploring diverse fields beyond my initial career plan.

SYED HASNAT ALI SHAH
TME / FUTURE WORLD SCHOOL



The word "innovative" describes the science stem school perfectly as it captures the essence of the school being both out of the box and intriguing.

MOMINA YASIR
BEACONHOUSE SCHOOL
SYSTEM



My overall experience was amazing. Before arriving at STEM School, I had a very different approach to learning and science. I was sure I wanted to pursue Computer Science but despite not being a fan of biology it has sparked an interest for me for Neuroscience. but now Neuroscience seems very interesting. Even if i pursue computer science as career, STEMx made me see a completely different side of it.

SYED RAAFAY ALI
HEADSTART SCHOOL



STEM School at LUMS was an educational, involving, hands-on STEM program in which we not only met fascinating, intriguing people but also spent all our time living the dorm life. We had daily talks about the most engrossing subjects, conversing with the sharpest minds in Pakistan. Then there were our lab practicals, some of the most enjoyable content of the entire course. STEMx was an absolutely transforming experience, one which I am pained to let go of.

OZAIR AHMED KHAN
EMS HIGH SCHOOL

TESTIMONIAL

STEMX LEADERBOARD (TOP-10 QUIZ RESULTS)

SR NO.		ACTIVITY SCORE
1	OZAIR AHMED KHAN	★★★★★
2	AUN MUHAMMAD	★★★★★
3	SYED RAAFAY ALI	★★★★★
4	YOUSUF MOHAMMAD KHAN	★★★★★
5	M. ABDULLAH IMTIAZ	★★★★★
6	MINAL REHAN	★★★★★
6	SYED AHMAD HASSAN	★★★★★
6	SHEIKH FAHAD	★★★★★
9	ABIHA FATIMA	★★★★★
9	ZAINUB REHAN	★★★★★
9	ROMAISA SHOAIB	★★★★★

The **STEMx Leaderboard** is a live (continuously updated) ranking of 10-15 students scoring the highest points on quizzes required to qualify for an interview for the STEM bootcamp..

Students on the Leaderboard are eligible to appear for an interview for any STEM School of their choosing from those available in any given year's STEM Calendar.

The STEMx Leaderboard shall be updated regularly after each wave and restarted annually for new students to take their place on the rankings.

STUDENT DISTINCTIONS AT SCIENCE SCHOOL @ LUMS

CS+MATH

SYED RAAFAY ALI
MUHAMMAD AYAAN
AUN MUHAMMAD
MUBEEN I CHAUDHARY

BIOLOGY

OZAIR AHMAD KHAN
MOMINA YASIR
SYED HASNAT ALI SHAH

AERONAUTICS

AJAR ALEEM
ALI SHAN
SHAHEER SULEMAN
MAIRAH FAISAL GHAURI

PHYSICS

ABDULLAH IMTIAZ
MUHAMMAD USMAN GHANI
MUHAMMAD HASSAN SHAHID
MUHAMMAD HASSAN

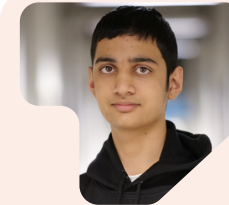
STUDENT TESTIMONIALS



Ayesha Naeem

Crescent Girls College

My STEMx journey was life-changing. Coming from an FSC background, Science STEM School exposed me to practical aspects and real-life applications of science. Despite being a science student for a while, I never realized how fascinating it could be to explore all fields of science.



Mubeen I Chaudhary
Aitchison College

A truly innovative place where students are taught immensely difficult scientific concepts in an easy yet still challenging way with a great deal of hands-on experience



M.Usman Ghani

**Pak Turk Maarif
International**

I would describe STEMx as one of the most educational yet the most fun event I have been to yet. It combined a rather new approach to learning and provided a platform for students to learn about more STEM careers and gave us a broader thinking range

FUN HAPPENINGS AT STEM SCHOOL



BREAKTHROUGH JUNIOR CHALLENGE

One important component of the Science STEM School @ LUMS was the introduction of The Breakthrough Junior Challenge!

The Breakthrough Junior Challenge is an annual, global science communication competition for high-school students founded in 2015 by Julia and Yuri Milner that offers a College Scholarship to the winner.

In this challenge, students seek to understand and explain a complex scientific idea through a 2-minute video. The scientific idea and./or video should be from one of the following disciplines:

- Physical Sciences
- Mathematical Sciences
- Life Sciences

Through a number of sessions at the STEM School, students were encouraged to identify a few ideas for a breakthrough challenge video, narrow down their selected ideas, write a script, and make a first attempt at producing a video.

STEMx plans to work with students interested in competing for Breakthrough Challenge 2024 to provide individualized feedback as well as run a number of sessions with relevant experts in science communication, storyboarding, and video production, etc. to help students submit polished videos. **The competition will open in April and will run through July and special support will be provided in June 2024.**

STEMx Future Roadmap 2024

STEMx aspires to expand its impact across Pakistan and plans to create 4 STEM waves along with two STEM Schools before summer internship



The STEMx Advantage+ Programme provides high school students from a selected group of schools across the country with an year-round engagement with STEM disciplines through a series of virtual and person interactions. .

STEMx enables students to learn from the best and the brightest scientists and innovators from across the country (and the world), situate themselves amongst peers, explore and discover their passions, and develop a deep understanding and appreciation of STEM.

STEM Advantage+ provides them opportunities to explore their STEM Interests in a hands-on manner and other opportunities (including summer research internships at Pakistan's leading Universities) that add tremendous value to their academic credentials.

STEM Advantage also seeks to develop not just academic rigor and grit but also help students create a **portfolio of activities and experiences** that will be very useful when they apply for University Admissions.

STEMx Faculty Members also provide guidance on University admissions and careers and may write recommendation letters, where appropriate.

STEMx Advantage will also provide a **quantitative report card** for students participating in more than 3 STEM WAVES and a **detailed performance report** on those participating in a Summer Research Internship.

Contact us to discuss joining STEM Advantage+.



CONTACT US

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YOUR STUDENTS THIS YEAR. JOIN
THE STEMX PARTNER NETWORK.



STEMX PARTNER SCHOOLS:



HEADSTART
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