

Pakistan Innovation Foundation Presents

2017 **NATIONAL**
STEM SCHOOL

A Unique 10-day Residential Experience

NATIONAL STEM SCHOOL™

Hosted by
Lahore University of Management Sciences (LUMS)

Dec 27, 2017 - Jan 5, 2018



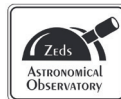
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In Partnership With:

With Support From:



Institute of
Integrative
Biosciences





EXPERIENCE THE EXCITEMENT OF HANDS-ON SCIENCE

Following the success of the inaugural programme in 2016, Pakistan Innovation Foundation is pleased to announce the National STEM School™ 2017 - a unique 10-day residential programme that will bring together the brightest 14-17 year olds to experience the excitement of hands-on science.

This programme specifically focuses on hands-on science to find and groom young learners who may one day become inspiring scientists, engineers, innovators, tinkerers-makers-builders. Through rigorous exposure, the students are engaged in activities and projects where they will “learn science by building things.”

We must instill, in our younger generation, the fast disappearing skill and pride of building things, a natural curiosity, and an appetite to wonder!

The National STEM School is based on the ideology that science is best taught by engaging students in actually exploring freely and creating things under the guidance of qualified professionals rather than being on the receiving end of lectures by teachers.

Participation in the programme gives young learners a leg-up in today's highly competitive world of undergraduate admissions, particularly in sciences and engineering give them critical exposure to the making and building culture that is integral to innovation.

While schools provide a basic foundation for learning and level the playing field, the more gifted amongst these young learners must get opportunities to advance their learning at their own pace through extra-school support and mentoring on a sustained basis.



National STEM School seeks to create inspiring young scientists and innovators in short to medium term. We hope one of our talented alums will go on to win a Nobel Prize in 20-30 years...

4

THEMATIC FOCUS AREAS



PHYSICS &
MATHS



SYNTHETIC
BIOLOGY



COMPUTER
SCIENCE &
ROBOTICS



ASTRONOMY &
ASTRONAUTICS

PROGRAMME STRUCTURE

Several key features of the STEM School makes it extremely unique in the Pakistani context:

PRACTICAL VS. THEORY

The programme is designed to pay considerable more emphasis on the practice rather than the theory of science and innovation. Participants tackle real problems devised by the faculty to help them understand how problems are defined and solutions discovered. Each day begins with a short theory class (about 60-90 minutes) followed by 5-6 hours of practical problem solving aimed at giving learners an opportunity to appreciate how real science happens.

MULTI DISCIPLINARY SCIENCE AND INNOVATION

A multi-disciplinary approach is at the heart of the programme philosophy. Learners are exposed to multiple disciplines in a manner that makes it fun to experience and they begin to appreciate how they come together in real life. Regardless of their particular area of choice, each student must undertake a small task in each discipline to simulate the kinds problems scientists solve in addition to taking on a bigger task as the overall project to graduate.

SCIENCE, PHILOSOPHY, ETHICS

Narrow scientific learning is meaningless without the ability to engage with the philosophy and ethics of science. This enables scientists to engage with debates about the broader questions of societal importance. The STEM School provides food for the soul as well as the mind. Each day begins with a session of reflections which engages learners in conversations about the philosophical, ethical, and societal impact of advancing science and innovation.

TEAMWORK, LEADERSHIP, AND COMPETITIVE COOPERATION

The STEM School engages learners in teamwork and competitive-cooperation and brings out the leadership potential. The 4-day challenge project that puts their ability to build, lead, and be part of a team to a test. The experience camaraderie and build life-long relationships and becoming part of an exclusive community of creative thinkers and problem solvers that gels together like no other.

“

We want to create the conditions of learning which are at least two notches higher than what is possible in a normal classroom in Pakistan

”

- Founder National STEM School

PROGRAMME FACULTY



Dr. Athar Osama

Course Director & Founder, Pakistan Innovation Foundation

Dr. Athar Osama a senior policy advisor to the Government of Pakistan and the founder of Pakistan Innovation Foundation (PIF). He is also the Founder of Muslim World Science Initiative and INNOVentures Global (Pvt.) Ltd. Prior to this, Dr. Osama was the Director of Middle East and Asia for Angle plc. - a British technology commercialisation and venture capital firm. Dr. Osama is the Fellow of the New York-based World Technology Network (WTN) and a Young Global Leader (2013-18) for the World Economic Forum (WEF). Dr. Osama graduated with a PhD in public policy from the Pardee RAND Graduate School in Santa Monica, CA and has a Bachelors degree in Aeronautical Engineering from Pakistan Airforce Academy where he won the coveted 'Sword of Honor.'



Dr. Suleman Shahid

Course Co-Director & Assistant Professor of CS at LUMS

Suleman Shahid runs LUMS' Computer Human Interaction and Social Experience Lab (CHISEL). As an HCI researcher and practitioner, he loves to learn new ways of designing usable, beautiful, results-driven and commercially successful solutions. Having studied computer science at RWTH Aachen, he quickly realized his passion in understanding the symbiotic relationship between society and technology. He received his Professional Doctorate in Engineering (PDEng) degree in User System Interaction and PhD in Affective Human Computer Interaction.



Dr. Faisal Khan

Biology Lead & Director, Inst. of Integrated Biosciences at CECOS

Dr. Faisal F. Khan holds a PhD in biology from University of Oxford, where he successfully carried out work at the intersection of Cell Biology and Systems Biology as a member of the Oxford Protein Informatics Group. Faisal is the key instigator of Pakistan's first ever participation in iGEM – the international competition of Genetically-engineered Machines - where students mentored by him won a Bronze Award. Faisal is also a board member of KPK IT Board and a co-Founder of Peshawar 2.0. As an entrepreneur, Faisal was selected amongst Europe's 40 Biotech Leaders of the Future by Novartis in 2009. In 2011, he was part of a team that won the CUE Grand Finale at University of Cambridge.



Dr. Waqar Saleem

CS Lead & Director of Computer Sciences at Habib University

Dr. Waqar Saleem holds a PhD in Computer Graphics from Max Planck Institut (MPI) Informatik, Saarbruecken, Germany and is fascinated by the field of computer graphics, specifically geometric modeling and shape processing. Dr. Saleem focuses on the development of new processing and management tools that may potentially be useful in the context of digital shape repositories. He is currently a Program Director of Computer Science and an Assistant Professor at School Science and Engineering at Habib University.



Dr. Sabieh Anwar

Physics Lead & Associate Professor/Founder of PhysLab at LUMS

Dr. Muhammad Sabieh Anwar holds a PhD in Physics from Oxford University where he was a Rhodes Scholar and a post-doc from University of California at Berkeley. Sabieh helped establish the physics department at LUMS and was among the principal founders of the School's experimental facilities and curriculum. Ideas from his physics instructional laboratories have been replicated in five Pakistani universities. He is the General Secretary of the Khwarizmi Science Society which is aimed at popularization of science at the grass roots levels. He is recipient of the TWAS medal in physics in 2008 and the National innovation Prize in 2015.



Umair Asim

Astronomy Lead & Curator at Zeds Astronomical Observatory

Umair Asim was born and raised in Lahore and is an educator by profession and an astronomer by the night. He has travelled through the breadth and width of the country with his astronomical telescopes holding sun gazing and sky-watching events in public parks and schools. Umair's own astronomical observatory at his home's rooftop in Lahore which is equipped with Celestron C14 telescope, Lunt152 hydrogen alpha solar telescope, and a lot of accessories. Umair has championed Pakistani astronomers to become players on the global serious and amateur astronomy scene. Umair Asim is also one of the co-Founders of the Astronomical League of Pakistan (ALOP).



Dr. Yasar Ayaz

Robotics Lead & Head of Robotics and AI at NUST

Dr. Yasar Ayaz holds a PhD in Mechatronic Engineering from Tohoku University, Japan and is one of the leading scientists in the area of Robotics and Intelligent Machines in Pakistan. Yasar has published over 50 publications and his research and systems in motion planning have been cited by researchers from some of the leading universities from around the World including MIT. In 2012, Yasar was awarded President Gold Medal for being the Best Teacher at NUST. Yasar also co-chairs the Robotics Foresight Group of the Pakistan Council for Sciences and Technology (PCST) and is the Director of the recently established National Center for Artificial Intelligence (NCAI) headquartered at NUST.

ELIGIBILITY AND CONDITIONS

The Programme is ideally designed for students who have already demonstrated an unusual interest or early-promise in science or innovation (problem-solving, tinkering, building, making, etc.). While a formal education is helpful, it is not necessary. This is an equal opportunity programme with no prejudice towards gender, race region, or type of education (or not!). We encourage diversity for optimal interaction and learning experience.

Participants must fill out an online form available through <http://www.pif.org.pk/stem-school> to register their interest. The application form requires basic contact and academic information AND a couple of essay type questions. Participants must answer each essay question diligently, to the best of their ability, and within the space allotted to each question.

Participants must be between ages 14 and 17 at the time of application. These would usually be somewhere between 9th and 12th Grade or O1 and A1 levels. An exception of +/- 1 yr may be possible under exceptional circumstances based on exceptional circumstances.

Candidates may attempt the essay questions in English or Urdu (Urdu Answers need be typed in script or scanned and uploaded as additional file). Students must ensure that they themselves, and not a teacher or supervisor, answers the essay questions as they shall be quizzed about them during the interview process. Short-listed candidates shall be invited for in-person interviews in late-November in 4 major cities across the country where they may be questioned about their knowledge but, more importantly, regarding their interest in science, technology, and innovation.

Students who have demonstrated a level of accomplishment (for example, by being part of International Maths and Science Olympiads, being a Grand Winner of Intel ISEF, a Winner of Burraq Space Camp, Distinctions in O/A levels or among the top-10 in one of Boards Boards of Education in Pakistan) should disclose these in their Essays or other questions.

Eligible candidates shall be invited to undergo an online test and short-listed candidates shall be invited for an in-person interview to select the best the brightest for this opportunity. Accepted candidates shall be made admission offer during the first week of December. A Wait-List of potential candidates may also be maintained and these shall be notified by December 15, 2017 should an accepted candidate fail to deposit boarding and lodging costs with LUMS or choose to withdraw altogether.

Admissions made during a particular year cannot be deferred to a future year.

Pakistan Innovation Foundation reserves the right to deny admission or withdraw an offer at any-time without assigning any reason. Participants who are unable to follow the prescribed code of conduct (such as on completion of assignments, demonstrating seriousness and a willingness to learn, punctuality, and maintaining good and cordial relations with other participants, etc.) at the STEM School may be warned, disciplined, or expelled with no fault of PIF.



SOME KEY DATES TO REMEMBER

Register by
October 31, 2017
at <http://www.pif.org.pk/register-stem-school>



Online Test between Nov 5-10th, 2017
Interviews between Nov 20 and Dec 5th, 2017



Admission Results Announced by
December 15, 2017



Deposits Programme Fee by
December 20, 2017)



Wait-List Candidates Notified by
December 22, 2017



STEM School Dates:
December 27, 2017 – January 5, 2018



More information:
<http://www.pif.org.pk/stem-school>



write to us at:
info@pif.org.pk



call us at:
051-8443223 and 8443224



FEES AND CONDITIONS

Pakistan Innovation Foundation is a non-profit organisation and neither it, nor any of its partners, make any profits from the National STEM School.

Programme Fee:

PKR 25,000 for the 10 day programme (Pakistan-based)
US\$ 500 for the 10 day programme (Expats/Foreign)

The fee covers the student's living expenses at LUMS for 11-12 days (PKR 1300-1500 /day) which includes shared accommodation and meals, etc. as well as partially covers certain programme overheads. However, students are responsible for their own travel from the place of residence to Lahore and back. Fee, once submitted, is non-refundable.

Financial Aid/Support:

No student shall be denied admission for not having financial resources to pay for the programme. PIF shall seek to provide need-based financial support for local (Pakistan-based) students through external sponsors or its own resources. If you request financial support, your guardian shall be contacted to provide further financial information to see if you qualify for support.

Other Considerations:

We anticipate shared accommodation (separated by Gender) to be available at LUMS Hostels. We also adhere to a strict disciplinary and ethics criteria while at residence in LUMS and all students are required to follow it.

All students must also reside at LUMS. There shall be no exceptions and no day-scholars are allowed to minimise programme disruptions.

Students doing Computer Science Track must bring laptops with them. Students looking to take up Physics Track must bring smart phones. All students are allowed to bring mobile phones with them, though their usage may be restricted during the programme. Students shall be solely responsible for ensuring the safety of their belongings and valuables.