

# SCIENTIA SPECTRUM



Exploring the Marvels of Science: Where Knowledge Ignites Possibilities!



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# CONTRIBUTORS

## Editor-in-Chief:

*Hassaan Moazam*

## Design Head:

*Hamza Zafar*

## Content Head:

*Hamna Salman*

## Content Team:

*Abeeha Ibrahim*

*Amina Raheel*

*Ahmad Hussain*

## Sponsorship Team:

*Arif Ullah*

*Ali Zaib*

*Wali ur Rehman*

## Publicity Team:

*Hajra Noor*

*Mahnoor Munawar*

*Fazal Ullah*

*Sohail Ashraf*

*Amna Pervez*

## Research Team:

*M. Momin Amer*

*Salman Sajid*

## Special Thanks:

*Prof. Dr. Shahid Rafique*

*UET SS Alumni*

*UET SS Ambassadors*

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# UET SCIENCE SOCIETY

University of Engineering and Technology, Lahore, established in 1921 is one of the oldest and most prestigious educational institute in Pakistan. With a legacy spanning a century, this Institute has cultivated generation upon generation of leading Engineers, Scientists and Leaders. Throughout the years, the number of departments, along with the research centers has increased, providing diversity in fields of engineering and enhanced quality in exploration and analysis. With the motto of "Read in the name of thy Lord Who creates", this Institution nourishes its students through academic excellence along with extra-curricular activities.

UET Science Society (UET SS) is a student-run organization founded by students of UET in 2014. UET Science Society aims to integrate the knowledge of Science and Technology among the students providing them a productive environment which enables them to express their inner talents. It has been UET Science Society's ultimate goal from the day of its foundation to bridge the gap between theoretical and practical approaches, introduce recent technologies and promote research. Through engaging activities, captivating discussions, hands-on experiments, inspiring talks by renowned experts, captivating workshops, fun-filled exercises and many interesting events - we create opportunities for a well-rounded approach to Scientific Exploration.

UET Science Society plays a vibrant and integral role within the academic landscape of both UET Lahore and UET KSK campuses. Boasting a distinguished reputation, the society has established connections with over 20 Ambassadors from various Universities, enriching its network and knowledge sharing capabilities. These Ambassadors, hailing from diverse academic backgrounds, contribute to the Society's mission of promoting interdisciplinary dialogue and exploration. Furthermore, the Science Society efficiently collaborates with Societies from multiple Universities, enhancing idea exchange and resource sharing. We're thrilled to share that our team members were recently featured in a documentary by BBC, highlighting both the promising future of science in Pakistan and the Chandrayan 3 Mission. This recognition underscores our dedication and significant contributions on both local and global scales.

## SCIENTIA SPECTRUM

The magazine "SCIENTIA SPECTRUM" is a captivating publication that encapsulates a vast range of scientific topics. This magazine is a panoramic array that offers a rich variety of topics spanning the entire spectrum of science. Whether you are a student, researcher or simply a science enthusiast, this magazine is for you to cater to your intellectual curiosity.

Welcome to a publication that doesn't just inform, but inspires a true testament to the beauty that science brings to our lives.



# OUR TEAM



*Prof. Dr. Muhammad Shahid Rafique*  
ADVISOR UET SCIENCE SOCIETY



*Hassaan Moazam*  
PRESIDENT



*Abeeha Ibrahim*  
VICE PRESIDENT



*Hamna Salman*  
GENERAL SECRETARY



*Hamza Zafar*  
PRESS SECRETARY



*Arif Ullah*  
FINANCE SECRETARY



*Zain Tariq*  
BOG



*Kashaf Jahangir*  
BOG



*Ahmed Cheema*  
HEAD KSK CHAPTER



*Momin Amer*  
DIRECTOR RNI



*Amina Raheel*  
DIRECTOR DOC.



*Hajra Noor*  
DIRECTOR PR



*Mahnoor Munawar*  
DIRECTOR HR



*Momna Khan*  
DIRECTOR DECOR



*Maryam Zahra*  
DIRECTOR DESIGN



*Zubair Saeed*  
DIRECTOR MEDIA



*Mahnoor Naem*  
DIRECTOR SPONSORSHIP



*Adeena Sajid*  
DIRECTOR ADMIN



*Syeda Famia*  
DIRECTOR LOGISTICS

# OUR AMBASSADORS



*Anas Mujahid*  
CHIEF AMBASSADOR  
UET SCIENCE SOCIETY



*Ishrah Minahil*  
COORDINATOR  
PUNJAB UNIVERSITY



*Hassaan Abid*  
COMSATS UNIVERSITY  
LAHORE CAMPUS



*Aima Maqbool*  
LAHORE COLLEGE  
FOR WOMEN



*Talal Hasan*  
UNIVERSITY OF VETERINARY  
& ANIMAL SCIENCES



*Saif ur Rehman*  
ISLAMIA UNIVERSITY  
BAHAWALPUR



*Ali Raza*  
ISLAMIA UNIVERSITY  
BAHAWALPUR



*Atta ul Mustafa*  
NUST  
ISLAMABAD



*Momina Ali*  
GCU  
LAHORE



*Usman Saad*  
NUST  
ISLAMABAD



*M Husnain*  
NUST  
ISLAMABAD



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UMT  
LAHORE



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UNIVERSITY OF  
HARIPUR



# OUR EVENTS

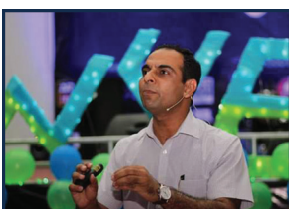
## STEM:

An event in which students from across Pakistan are invited to showcase their Science Projects and Industrialists are invited as Judges. A platform to present their STEM knowledge through mind-blowing experiments, ingenious gadgets, and effectual projects.



## SNYES:

An acronym for Summit of National Youth, Entrepreneurs, & Scientists. An all-encompassing event for students to learn from Speakers from different fields including Professors, Influencers, Activists and Industrialists, who are invited to give insights into the real world.





## PSI MEET:

It's an event that encourage students to apply scientific laws practically in fun-filled modules i.e. Tall of the Tallest (create the tallest stable structure), Science Kasoti (a test of scientific knowledge in a quiz-like manner) and Sci-tee (painting T-shirt with a scientific theme).



## OUTREACH:

This program falls within community service, involving visits to various government colleges and engaging them in some experiments. The intention is to fill the gap between theory & practical.



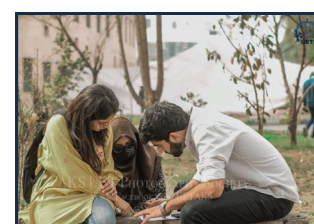
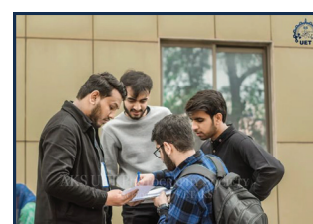
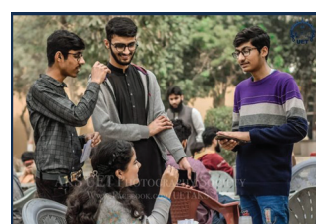
## PROJECT BREATHE:

An event organized to raise awareness about the importance of tree plantation for mitigating climate change and uphold a cleaner environment. A project in which students plant saplings in their localities aiming to give back to the environment and to promote sustainability.



## SCAVENGER HUNT:

A majestic blend of adventure and brainy tasks. Clues are given that lead to exciting tasks, students work in teams and locate the clues that have been scattered around them to discern.





## SOTM:

Scientist of the Month (SOTM) aims to find the brilliant minds of STEM . Having 2 rounds, Buzzer round and Jeopardy round, participants showcase their knowledge and problem-solving skills.



## DEBATES & WORKSHOPS:

Workshops & Debating competitions are organized to polish the skills of students in various fields and participants showcase their ability to construct coherent arguments and think critically.



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# ALUMNI INSIGHTS

Our Alumni with their incredible achievements and contributions to society, are a beacon of inspiration for us. We celebrate their successes and eagerly anticipate the continued strides they'll make in the years to come.

## HASEEB RAZA PRESIDENT (2019)

As the former president of UET Science Society, I'm immensely proud of the strides we've taken in fostering a community of curious minds. Together, we've explored the frontiers of knowledge, conducted experiments that sparked innovation, and forged friendships that will last a lifetime. Let's continue to inspire and be inspired, pushing the boundaries of what we know and igniting the passion for discovery in future generations. The future is bright, and science is our guiding light. Keep reaching for the stars!

## TALHA SAEED PRESIDENT (2021)

UET Science Society is the most precious and valuable memory of UET Lahore that I have with me. I have devoted my 4 years of university to this family. I have seen its ups and downs. Coming to my journey, I worked hard here in the Science Society but I partied more. But, the last year in this society is the biggest memory of UET. My fellow mates of 18 session were exceptional. They were more friends to me than a team. I tried to keep the environment of this society as positive and conducive as possible. [#OneloveSS](#)

## BAQAR HUSAINI PRESIDENT (2022)

Reflection on an incredible four year journey, from joining SS as a freshman to serving as the President. I am grateful for the remarkable experiences and memorable moments in UET Science Society. We organized innovative events and reaching new heights was only possible through the unwavering support of my Core Members. To the juniors who are carrying on our legacy, I urge them to aim high and strive for even greater achievements. I am thankful for the wonderful memories that I will cherish forever.

## SAAD GHOURI BOG (2021)

Science Society has given me the four most beautiful years of my life. Coming from an Architectural background it was difficult for me to adjust in this Society .But then I found such beautiful people here that I fell in love with it. From the Executive member of Team Design to the Board of Governor of Society ,I have many memories of PSI Meet 4.0 and 5.0 ,COVID Times, Induction of 19,20 and 21 sessions and the sittings of Q Canteen.In the end,I would wish the best of luck to the team for their Future Endeavour .  
[#OneloveSS](#)

**FAIZA** GENERAL SECRETARY (2021)

My time at UET was enriched by the vibrant community and countless memories. UET Science society has provided me with many learning opportunities. Fond memories of engaging events and collaborative projects still resonate with me. I fostered lifelong friendships here and I am really grateful for my time here. I can vividly recollect the incredible journey that shaped not only my academic years but also my personal growth. UET Science Society, a vibrant and dynamic community of like-minded individuals, served as a cornerstone in my university life.

**EHMAD SAEED** PRESS SECRETARY (2021)

As member of the UET Science Society, I embarked on a thrilling journey that blended innovation and collaboration seamlessly. During my tenure as Press Secretary – UETSS gave me the privilege of shaping impactful narratives. From crafting captivating visual designs to orchestrating media campaigns, each moment was an opportunity. I'm excited to encapsulate this exhilarating journey, sharing the challenges we conquered, the joyous birthdays we celebrated together, and the invaluable lessons that continue to inspire me and those around me.

**SALMAN AMJAD** V. PRESIDENT (2022)

I wish I could go back in time to relive and cherish those moments of happiness, laughter, turmoil before an event, post-event celebrations, sweet and sour friendships, loads of conversation, 3 am phone calls, teasing and 8 am meetings. Those 4 years were not a piece of cake, whose survival wouldn't have been possible without an inclusive environment. I still miss my team, my people and my society. [#BlueArmy](#)

**HAADIA AAMIR** BOG (2022)

My journey with the UET Science Society has been an exhilarating and enriching experience, from joining as a documentation team member to becoming one of the core members. I have acquired valuable skills and life lessons, made new friendships, and created lasting memories. Being a part of this society made my final year memorable, from planning events to post-event gossip, it's safe to say, that my university journey wouldn't have been complete without these unforgettable moments.

Thank you for the unforgettable memories.

**AREEBA** GENERAL SECRETARY (2022)

A great sense of appreciation and nostalgia envelopes me as I reflect on the amazing 4 year experience that was the UET Science Society. These years have been a period of tremendous growth, friendships and unforgettable memories. From member to General Secretary, I have learned a lot along the way. The hustle of arranging the events, late night planning sessions, memorable meetings and experiences I shared with my fellows and juniors will always hold a special place in my heart.

**M. ISHFAQ** BOG (2022)

Got to know about UET SS from Mudassir Bhai from the 16th session. I joined SS as a general member, and after that, as a co-director. we did our best to revive society after the pandemic by organizing events and Science Days. I learned a lot from Saad bhai, Talha bhai, Faiza api, and Arbaz bhai. As BOG proposed to start a new event during the summer vacation called "Plant Drive." I often told Salman, "YARRR!! Mujhy society ni left krni chahiye thi". UET SS will always stay close to my heart ❤️

**ZAIN** PRESS SECRETARY (2022)

During my tenure as Press Secretary at UET Science Society, I had the privilege of leading three dynamic teams: Decor, Media, and Design. Collaboratively, we transformed ideas into captivating realities. The Team Decor added vibrant hues to our events, establishing the ideal atmosphere. The Team Media diligently handled tasks including post curation, sharing, and enlightening science fact dissemination, while the Design team ingeniously brought concepts to life visually. Together, we painted a memorable and inspiring canvas of innovation and creativity.

**ABDUL REHMAN** FINANCE SECRETARY (2022)

As Finance Secretary of the UET Science Society, it was an incredible journey. We achieved great success together, organized memorable events, and made lifelong memories. I am proud of the financial transparency and accountability that we maintained throughout. I am confident that the UET Science Society will continue to thrive and make a positive impact in our community. I miss my team, my people, and my Society ! Thank you for the wonderful memories.  
Best of Luck Team SS !

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# COLLABORATORS

## UET TRIBUNE:

UET Tribune is the largest and official media network of UET. It works to promote student talent through a variety of extracurricular activities. UET Tribune is proud to be UET's most diverse society, with fields spanning from photography to content writing to web development and much more. But the primary goal is to develop its members into multi-talented individuals with diverse technical and non-technical skills.



## ASME:

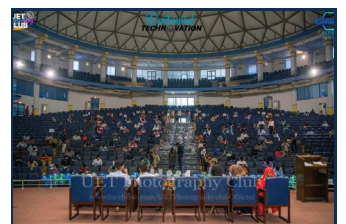
ASME UET Lahore is one of the most prestigious and dynamic section of ASME International and was established in 2006. This society enrolls students from different departments, helps to enhance their hidden abilities and make a family among them.

ASME UET Lahore every year organizes many helpful platforms for students to find out their hidden talents and take them in front of the world. Some of the main events organized by ASME UET Lahore are Tech Fest, Technical Workshops and many helpful platforms. There are two domains in society, Technical and Non-technical.



## ASHRAE:

ASHRAE UET Lahore cultivates innovation, knowledge sharing, and skill development in academia. Leveraging technical events and a diverse student body, it empowers engineering students to excel professionally. Recent events like the "Problem-solving and Creativity Webinar" and industrial tours provide invaluable insights into real-world challenges. "Industrial Mindfest" offers industry-oriented mock tests. ASHRAE UET Lahore's commitment extends to the "ASHRAE Learning Portal", where students gain proficiency in engineering related softwares. The chapter also organizes visits from US university representatives, guiding students on postgraduate studies. The annual "Meraki" event embodies the spirit of compassion by visiting an orphanage.



## ENVIRONMENTAL PROTECTION SOCIETY UET:

Environment Protection Society has debuted as a scientific organization only in 2022, but has quickly made a name for itself. First established as a university based social services society in 2020, comprising of students from the Institute of Environmental Engineering and Research, it was later changed into a departmental society that is focused on creating awareness for the welfare of the planet and fostering a space where members have creative freedom to propose sustainable solutions to environmental problems. It has held many workshops, guest talks from people working in the field and participated in inter and intra university competitions.



## ENVIRONMENTAL PROTECTION SOCIETY UCP:

The University of Central Punjab's Environmental Protection Society aims to foster eco-consciousness among students, raising awareness about pressing environmental issues and their solutions. Through workshops, seminars and activities, the society educate its members about sustainable practices, waste reduction and conservation efforts. It provides a platform for students to collaborate on environmental friendly projects, promoting greener living both on campus and in the community. By cultivating a sense of responsibility towards the environment, society empowers individuals to become advocates for positive change, contributing to a sustainable and harmonious future.



## AUTOMOTIVE CLUB:

Automotive Club is one of the technical societies of UET Lahore. Automotive Club has been working with one motive, and that is to make students of UET Lahore technically strong and skillful. It aims to provide a platform where all automobile enthusiasts can come together to share their passion, knowledge and experiences. For this purpose, Automotive Club has held many events including, a seminar on study visas and skilled recognized visas. The purpose of this seminar was to educate students about the various study visas & available skilled recognized visas opportunities, enabling them to make well-informed decisions regarding their education & future career prospects.



## UET MUN:

UET MUN Society is a dynamic student-led organization, that focuses on molding the next generation of diplomatic leaders. With its striking red logo symbolizing passion and action, UETMUN is a beacon of opportunity for young delegates. Through rigorous training and engaging Model United Nations simulations, we empower students to develop crucial negotiation, research, and public speaking skills. Our mission is to foster global awareness, encourage diplomacy, and inspire change. Over the years, we have built a vibrant community, where we challenge perspectives, build bridges, and prepare tomorrow's leaders to address the world's most pressing issues.





## SOCIETY OF AUTOMOTIVE ENGINEERING:

The idea to establish SAE-UET was proposed in 2019 by the students of B.Sc. Automotive Engineering UET Lahore (Session-2018) and founded by Ahmad Hassan (Founding President, SAE-UET) from pioneer session of B.Sc. Automotive Engineering, UET Lahore. As the official society of the Automotive Engineering Centre, SAE UET represents all UET Lahore students and works on enhancing their professional and technical skills. The purpose of SAE-UET is to provide opportunities for the students of UET to gain broader insight into professional engineering by organizing events, arranging field trips to industrial sectors and sponsoring engineering projects.



## COMSATS LITERARY SOCIETY:

Comsats Literary Society is a student-led organization that is dedicated to helping students improve their communication skills and conquer their fear of public speaking. Through various initiatives, such as debates & critical thinking sessions, CLS provides a platform for students to enhance their abilities in these areas and is known for its successful participation in competitions at LUMS. CLS also promotes literature by organizing literary competitions. Furthermore, CLS aims to foster cultural inclusivity by hosting one of the largest cultural events in the city named "LOK VIRSA". Also, we aim to increase religious awareness through competitions focused on Naat and Qiraat.



## ITE UET:

ITE UET stands as the pioneering international student chapter of ITE Pakistan, affiliated with ITE International & UET. Approved by ITE International USA on Nov 09, 2015, within a year, it amassed a membership exceeding 1000. Encompassing B.Sc., M.Sc., Ph.D. students, and industry professionals. ITE UET provides a robust platform for cultivating technical skills, professionalism, and intellectual prowess. Encouraging research, planning and transportation project design, it serves as a crucible for professional advancement. Moreover, it fosters interactions between students and industry experts, culminating in the enrichment of knowledge and social skills.



## ACM KSK:

ACM UET New Campus, a vibrant hub of innovation, collaboration and growth. Our mission is to ignite a passion for technology in students and empower them to become future leaders and change-makers. With a vision to cultivate an ecosystem of creativity and excellence, we are dedicated to providing cutting-edge education, organizing events and workshops, and fostering industry connections. Since our inception in 2020, we have embarked on numerous impactful activities and projects. From hosting hackathons that sparked groundbreaking solutions to organizing tech talks, we have continuously pushed boundaries and created opportunities for growth.



## ICE UET:

Institute of Civil Engineers (ICE) UET Lahore, established in 2012, is affiliated with ICE UK. ICE offers curricular, extra-curricular all sorts of events and provides a great learning platform to students. CIVCON(-Civil Conference) is the signature event of ICE. Apart from that, ICE UET Lahore ventures further into conducting workshops, seminars and conferences related to the field of civil engineering and the latest technologies. Recently a workshop on ETABS have been conducted. 16th International Conference on Geotechnical Engineering, another milestone, in which various eminent national and international geotechnical experts presented their research papers.



## IEEE:

The IEEE Student Branch at the University of Engineering and Technology, Lahore was established in 1982. With the support of both; the technical and non-technical chapters, IEEE UET Lahore is committed to providing excellent opportunities for professional development for the students of UET Lahore by regularly arranging a variety of technical activities and workshops, including seminars, talks, competitions, and training programs to help students in their professional growth. The success of recently held events such as "Ed-hack" and "Summit on Soft Skills" has garnered much attention, a testament to the dedication, expertise and collaborative spirit of the society.



## SOMAME:

Holding the mission statement, "SOMAME UET is an initiative to connect all the Metallurgical & Material Engineers on a single platform". Since the foundation in 2018 set by one of its alumni, Naveed Ali, the five years of excellence have been proved by arranging various departmental and inter-university competitions under the banner of MetaComp, Metalympics, Autumn Fest, Seminars and many more. With support, mentorship, and resources, this door will nurture cutting-edge concepts, propelling the growth of exceptional minds and providing a transformative journey for fellows to explore boundless possibilities and ignite their innovative potential.



## X NEWS UET:

Established in 2010, UET X News stands as the pioneering media society at the University. As the authentic source of information, it offers vital admission insights, guidelines and noteworthy news updates. Hosting insightful educational seminars, the platform cultivates knowledge. Engaging podcasts showcase UET's influencers, while capturing major events such as the Career Fair and Convocation cements its importance. A historical repository, X News chronicles the university's journey. Through photo coverage, it immortalizes UET's diverse events and locales. Bolstered by a dedicated team of editors, designers, photographers, hosts, and writers, UET XNews thrives as the heartbeat of campus information dissemination.





# SCIENCE RHYMES

## THE ENGINEER

*By Stephanie Calmenson*

Listen up and you will hear  
Why I am called an engineer.

I solve. I build. I invent.  
I'd say my time is very well spent.

Want a bridge? I'll design it for you.  
Want a new kind of wheel? I'll develop  
that, too.

I use computers, I use my brain.  
I think and test till the answer is plain.

Want a robot, a rocket, an electronic device?  
I'll take the assignment; I won't think twice.

I'll make running shoes that will send  
you soaring!  
I'll develop a device that will keep you  
from snoring!

My life is all about invention,  
Making the world work better is my intention.

## SCIENTIFIC INQUIRY

*By : Susan BlackBay*

Scientists are like explorers,  
using what they know and see  
to blaze a trail that, step by step, will lead to  
new discoveries:

Formulate, distill and focus,  
narrow down, define the gist,  
determine scope and pinpoint locus  
this is your hypothesis.

Gather all the stuff you need,  
to put in play the machinations  
Document the happenings  
these comprise your observations.

What things change and what things stick?  
Record the outcomes and effects.  
Don't presume and don't predict  
collect the data: just the facts.

Combine the concrete things you see  
with what you know and trials you test.  
Interpretation is the key  
results are where you end the quest.

## SYMMETRY

Physics' beauty burning bright  
in mans' search for natures might  
at its core, simplicity  
framed by beautiful symmetry

Whenever natures hand does seize  
an object; moving it with ease  
then - with opposite, symmetrical  
tackthe  
object seizes nature back

The fundamental particles  
no random collection of articles  
each does sit in its place in a family tree  
grown in deep mathematical symmetry

At the core of physics; the decree  
of conservation of energy  
is forever entangled intimately  
with a strict and time-wise symmetry.

Seeking not the joy of art  
but the natures' working chart  
dusty eye may shed a tear  
as man's vision becomes clear.

## NEWTON LAWS

*By Carolyn Colley*

*Sir Isaac Newton was his name,  
Observing objects was his game.*

*He made three rules about what he saw,  
When we see motion, it's described  
by the law.*

*The first law of motion is just a  
piece of cake,  
To make an object move, all it  
needs is a shake.*

*The second law of motion is about  
a force,  
Give it a shove and the object  
takes that course.*

*The third law of motion is pure  
satisfaction,  
For each force made there's an  
equal and opposite reaction.*

*Pushing or pulling, exerting a force  
Moving and shaking, its physics, of course!*



# REVIEWS & ARTICLES

## IS MARS HABITABLE?

BY ALUMNI UET SCIENCE SOCIETY



Mars is the most habitable planet in our Solar System besides Earth. But it remains a hostile world for many kinds of life. A system for creating small islands of habitability would allow us to transform Mars in a controlled and scalable way. People have long dreamed of reshaping the Martian climate to make it livable for humans. Unlike Earth's polar ice caps, which are made of frozen water, polar ice caps on Mars are a combination of water ice and frozen CO<sub>2</sub>. Like its gaseous form, frozen CO<sub>2</sub> allows sunlight to penetrate while trapping heat. In the summer, this solid-state greenhouse effect creates pockets of warming under the ice.

The Martian surface was eminently habitable in the ancient past, featuring lakes, rivers, and even a huge ocean. But things changed dramatically after the planet lost its global magnetic field about 4 billion years ago. Charged particles from the sun began stripping away Mars' once-thick atmosphere, eventually reducing it to a thin sliver that cannot keep much heat in or UV radiation out. The surface became extremely cold and dry as a result, leaving subterranean aquifers as perhaps the only potential abodes for Earth-like life.

Many discussions about making the Martian surface more hospitable focus on restoring that atmosphere to

its former glory beefing it up by vaporizing huge amounts of water ice and frozen carbon dioxide, for example. But such "terraforming" efforts would be extremely difficult, expensive and time-consuming. The researchers landed on silica aerogel, one of the most insulating materials ever created.

"Silica aerogels are 97 percent porous, meaning that light moves through the material but the interconnecting nanolayers of silicon dioxide infrared radiation and greatly slow the conduction of heat. These aerogels are used in several engineering applications today, including NASA's Mars Exploration Rovers." Using modeling and experiments that mimicked the Martian surface, the researchers demonstrated that a thin layer of this material increased average temperatures of mid-latitudes on Mars to Earth like temperatures. While working on this material, Wordsworth said: "Spreading it over a larger area would make the solid-state greenhouse effect more efficient, as the proportional amount of heat emitted from the sides would be less, but you could still get substantial warming in a greenhouse".

There are also significant ethical considerations. For example, is it right for humanity to take Earth organisms to another planet, especially one that may have had its biosphere in the past and may even have one today? But researchers and mission planners have been debating such planetary-protection issues for years. And the conversation is only going to get more heated as the quest to put astronauts, and their trillions of hitchhiking microbes, on the Martian surface edges from sci-fi dream to reality.



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# UNIVERSAL UNIFIED THEORY

M. RAZA JET SCIENCE SOCIETY



Einstein is one of the most well-known physicists of his time and whole era. His famous works include Relativistic Mechanics and explanation of Photoelectric Effect. However, his one of the most fascinating and revolutionizing works include his Unified Field Theory. In this Theory, he theoretically unified Gravity with electromagnetism. It means he theoretically unified three basic force fields of nature i.e. Gravitational, Electric, Magnetic fields.

It has been a legacy since ages to develop a single theory of everything. From ancient civilizations to modern cultures, there have been some major contributions to this supreme goal. Some modern theories includes relativity, Quantum Mechanics, String Theory, Standard model of particle physics, Loop quantum gravity and M-Theory.

Unified Field Theory was a lifelong pursuit of Albert Einstein in which he wanted to develop a single, coherent, unified framework describing all basic force fields i.e. Gravitational, Electric, Magnetic, Strong & Weak Nuclear Force Fields. However, he was focused primarily to unify pre unified Electromagnetic field with Gravitational field. Unfortunately, he did not succeeded in extending his spacetime curvature concept of gravity to include other basic force fields. But it contributed to further understanding of many much important concepts. His idea was to unify force fields theoretically by geometrical interpretation of curvatures and the mathematical model was based on different force field constants and multidimensional tensors.

The most complex part in way of this goal was that gravitational field, unlike other fields is more complex to be unified with others due to several factors:

- Our Modern Concept of Gravity is based on Relativistic Mechanics which uses a classical approach, while all other fields are described by Quantum Mechanics.

- Gravity is Weaker than other fundamental forces, making it difficult to observe and test hypothesis at small scale. This is also the reason for not having accurate Quantum model of Gravity
- Gravity does not have Gauge Symmetry, which is a factor determining the extent of unification of a force field with others.

There have been several attempts to unify gravity with other force fields by seeking results from other Modern Theories. Like, String Theory is predicted to be modeled for study of Hypothetical gravitational particle Graviton if tension in basic string is about  $10^{39}$  Tons.

It is interesting that Einstein's work was a major contribution in Quantum Mechanics development and he refused to accept this field as it did not seem logical to him. Now we are facing difficulties and complexities in Unification of Gravity as it is based on his classical relativistic approach.

In viewpoint of Stephen Hawking, Einstein's Effort in this regard was not very fruitful as our understanding of universe was not that much advanced and little was known about Nuclear Forces. According to Hawking there are few possibilities in our quest for this unified theory:

- There really is a unified theory and we will get it if we are smart enough.
- There is no such theory and universe is working on infinitely many partial theories.

In either of the possible results, this quest is more important to be continued to unveil more about this universe. Also, we must not be overconfident as in the past many scientists thought their work to be the last fact of science to unveil and they are always proven wrong. We may not be there just yet of understanding how this Universe is working and there are many questions to be answered but, continuation of this legacy is what will lead us to our ultimate goal:

***Universal Unified Theory of all fundamental force fields and Theory of Everything***



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# NO PLAN "B"

CLIMATE EMERGENCY



Climate Change 2023 Synthesis Report by United Nations reiterates that humans are responsible for all global heating over the past 200 years leading to a current temperature rise of 1.1°C above pre-industrial levels, which has led to more frequent and hazardous weather events that have caused increasing destruction to people and the planet. The UN Chief spoke on the global average temperature this July, which was confirmed to be the highest on record and likely for at least 120,000 years. July also had the highest-ever ocean surface temperatures.

Climate change is more than a great threat with the danger of humanity's worst challenges like health, poverty, and hunger. The 17 SDGs are specified in the 2030 Agenda for Sustainable Development. In this era, when planet Earth is facing drastic changes in climate, the 2030 Agenda stands to transform the world. Its goals and targets are to change action in next 15 years in the following areas:

- People
- Planet
- Prosperity
- Peace
- Partnership

In addition to the 2030 agenda, another important step towards a healthier environment is the Paris Agreement. Both of them share the purpose of creating a more productive and resilient environment.- Global warming can still be controlled but to reach a "net-zero" around 2050, we need to reduce the Earth's temperature by 1.5° C annually by controlling the land, energy, industry, buildings, transport, and cities. The Paris Agreement aims at reducing the temperature globally and is effectively adopted by many countries in a short time. At COP26, countries adopted the Glasgow Climate Pact, which calls for a doubling of finance to support developing countries in adapting to the impacts of climate change.

## What can we do?

There are many ways to adapt to what is happening and what will happen. Individuals can take some simple measures. You can plant or preserve trees around your home, for instance, to keep temperatures cooler inside.

Given the scale of climate change and the fact that it will affect many areas of life, adaptation also needs to take place on a greater scale. Our economies and societies as a whole need to become more resilient to climate impacts. This will require large-scale efforts, many of which will be orchestrated by Governments.

The climate emergency is a direct consequence of our carbon-heavy land-use and agriculture, transport, buildings and industrial processes and our polluting energy sources. Without profound changes to these sectors and a drastic cut to our carbon footprint, there is little hope to protect the planet from the worst effects of a warmer world. At the same time, *"if everybody shifts a little, there is room for all"*. Each one of us can shift a little: how we consume, how much we waste, what we eat and what sort of transport we use and make room for everyone to benefit from a clean, safe and cool environment.

**Only One Earth**



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# FUTURE OF GREEN ENERGY

HAMNA SALMAN UET SCIENCE SOCIETY



What if we run out of electricity one day? What if we are no longer able to access any of smart gadgets? These questions are appalling enough to make every sane mind wander about how we are going to sustain power for our future. Considering present situations in Pakistan, more than 94.9% population has availability of electricity but no one can guarantee that they will continue to get it in future as well.

Best approach towards a sustainable future is to consider transitioning to alternative sources of power. In a world where the demand for energy is ever expanding and environmental concerns loom larger than ever, the significance of embracing renewable energy sources cannot be overstated.

Renewable energy sources are derived from naturally occurring and viable resources that are inexhaustible on human timescales. These sources are considered sustainable because they are naturally replenished and do not deplete over time as fossil fuels do. Renewable energy can play a very crucial role in addressing energy needs of modern time while reducing environmental impacts and the dependence on finite fossil fuel reserves. Awareness about renewable energy sources is both timely and important. Serious consideration of these inexhaustible energy sources will be very fruitful in near future. Renewable energies which can help mitigate impacts of climate change and reduce our dependence on non-renewable resources are solar energy, wind energy, hydro-electric energy, biomass energy, geothermal energy and tidal energy. These are clean, abundant and sustainable sources of energy.

Future of renewable energy sources is very promising since it's a global concern now, alternative means are now coming under serious consideration. Use of regenerative and eco-friendly means to generate energy can be very cost competitive. They can offer advancement in effective and smart storage of energy. Their common use on domestic and commercial level

can cause impactful decentralization of energy generation and reduces the reliance on transitional means of energy. These environment friendly sources, all together, can provide a great assistance in creating hybrid energy systems that are reliable, consistent and user friendly. They can have a subtle contribution towards increased trend of electric vehicles (EVs) which require clean electricity to operate. Considering its consequences for a longer period of time, it can expand gateways for foreign investments and advanced innovations in Pakistan. It can profoundly influence Government policy and international agreements which can undoubtedly lead towards better employment opportunities and economic growth. One of the biggest push factor to consider renewable resources is to accomplish carbon neutrality. Depleting environment, climate change and pollution underscore the demand to embrace these low impact energy sources.

While future of green energy holds substantial significance, challenges remain, including energy storage limitations, deprivation of experts, limited awareness among people and void of trend. However, with ongoing technological breakthroughs and global commitment to a cleaner and greener environment, it is anticipated that in future sustainable energy will be used effectively.



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# CYBER SECURITY

NAYAB MOAZAM ALUMNI UET SCIENCE SOCIETY



A few years ago, "Cyberspace" was just a term from science fiction used to describe a network of computers linked together. The term "Cyberspace" first appeared in fiction in the 1980s in the work of cyberpunk science fiction author William Gibson. Now, the technology has evolved so much that a huge chunk of data is stored in cyberspace. Cyberspace owes its expansion to the swift development of Information Technology. It has facilitated the people by making the information easily accessible. The use of this widespread, interconnected technology has become an integral part of the lives of today's generation. From communicating through messages, emails to online shopping, banking, transport, land records, defense system, and business, it has penetrated every aspect of our lives. According to Chip Morningstar and F. Randall Farmer, cyberspace is defined more by the social interactions involved rather than its technical implementation.

With the increased penetration of the internet and cyberspace in our lives, cybersecurity has become the biggest requisite in the world. It is often quoted that future wars will not be fought on land, water or air, like traditional wars; cyberspace will one day become the greatest theatre of warfare. The wars will be fought with one click of a mouse button. The protection of data from hackers, malware and viruses is the principal challenge of the modern era due to its complexity in politics, military, and technology. Growing cyber threats such as data theft, phishing scandals, and other cybercrimes demand that users should remain cautious about shielding data. Securing information from unauthorized access, threats and vulnerabilities via different operations and activities are included in cybersecurity. Serious monetary damage has been caused by these cybercrimes. According to a report cybercrime is estimated to cost the world \$10.5 trillion annually by 2025. Cybercrime costs make up a value worth 1% of the Global GDP. The damage inflicted by ransomware attacks was 57 times more destructive in 2021 than in 2015.

Today, computer security comprises mainly preventive measures, like firewalls or an exit procedure. The principle of least privilege provides each part of the software with limited access. In this way, even if an attacker gains access to that part of the software, he cannot enter the whole system. The intrusion detection system detects the ongoing attacks to the system and helps in the post forensic attacks. Many hardware protection mechanisms are also used for securing privacy breaches. Some organizations are turning to big data platforms, such as Apache Hadoop, to extend data accessibility and machine learning to detect advanced persistent threats.

But responding to all the security breaches is often very arduous. The attackers generally commit their actions through proxies and anonymous identities and cover their tracks after successful security breaches. The number of attempted attacks is so large that organizations cannot waste time in trailing every attacker. A large number of attacks are made by automated vulnerability scanners or malware. Analysis of the incident, its root cause and the organization's response with the intent of improving the incident response plan and future response efforts is a key component in cybersecurity.

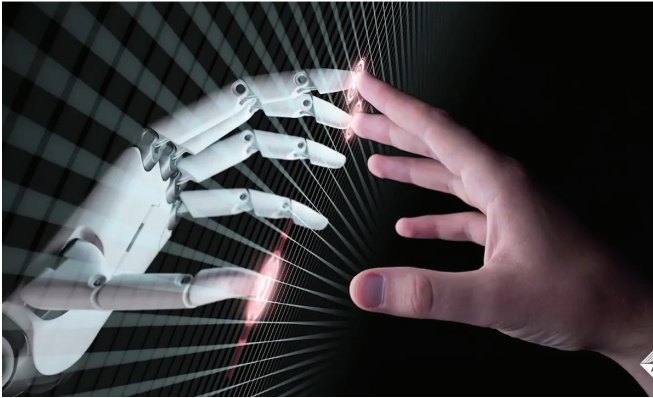
Thus, cybersecurity plays a key role in preventing some heinous and dangerous crimes like leakage of personal information, blackmailing, fraud transactions through another account and hacking of sensitive information of a country. It is essential to understand the different types of risks and vulnerabilities that exist in the Internet world. For every user, it is important to think before connecting to someone using an online medium. Users should also think before sharing any information with other users through the internet.



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# ELECTRONIC SKIN

BY UET SCIENCE SOCIETY



With the advancements and great achievement in field of robotics and AI on daily basis, Assistant professor Benjamin Tee and his team from the department of Materials Science and Engineering National University of Singapore (NUS) have achieved the new electronic skin system with ultra-high response and resistance to damage. Moreover, it can be paired with any kind of sensor skin layers to function as an electronic skin.

The team under Assistant professor Benjamin Tee spent one and half a year to develop a sensor system inspired by the human sensory nervous system that could potentially perform better. The nerve bundles in the human system transmit the signals, implementing such a technique using interlinked wiring systems that are already used in existing electronic skins, can increase the chances of damage and are difficult to extend.

“Humans use their sense of touch to accomplish almost every daily task, such as picking up a cup of coffee or making a handshake. Without it, we will even lose our sense of balance when walking. Similarly, robots need to have a sense of touch to interact better with humans, but robots today still cannot feel objects very well” said Assistant Professor Benjamin Tee while he explained his work as he has been struggling for the last ten years to give robots a better sense of touch.

He extended “The human sensory nervous system is extremely efficient, and it works all the time to the extent that we often take it for granted. It is also very robust to damage. Our sense of touch, for example, does not get effected when we get a cut. If we can mimic how our biological system works, and make it even better, we can bring about tremendous advancements in the field of robotics where electronic skins are predominantly applied.”

The present electronic skins use interconnecting sensors by current systems which is more likely to get damaged, on the other hand, ACES (Advance Computer Engineering Services) uses a common electrical conductor to connect various sensors operating independently.

This feature makes them less likely to damage. Assistant Professor Benjamin Tee’s team also developed self-repairing electronic skin by pairing ACES with a transparent self-healing sensor skin layer. This type of skin can be used in the prosthetic limbs to restore the sense of touch in disabled people.



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# FUTURE OF VR

BY UET SCIENCE SOCIETY



In today's world, modern technology is developing rapidly as a substitute for all the characteristics of life. The 21st century will be remembered for fast-paced technological development. The basic purpose of every technological advancement is the upward mobility of mankind. One such technology is virtual reality. It is a simulated experience identical to the real world. The primary subject of virtual reality is simulating the vision through computer-generated illusions. Unlike traditional user interfaces, VR places the user directly inside the virtual 3D world and simulates as many senses as possible, such as vision, hearing, and touch. VR uses similar sensors as the augmented reality and takes the user in a virtual world instead of creating virtual objects in the real world.

The idea of virtual reality was first portrayed in the 1930s when the first simulator was invented by the scientists to prepare the pilots by exposing them to an actual flight environment before being able to fly. The invention got improvement in 1965, when Ivan Sutherland, presented his theory of developing a portable virtual world using two tiny television sets, one meant for each eye. Scientists continued working on this idea until, in 1985, Michael McGreevy, from NASA introduced an improved version of virtual reality. It was light-weighted, using a motorcycle helmet with mini display screens. It was also provided with the special sensors which were used to detect movements with the help of sensitive computer technology. Finally, during 1986, the invention got its final touch when a programmer, Jaron Lanier, introduced a new glove for virtual reality. In this way, this technology took the modern form.

Virtual reality is taking our society by storm, invading almost every aspect of our lives. With some special equipment such as helmets and gloves, any person can engross himself in a virtual world where he can travel to the moon or learn how to fly a space shuttle. It is commonly used for entertainment such as video

gaming or 3D cinema. It is also helpful in psychology and social sciences since it helps in creating a simulated environment and can be used for curing anxiety disorders such as post-traumatic stress disorder (PTSD) and phobias. There are a wide variety of applications for virtual reality which include architecture, sports, entertainment, arts and medicine. To engross the users completely in a virtual environment, several effects and sensing elements are included. By using headphones, eye and head tracking by laser sensors, gyroscope and 3D sound effects, a complete virtual world is created that engages the users due to the convincing milieu.

Apart from all the attractions, it also has some dangers. It can cause several psychological issues such as addiction, brainwashing, effects of interactive violence and devaluing of the real world. Many people today live more in the virtual world than in the real world. This has made sociopaths out of some of them. They are so used to interacting with people in the virtual world that they no longer know how to interact with people in the real world. The major concern of some critics is that virtual reality will use us in the future by becoming too large for us to control. It may be used so frequently that humans will use the virtual world as a means of escape from the daily grind of their lives. Mychilo S. Cline argued in 2005 that through virtual reality, techniques will be developed to influence human behavior, interpersonal communication and cognition.

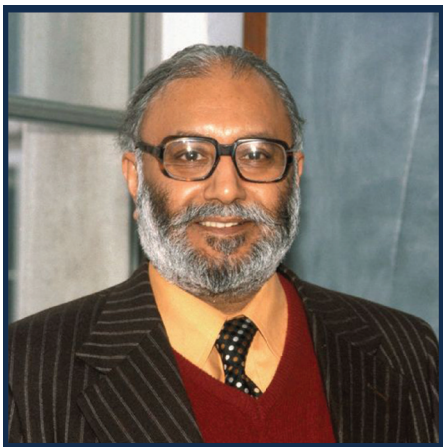
In the future, we'll see rapid advancements in creating a truly immersing digital experience through virtual reality. We can expect to see many more innovative uses for the technology, and perhaps a fundamental way in which we can communicate and work. Studies are being carried out to make further improvements in it, and we can predict its importance in the upcoming time due to its vast applications. This superb invention carries great elasticity in it and we can hope to get even better results that will bring great changes in almost every field.



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# SCIENCE LEGENDS

## DR ABDUS SALAM



Abdus Salam was a Pakistani theoretical physicist who made significant contributions to the development of Quantum field theory and Electroweak theory. He was awarded the Nobel Prize in Physics in 1979, along with Sheldon Glashow and Steven Weinberg, for their work on Electroweak unification. He also founded the International Centre for Theoretical Physics (ICTP), which is a research institute dedicated to promoting physics research in developing countries. Dr. Abdus Salam made several contributions towards SUPARCO, the Space and Upper Atmosphere Research Commission of Pakistan. He was the founding director of SUPARCO in 1961. He helped to establish the Theoretical Physics Group (TPG) at SUPARCO, which is responsible

for developing and conducting research in theoretical physics. He secured funding from the United States government for SUPARCO's early projects. He inspired and mentored many young physicists who went on to work at SUPARCO.

## TASNEEM ZAHRA HUSSAIN



Tasneem Zehra Hussain is a Pakistani theoretical physicist who is known for her work on string theory. She is the first Pakistani woman to have received a PhD in physics. Her research has focused on the classification of supersymmetric flux backgrounds in 11 dimensions. She has developed a series of animated presentations that make basic theoretical physics accessible to high school students. She has helped train Pakistan's physics team to the International Physics Olympiad. She is a trustee and board of directors of the Alif Laila Book Bus Society, a non-profit educational institution catering primarily to underprivileged children. She has designed Pakistan's logo for the World Year of Physics (WYP) and was an active participant in

the WYP Physics Stories project, led by Argonne National Laboratory of the United States. Tasneem Zehra Hussain is a role model for young women in Pakistan and around the world. She is an inspiration to many who are working to promote science & education in their communities.



## GRACE HOPPER



Hopper was a pioneer in the field of computer programming. She also coined the term "bug" to refer to a problem in a computer program. Hopper's work was based on her studies of the Mark I computer, which was one of the first electronic computers. She developed a system for translating mathematical formulas into code that could be understood by the Mark I computer. This system was the first compiler, and it made it much easier to program computers. Hopper's work has had a major impact on the development of computer programming. It has made it possible to write programs that are more complex and efficient, and it has also made it possible for more people to learn how to program.

## DOROTHY HODGKIN



Hodgkin was the first person to determine the structure of a protein using X-ray crystallography. She was awarded the Nobel Prize in Chemistry in 1964 for her work. Hodgkin's work was based on her studies of the X-ray diffraction patterns of proteins. She was able to use these patterns to determine the positions of the atoms in the proteins. This was a major breakthrough, and it allowed scientists to study the structure and function of proteins in much more detail. Hodgkin's work has had a major impact on our understanding of biology. It has helped us to understand how proteins work, and it has also helped us to develop new drugs that target proteins.

## CHIEN SHIUNG WU



Wu made important contributions to the development of Nuclear Physics. She was the first woman to win the Wolf Prize in Physics, and she was also the first woman to be elected to the National Academy of Sciences. Wu's most famous experiment was conducted in 1956. She and her colleagues performed an experiment to test the Law of Conservation of parity. This law states that the laws of physics are the same for matter and anti-matter. Wu's experiment showed that this law is not always true. Her results were a major breakthrough in physics, and they helped to change our understanding of the Universe. Wu's work has had a major impact on our understanding of the Universe. It has led to the development of new theories of physics.



## ANTI SLEEP GLASSES

A 13-year-old student named Bisma Solangi from Karachi has gained recognition from NASA for her impressive achievements. She invented a special pair of glasses that can help prevent drivers from falling asleep while driving. These glasses aim to reduce accidents and promote road safety. NASA was impressed by her invention and invited her to their camp to further develop her skills and create more amazing devices.

Drowsy driving is a significant danger to drivers and others on the road, both in Pakistan and worldwide. According to the World Health Organization, a significant number of road traffic incidents are caused by fatigue-related accidents.

Inventors like Bisma play a crucial role in developing innovative solutions to address this issue. Their inventions have the potential to save many lives on the road.



## COLOR CHANGING CAR

BMW's I Vision Dee Concept Car changes colors in seconds. This CES concept car uses e-ink technology to switch between 32 body colors, while its windshield offers a view of "mixed reality".

The color-changing technology isn't paint; instead, it's kind of a combination of a wrap and a really advanced version of an e-reader screen. The wrap is super-thin, designed to adhere precisely to the dimensions of the fully electric SUV tasked with showcasing this technology, and cut with lasers to fit each body panel perfectly. According to BMW's announcement, the wrap "contains many millions of microcapsules, with a diameter equivalent to the thickness of a single human hair". Each capsule contains negatively charged white pigment and positively charged black pigment, apply electricity to switch the charge, and the pigments change places to change the car's color.





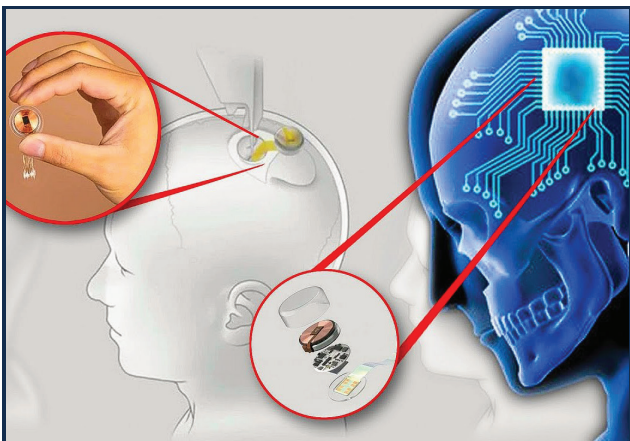
## NEURALINK - BRAIN CHIP

The Neuralink implant company wants to help restore vision and mobility to people by linking brains to computers. Elon Musk's brain-chip firm says it has received approval from the US Food and Drugs Administration (FDA) to conduct its first tests on humans.

Neuralink hopes to use its microchips to treat conditions such as paralysis and blindness and to help certain disabled people use computers and mobile technology. The chips which have been tested in monkeys are designed to interpret signals produced in the brain and relay information to devices via Bluetooth.

Experts have cautioned that Neuralink's brain implants will require extensive testing to overcome technical and ethical challenges if they are to become widely available. Mr Musk has also previously suggested that the proposed technology could help ease concerns about humans being displaced by AI.

The company has repeatedly overestimated the speed at which it can execute its plans. Its initial aim was to start planting chips in human brains in 2020, in order to honour a pledge made the year before. It later vowed to get started in 2022.



## DNA CLONING

DNA cloning is the process of making multiple copies of a particular segment of DNA. During this technique, the selected DNA fragment is inserted into a plasmid (the circular piece of DNA) using enzymes. Restriction enzymes and DNA ligase are used in the process.

The restriction enzymes are used to cut the DNA fragments at specific sequences and DNA ligase enzymes are used to join the nicks. The recombinant DNA thus produced is introduced into bacteria. These bacteria reproduce and produce an exact copy of the plasmid. These copies are known as clones.

The DNA molecules produced through the cloning techniques are used for many purposes, which include:

- DNA cloning can be used to make proteins such as insulin with biomedical techniques.
- It is used to develop recombinant versions of the non-functional gene to understand the functioning of the normal gene. This is applied in gene therapies also.
- It helps to analyze the effect of mutation on a particular gene.





## ABOUT US

Alkhidmat Foundation Pakistan was established in 1990 by a group of like-minded individuals who were inspired by the teachings of Islam and its emphasis on helping the poor, needy and vulnerable members of society. The organization was formally registered as a non-profit in 1993 and since then has been providing relief and development services to the most deprived and marginalized communities in Pakistan.

The idea behind the establishment of Alkhidmat was to create an organization that could operate on a national scale and provide humanitarian assistance to the most vulnerable and needy segments of society. The organization has been successful in achieving this goal, and today, it operates in all four provinces of Pakistan.

Alkhidmat Foundation Pakistan works as a non-profit, non-political and autonomous humanitarian organization to deal with real-life problems, emergency situations and humanitarian assistance.

## OUR MISSION

Alkhidmat Foundation Pakistan is a non-political, non-governmental and non-profit organization, which is committed to serving humanity especially vulnerable and orphans without any kind of discrimination to contribute to their well-being of health, education, financial sustainability, livelihood, shelter, availability of clean water, mosques, savage of disaster and other aspects of life and for the welfare of its employees by means of resource mobilization and developing a partnership with NGOs, other concerned public & private organizations, supporting, engaging in and during useful programs and doing all such acts, deeds & things required to achieve above with integrity.

***“SERVICE TO HUMANITY WITH INTEGRITY”***



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## EDUCATION PROGRAM

Undeniably, the role of education in transforming the lives of people is crucially important. Our current literacy rate is 56 percent which means that half of our country is illiterate. An estimated 22 million children majority of them girls are not going to school. Alkhidmat Foundation believes that every child deserves to be better educated, nourished, and groomed. Alkhidmat Foundation in accordance with its resources is contributing to the future of young students. With our Alfalah Scholarship Program, we are catering to the needs of brilliant but needy students at school, college, and university levels. Moreover, our Child Protection Centers, Skills Development Centers in collaboration with Child Protection and Rehabilitation Trust (CPRT) are preparing out-of-school children to take interest in their studies and get back to school.

EMPOWER. TRANSFORM. THRIVE.  
**BANO QABIL**

APNI DUNYA AP PAIDA KAR

UNLEASH YOUR POTENTIAL!

FOR FREE  
**IT TRAINING**

**REGISTER NOW!**





## OTHER SERVICES

Disaster Management

Agosh Home

Health Services

Clean Water Program

Orphan Care Program

Community Service



الخدمت فاؤنڈیشن پاکستان  
ALKHIDMAT FOUNDATION PAKISTAN

کفالتِ یتیم سے ...  
جنت کا حصول بھی ... رفاقتِ رسول ﷺ بھی



# زندگی کو پھر سے مسکرانا ہے

دس ارب روپے کی امدادی سرگرمیوں کے بعد تعمیر وطن پروگرام کے تحت سیلاب متاثرہ علاقوں میں یتیم بچوں کی کفالت جاری ہے۔  
جبکہ ملک بھر میں بیس ہزار سے زائد یتیم اور بے سہارا بچے پہلے ہی کفالتِ یتیمی پروگرام کا حصہ ہیں۔

Having done PKR 10 billion relief activities, orphans are being sponsored in flood affected areas under the Tameer-e-Watan Program.  
Currently, over 20,000 orphans and helpless children are registered under Alkhidmat Orphan Care Program.

## CLOSING THOUGHTS

*UET Science Society extends heartfelt appreciation to all Contributors, Collaborators, and Partners who have made this magazine a reality. Each article, research paper, and insight shared here is a testament to the collective passion for scientific exploration.*

*As we conclude this edition, we eagerly anticipate the future of this magazine as a dynamic platform for scientific discourse. Our vision is to continue fostering an environment where ideas flourish and knowledge knows no bounds. With your continued support, we are confident that this platform will become a hub for innovative research and meaningful knowledge exchange.*

*Let us stride forward together, driven by the thirst for knowledge and the spirit of discovery. Thank you for being an integral part of the UET Science Society's journey.*

UET SCIENCE SOCIETY

