ENGINEERING PULSE

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ENGINEERING PULSE

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A Call to Protect Our Planet: Key Steps for Addressing Climate Change

Climate change describes global warming—the ongoing increase in global average temperature—and its effects on Earth's climate system. Climate change in a broader sense also includes previous long-term changes to Earth's climate. The current rise in global average temperature is more rapid than previous changes, and is primarily caused by humans burning fossil fuels.

Climate change is causing a range of increasing impacts on the environment. Deserts are expanding, while heat waves and wildfires are becoming more common.

Climate Change is Causing a Range of Increasing Impacts on the Environment

Heat Waves & Wildfires: A Dangerous Duo:
After a summer 2019 heat wave was blamed for 2,500 deaths in Western Europe, a study found that climate change made the heat five times as likely as it would have been in a world that hadn't warmed. Heat waves in the ocean have become 20 times as likely as the average temperature has risen. Extreme heat events can trigger a variety of heat stress conditions, such as heat stroke,

Heat Waves in the Ocean Have Become 20 Times as Likely as the Average Temperature has Risen

which is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature. Body temperature rises rapidly, the sweating mechanism fails, and the body cannot cool down. This condition can cause death or permanent disability if emergency treatment is not given. Small children, the elderly, and certain other groups including people with chronic diseases, low-income populations, and outdoor workers have higher risk for heat-related illness. Higher temperatures and respiratory problems are also linked. One reason is because higher temperatures contribute to the build-up of harmful air pollutants.

Whereas, wildfire leaves an area, root stabilization provided by plants may no longer be viable. In such cases, erosion problems can affect the land and local water

Pakistan Sees Four-Fold Increase in Malaria Cases after Floods

sources. Unstable soil can contribute to mudslides, flooding events, and land degradation.

Climate Change Threats to Human Well-Being:
Climate change threatens people with increased flooding, extreme heat, increased food and water scarcity, more disease, and economic loss.

According to the World Health Organization, Pakistan has seen a four-fold increase in the number of malaria cases after the floods, from 400,000 cases nationwide in 2021 to more than 1.6 million cases in 2022.

The floods have effectively driven the worst malaria outbreak in Pakistan since 1973, and upended all the extensive malaria control efforts undertaken before the floods started.

Pakistan is a low-middle-income country with a primarily agrarian economy; however, it is gradually industrializing and more than a third of the population currently lives in cities. For food and nutrition security, the country significantly relies on its climate-sensitive land, water, and forest resources. Agriculture continues to be a significant occupation for 42% of the population. Irrigation from the glacier-fed River Indus and its tributaries supports about 90% of farmland. Glacier melt has accelerated due to climate change, increasing the likelihood of Glacier Lake Outpouring Floods (GLOF) and mudslides downstream. Faster glacier melt, rising temperatures, shifting seasons, and irregular rainfall patterns are all affecting the flow of the River Indus, which will have a growing impact on agriculture, food production, and lives. Already, 39% of the population lives in poverty, and the loss of livelihoods indicated in this research will have a significant impact on people's health and capacity to access healthcare. Heat fatigue, starvation, the introduction of vector-borne diseases like dengue fever, and an increase in the burden of aquatic infections will all have an impact on people's capacity to work and make a living.

Climate Change Reductive Measures:

Renewable Energies: Changing our main energy sources to clean and renewable energy. Solar, Wind, Geothermal and biomass could be the solution.

Sustainable Transportation: Our transport methods must be aligned with environmental requirements and reduce their carbon footprint. It is essential to rethink our transport methods from the design stage towards eco-friendly transportation.

Air Pollution Prevention: Many methods exist to prevent, control and reduce air pollution, in particular by reducing the consumption of fossil fuels, and limiting industry emissions and waste.

Waste Management & Recycling: The simplest solution to reduce waste is to adapt our production methods to our consumption patterns. The recycling process must also be taken into account in our consumption habits.

Sea and Ocean Preservation: Oceans and seas are the largest storage of greenhouse gasses and are an exceptional support system for life on this planet. Limiting overfishing, unsustainable development activities in coastal areas and the consumption of environmentally

friendly products is now essential.

Circular Economy: Use the 3 r's of circular economy (Reduce, Reuse and Recycle) to significantly reduce our waste and avoid unnecessary production of new items.

Reduce Greenhouse Gas Emissions: To combat climate change, reducing greenhouse gas emissions is paramount. This can be achieved by transitioning to clean and renewable energy sources such as wind, solar, and hydro power. Improving energy efficiency in industries, buildings, and transportation is also vital. Electrifying transportation and promoting the adoption of electric vehicles can significantly reduce emissions. Additionally, implementing carbon pricing mechanisms like carbon taxes or cap-and-trade systems can provide economic incentives for emission reductions, while promoting sustainable agriculture helps curb methane emissions from livestock.

Protect and Restore Forests: Forests play a critical role in mitigating climate change as they act as carbon sinks. Protecting existing forests and embarking on reforestation efforts can help absorb carbon dioxide from the atmosphere, effectively sequestering carbon and reducing its concentration in the atmosphere.

Promote Sustainable Land Use: Sustainable land use practices are essential for mitigating climate change. Encouraging responsible urban planning and reducing urban sprawl can limit emissions associated with transportation and construction. Implementing sustainable farming practices not only reduces emissions but also mitigates soil degradation. Preserving wetlands and peat lands is equally crucial, as they store carbon and provide habitats that support biodiversity.

Reduce Waste and Promote Recycling: Reducing waste and promoting recycling are practical ways to lower carbon footprints. Implementing waste reduction and recycling programs at local and national levels can divert waste from landfills and reduce emissions associated with waste disposal. Encouraging the use of recycled materials in manufacturing processes further lessens the environmental impact.

Individual Action: Individuals can make a significant impact by taking steps to reduce their personal carbon footprints. This includes conserving energy through energy-efficient practices, reducing waste through recycling and mindful consumption, and making sustainable choices in daily life, such as using public transportation or adopting a plant-based diet. Collectively, these individual actions can contribute to the broader effort to combat climate change.

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The Journey of Engr. Nasir Khaliliy: From Swat to Revolutionizing Pakistan Railways

Introducing Engr. Nasir Khaliliy, a dedicated professional whose journey spans engineering, public service, and active participation in Pakistan Railways. Currently serving as the Divisional Superintendent of Pakistan Railways in Karachi, Nasir's roots lie in Swat, his beloved hometown.

With a bachelor's degree in Mechanical Engineering from UET Peshawar and a career start in Dubai, Nasir held key roles in a multinational corporation. However, his calling to impact Pakistan led him back in 2003, where he joined Pakistan Railways.

His contributions have been diverse, from Lahore to Peshawar and now Karachi, in roles spanning maintenance, manufacturing, and management. Pakistan Railways' historical significance in national industrial development underscores his commitment.

Nasir Khaliliy's dedication extends to the Pakistan Engineering Council, where he serves on various committees. He's also a proactive member of think tanks, influencing policies and societal trajectories.

In summary, Engr. Nasir Khaliliy's journey reflects his unwavering commitment to Pakistan's growth and development, combining engineering expertise, public service, and policy influence for a meaningful impact.

Engr. Muhammad Nasir Khaliliy
DS-Pakistan Railways

We Established Pakistan's First Steel Mill, Named as the 'Steel Shop'

Engineering Pulse: Thank you sir for joining us. Could you please tell us about your academic background?

Engr. Khaliliy: I would like to express my gratitude for the opportunity provided to me. Swat holds a special place in my heart as it's my hometown. I completed my schooling from Peshawar and got a bachelor's degree in Mechanical Engineering from the UET, Peshawar in 2000.

In that same year, I moved to Dubai, where I commenced my career with a multinational corporation. During my tenure, I held various roles, including Project Manager, Quality Consultant, and Quality Assurance Engineer. But after some time, I had a profound realization - a calling to return to my homeland, Pakistan because I had a thought that my contribution could make a meaningful impact in Pakistan. So, I decided to return from Dubai to Pakistan.

After my return to Pakistan, I pursued the Federal Public Service Commission exam and then joined the Pakistan Railways in 2003. Since then, I have served in various capacities. I worked as a divisional superintendent in Lahore and Peshawar before moving to Karachi to work for Pakistan Railways as a Divisional Superintendent Karachi.

Adapting to a New Environment While Being Away from the Comfort of Home is Undeniably Demanding

Pakistan Railways provides a wide range of opportunities, including maintenance and manufacturing, engineering management, human resources, budgeting management, and material management. It has its own hospitals, police stations, offices, and even schools, providing a full range of services along with electricity and gas for basic needs. When Pakistan was founded, Pakistan Railways took charge of maintaining and manufacturing facilities in the country. Many other organizations turned to Pakistan Railways for advice when starting their businesses, some of them are ‘Pakistan Ordnance Factories’ and ‘Heavy Mechanical Complex’. We established Pakistan's first steel mill, named as the 'Steel Shop,' which was purchased from a private individual in 1937. This is why we have had the capacity for steel production since that time, and we have been manufacturing products from our own resources.

I am also an elected member of Governing Body of Pakistan Engineering Council, where I am the part of Financial Budgeting Committee, Young Engineers Development Committee, and the Selection Board.

Other than that, I am actively engaged in the

realm of think tanks. Think tanks play a pivotal role in shaping policies, generating insightful analyses, and influencing the trajectory of society. The data and insights they produce are instrumental to governments, businesses, media organizations, social movements, and various interest groups. My involvement in a think tank further solidifies my commitment to contributing to meaningful change.

This is my brief introduction that provides a glimpse into my multifaceted journey.

Engineering Pulse: Thank you so much! Could you kindly share your personal journey and the challenges you encountered on your path to success as a student from Swat?

Engr. Khaliliy: We are all aware of the myriad challenges that often confront students in Swat hindering their educational journey. The scarcity of high-quality educational institutions, especially in remote areas, significantly restricts students' access to quality learning opportunities. Economic constraints force many students to contribute to their families' finances, diverting their attention from academic pursuits. Despite these formidable obstacles, the youth of Swat display remarkable resilience and community-driven efforts are pivotal in addressing these issues and enhancing the local educational landscape.

In my case, my father emerged as a staunch advocate for education and consistently encouraged me to pursue my studies. His unwavering emphasis on education became my driving force. Throughout my school and university years, I not only dedicated myself to my academic growth but also took the initiative to educate others. During my time, private schools were virtually nonexistent, prompting my father to make the decision to enroll me in a newly established private school. Following my matriculation, I resided in hostels, and my educational journey led me to Sir Syed College Wah Cantt and did my F.Sc. from Edwardes College, Peshawar. It was during these formative years that I improved my interpersonal, communication, and presentation skills.

However, living away from home from an early age did present its unique set of challenges. As an inherently outgoing individual, prolonged periods away from home proved to be emotionally taxing. Swat students residing in boarding institutions encounter distinct challenges that can significantly impact their educational and emotional well-being. The separation from loved ones often engenders feelings of homesickness and emotional disquiet. Adapting to a new environment while being away from the comfort of home is undeniably demanding.

Karachi Division Contributes Between 110 and 120 Million Rupees to the Pakistan Railways Daily

Engineering Pulse: After hearing about your journey and the impact, how has working for different organizations influenced your perception of the sector?

Engr. Khaliliy: When I joined Pakistan Railways in 2003, it was in excellent condition during the era of President Pervez Musharraf. Initially, the railways required substantial and rapid investment, as well as public patronage, to generate substantial returns and boost economic activity.

It was once, a significant financial crisis struck, impacting the railway's operations to the extent that workers were not receiving their salaries on time. I was serving then as a Workers' Manager, responsible for overseeing wagon maintenance, with approximately 6,000 employees reporting to me. To address that salary issue, I took on a leadership role and mobilized the workforce. I devised a formula for efficient scrap extraction, and we successfully extracted scrap iron up to 18 feet underground and sold it, which proved to be beneficial for the Pakistan Railways.

Pakistan Railways remained in a state of crisis until 2013, but we persevered, and through diligent efforts, we managed to overcome these challenges. During the tenure of Khawaja Saad Rafique, Ex-Federal Minister, we introduced innovative changes, including new designs for coaches, fire and electric retardant materials, and the implementation of aluminum composite panels.

In 2000, when I was in Peshawar, I was tasked with addressing the issue of encroachments. I was specially assigned to this role, and Alhamdulillah, within 11 months, I successfully resolved 92 cases, resulting in the release of land worth 6 billion and 83 crores rupees. In my subsequent tenure as DS Lahore; I continued to work efficiently, establishing a vaccination center during the COVID-19 pandemic, I managed all railway-related activities and set up a vaccination center at Lahore Railway Station to serve both railway employees and passengers. Over a span of approximately 3-4 months, nearly 191,000 people received vaccinations at this accessible center.

Safety concerns have always been a priority, given the high number of accidents in the area. To mitigate this issue, I oversaw the installation of fencing spanning 119,000 feet, resulting in the reduction in the frequency of road accidents. This accomplishment is among my most significant contributions to enhancing railway safety.

Our previous accident ratio was 37%, but it has now dropped to 6%. We used to rely on 'Yousuf Wala Coals,' but today our freight activities generate an income of 60 to 70 million per day. Passenger services generate 50 to 55 million dollars in revenue for us. Even today, our Karachi division contributes between 110 and 120 million rupees to the Pakistan railways daily. While railway duties may appear simple to others, they are just as difficult as the job of a police department. Even during holidays, our train operates round the clock, 24 hours a day.

Engineering Pulse: What attribute do you see in young engineers that is currently missing nowadays? What do you want them to improve?

Engr. Khaliliy: As the convener of the Young Engineers Development Committee (YEDC), we have introduced a number of courses for young engineers so that recent graduates can gain experience and those who are already employed can participate in the Continuous Professional Development (CPD) program.

These programs are intended for engineers who are lacking in certain skills. We frequently see engineers who are technically proficient but lack the interpersonal, communication, and presentation skills required to effectively market their product in the industry. I believe in the proverb:

"If you are in Matric, aim for the college; otherwise, staying in Matric will not benefit you."

This means that I don't want to repeat any tasks; instead, I want to keep moving forward because stagnation is useless. If I am unable to complete a task or progress, I will not dwell on it or make the same error in another task.

Engineering Pulse: Engineers play a crucial role in the progress of the country. I would like to know your vision for Pakistan Railways in the future. Do you have any messages for young engineers?

Engr. Khaliliy: We are working to improve Pakistan Railways by focusing first on passengers' safety and then on their convenience. Furthermore, we intend to generate revenue through innovative means. Our primary focus is freight, and we believe in running fewer trains at a higher level of quality in order to ensure safety, punctuality, and passenger comfort.

The Pakistan Engineering Council is a source that can offer you various guidelines. It is critical that you keep moving forward in your career and do not give up hope. Experimenting with different areas; evaluate your abilities first to determine what is truly important to you. If you work in administration but are a researcher, you may be doing injustice with you and vice versa. Define your path first, and then use the platforms provided by PEC or other organizations. Please notify us if you encounter any problems or issues. We will not only listen to you, but we will also collaborate with you to find solutions and make progress.

I'd also like to address the Pakistan Engineering Council and suggest that they take control of their supply chain and concentrate on demand and supply dynamics. You are doing injustice if you previously believed that nothing could be accomplished without connections, and if you have not made any efforts for any test or interview. First and foremost, try to fulfill your responsibilities. Unfortunately, fresh engineers at large think negatively and lack faith in Allah's system.

Engineering Pulse: Your words are not just for us but a message for all aspiring engineers who will have much to learn in the future. On behalf of Team Engineering Pulse, we wish you the very best of luck and our prayers are always with you.

Engr. Khaliliy: Thank you for your Team's arrival. Pakistan Railways shall always welcome you!

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3D Printing: A Transformative Technological Advancement Reshaping the Field of Engineering

Introduction:
3D printing, also known as additive manufacturing, is a process of creating a three-dimensional object from a digital model. It is done by layering material, such as plastic, metal, or ceramic, on top of itself until the object is complete. 3D printing has had a major impact on the field of engineering, as it allows engineers to create complex objects that would be difficult or impossible to make using traditional manufacturing methods.

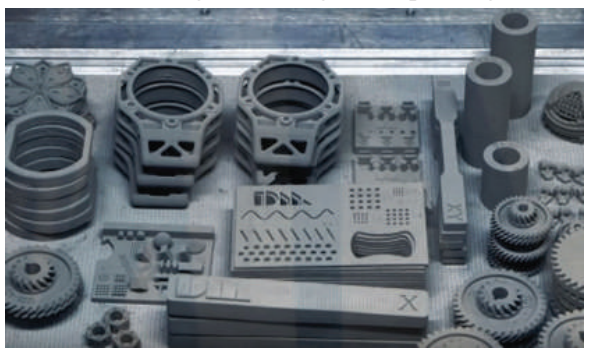
Advantages of 3D Printing
There are several advantages to 3D printing, including:

Rapid Prototyping: 3D printers can create prototypes directly from digital models without expensive tooling or molds. This can save engineers a lot of time and money, and it can help them to get their products to market faster.
Customization: 3D printers can create objects from any digital model, regardless of their complexity. This makes 3D printing ideal for creating custom prosthetics, medical implants, and other specialized objects.
Manufacturing flexibility: 3D printing can be used to manufacture a variety of products, including aircraft parts, medical devices, and automotive components. 3D printing can help reduce manufacturing costs and lead times and is well-suited for manufacturers who require Low-Volume production runs without needing to invest in traditional manufacturing equipment.

Impact of 3D Printing on Engineering Fields
3D printing has had a major impact on a variety of engineering fields, including:
Aerospace Engineering: 3D printing is being used to manufacture aircraft parts, such as brackets, struts, and fuel nozzles. 3D-printed aircraft parts are lighter and stronger than traditional parts, which can help to improve fuel efficiency and performance.
Automotive Engineering: 3D printing is being used manufacture to automotive components, such as prototypes, tooling, and end-use parts. 3D-printed automotive components can help to reduce manufacturing costs and lead times.

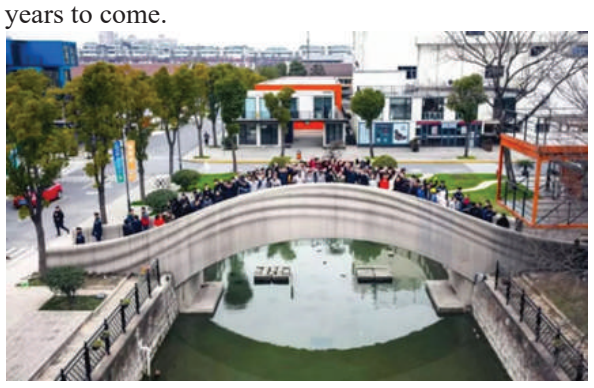
Medical Engineering: 3D printing is being used to manufacture medical devices, such as custom prosthetics, dental implants, and surgical guides. 3D-printed

medical devices can be tailored to be suitable for the patient's needs, which can improve the chances of successful treatment while making the treatment process comfortable and affordable for the patients.
Civil Engineering: 3D printing is being used to construct buildings and bridges. 3D printing can



help reduce construction time and costs and can also be used to create large structures. In 3d printing, bridges are built in a single segment rather than having to
construct them in separate segments and then connect them, unlike traditional methods.

Conclusion:
Overall, 3D printing is a revolutionary technology that has a major impact on the engineering field. 3D printing is allowing engineers to prototype new designs quickly and easily, create custom objects and manufacture complex products which were previously outrageously expensive or incredibly difficult to manufacture. As 3D printing technology continues to develop, it is likely to have an even greater impact on the field of engineering in the years to come.



(the longest 3D-printed bridge in the world)

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Prof. Engr. Dr. Bhavani Shankar Chowdhry
A Gem of Engineering

Early Years and Education:
Dr. B.S. Chowdhry was born in a small village of very under privileged area of Sindh (Thar) in 1959 began his journey in 1983 when he received his bachelor's degree in Electronic Engineering. In 1990, he earned a Ph.D. in Microprocessor-Based Intelligent Instrumentation from the University of Southampton, England. This set the stage for his illustrious career.

Teaching and Research:
After completing his Doctorate, Dr. Chowdhry returned to his University, MUET, Jamshoro, and dedicated himself to teaching and research. He had served as a Chairman of the Electronic Engineering Department and as the Founding Chairman of the Telecommunication Engineering and Biomedical Engineering departments over the years. His influence extended beyond the classroom. He had also served as Dean of the Faculty of Electrical, Electronics, and Computer Engineering and also as a Director Institute of Information and Communication Technology (IICT).

Prolific Writer and Researcher:
Dr. Chowdhry's dedication to knowledge advancement is evident in his prolific writing. He has written and edited numerous books, some of which have been published by Springer Verlag that is a well-known German publisher. Not only this but more than 100 research papers published in national and international journals further demonstrate his research prowess.

Awards and Recognition:
His outstanding contributions to education have earned him several honors, including the Best Teacher Award from Higher Education Commission (HEC) and the National Cultural Award. Moreover; he has received many international recognitions for his achievements while serving as a Guest Scientist/ Associate at the International Centre for Theoretical Physics (ICTP) in Italy.

International Collaborations:
Dr. Chowdhry's commitment to promoting international cooperation is admirable. He was instrumental in securing approval for various projects facilitating student and staff exchanges through the European Commission's Erasmus Mundus exchange programs. More than 150 MUET students benefited from these efforts, which provided them with invaluable international experiences.

Flagship Conferences and Editorial Contributions:
His dedication for promotion of research and collaboration is evident in the organization of many major conferences. He co-organized a groundbreaking workshop on "FPGA Based Instrumentation Systems" and was instrumental in the establishment of the "Global Conference on Wireless and Optical Communication" series.

Continued Impact:
Dr. Chowdhry's contributions continue, as he recently served as Lead Editor for a book on "IoT Architectures, Models, and Platforms for Smart City Applications" and as Associate Editor for the British Journal "Annals of Emerging Technologies in Computing (AETiC)." These activities demonstrate his unwavering dedication to the advancement of knowledge.

Prestigious 'Sitara-e-Imtiaz' Award:
Dr. B.S. Chowdhry was honored with the 'Sitara-e-Imtiaz' civilian honor by the President of the Islamic Republic of Pakistan on the occasion of Independence Day in 2022. This renowned award celebrates his enormous achievements to the country's public and educational sectors, and it adds to a long list of awards he has garnered over his remarkable career.

Conclusion:
Dr. B.S. Chowdhry's career in Electrical and Computer Engineering has been nothing short of inspiring. His commitment to education, research, and international collaboration has not only influenced the lives of countless students but has also left an indelible mark on academia. Dr. Chowdhry's story, as a distinguished figure in his field, continues to inspire future generations to aim for greater heights in the pursuit of knowledge and excellence.

Prof. Engr. Dr. Bhavani Shankar Chowdhry

Prof. Engr. Dr. Bhavani Shankar Chowdhry is a distinguished recipient of Pakistan's prestigious Sitara-e-Imtiaz, the country's third-highest civilian honor. He is not only a renowned name in the field of Electrical and Computer Engineering but he is also a pathfinder who has left an indelible impression on education, research, and international cooperation. With a spectacular career spanning more than three decades, his impact on the world of academics is absolutely astonishing. Come along with us as we explore the fascinating life and incredible accomplishments of this extraordinary person.

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Metamaterials Unleash a New Era in Micro-Optics

In the mesmerizing realm of optical technology, a truly remarkable innovation has emerged, and it goes by the name of "metasurfaces." Think of them as something straight out of a magician's hat – these marvels possess the remarkable ability to make objects appear invisible, much like the famous cloak of invisibility wielded by Harry Potter. However, metasurfaces are not mere illusions; they harbor the potential to revolutionize the way we employ and comprehend optics.

One of their most mind-boggling accomplishments is their ability to shrink lenses to a mere one 10,000th of their usual size. This groundbreaking achievement has ignited tremendous excitement, especially in the domains of virtual reality, augmented reality, and LiDAR technology. Yet, there exists craft impressive gadgets. This endeavor gave birth to ingenious creations such as metal lenses, metaholograms, and beam diffraction devices. These inventions were akin to the popular kids at a science-themed party, captivating the imagination of both scientists and the general public alike.

But today, there is a tectonic shift underway in the world of optics. Scientists are forging collaborations with metasurfaces and other optical marvels, envisaging a future where these metasurfaces become integral components of everyday objects. Imagine your television incorporating metasurfaces to elevate picture quality to an entirely new realm of excellence. Envision your LED lights empowered by metasurface magic, rendering them not just advanced but indispensable.

To transform this vision into reality, the scientific community is extending its hand to industries and educational institutions, issuing a resounding call for collaboration. Through the synergy of collective efforts, metasurfaces can ascend into the limelight, potentially propelling our country into a metasurface-enhanced optical tools. Consider non-invasive diagnostics and imaging techniques that provide unparalleled clarity, revolutionizing the way we detect and treat diseases. Metasurfaces could very well be the unsung heroes of modern medicine, quietly working behind the scenes to improve our well-being.

In summary, the world of metasurfaces is not limited to optical illusions or niche applications. It's a transformative force that has the potential to touch every aspect of our lives, from entertainment and communication to healthcare and sustainability. As Professor Rho and his team at POSTECH lead the charge in this scientific revolution, it's a journey worth keeping a close eye on. Metasurfaces are not just redefining a substantial obstacle on the path to making metasurfaces a practical and affordable reality – the intricate manufacturing processes and significant production costs involved. Now, imagine a team of brilliant minds, akin to the legendary Avengers of the scientific world, uniting for a common mission. This team is led by the visionary Professor Junsuk Rho and comprises a cadre of exceptionally talented PhD candidates. They hail from the esteemed Pohang University of Science and Technology (POSTECH), and together, they are on an expedition to redefine the landscape of optical technology.

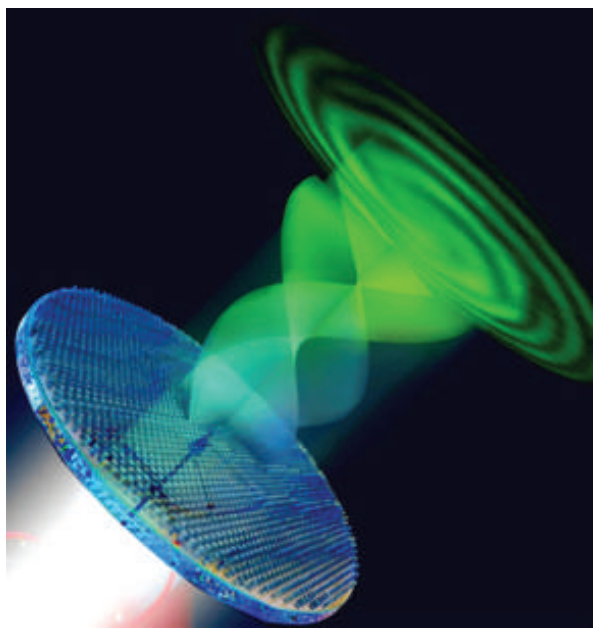
In days gone by, optical research predominantly centered on manipulating the behavior of light to position of prominence within the tech industry.

Professor Rho, the driving force behind this audacious undertaking, envisions metasurfaces as indispensable partners for our electronic devices. He foresees metasurfaces enhancing their capabilities and pushing the boundaries of innovation. His optimism hinges on a future where metasurfaces seamlessly integrate into diverse applications, a future made tangible through unwavering dedication, tireless research, and steadfast support from our nation.

In essence, metasurfaces can be likened to the superheroes of the optical realm. They possess an extraordinary power that can redefine how we perceive and interact with our surroundings. With a concerted effort and unwavering determination, metasurfaces harbor the potential to elevate our everyday experiences to an entirely new echelon of coolness.

Engr. Muzammil

A Software Engineer with a fervor for the written word. Beyond my coding endeavors, I've found a deep passion for blog writing. I've cultivated this passion on my personal website, where I regularly share my insights and thoughts on various topics. In this article, we'll take a journey into my world, exploring the fascinating crossroads of software engineering and the art of blog writing that define my unique digital presence.



But beyond the realm of gadgets and devices, metasurfaces also hold immense promise in the field of healthcare. Imagine precision surgeries conducted with unprecedented accuracy, guided by optics; they are reshaping our world. So, if you're fascinated by the cutting edge of technology and the promise of a brighter, more sustainable future, dive into the world of metasurfaces and be prepared to be amazed.

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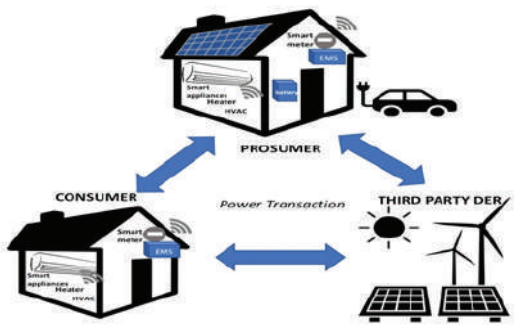
Principles and Protocols of Renewable Energy

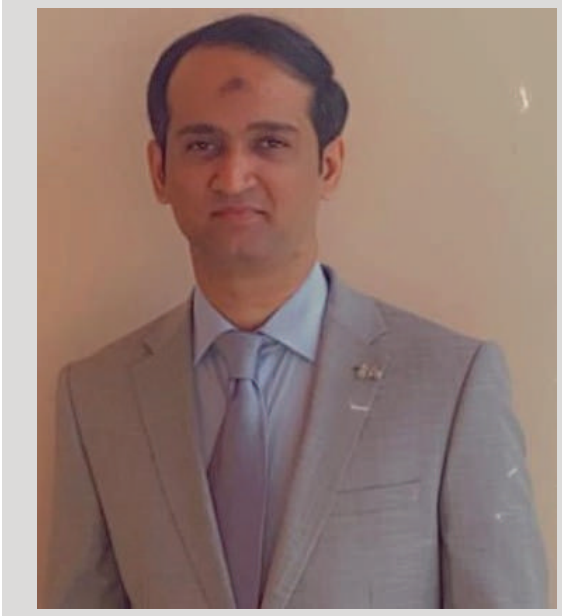
Energy derived from sources that can be naturally renewed over a human period is referred to as renewable energy. Sunlight, wind, the flow of water, and geothermal heat are examples of renewable resources. Despite the fact that the majority of renewable energy sources are sustainable, some are not. A lot of times, heating, cooling, and electricity are produced using renewable energy. Large-scale renewable energy projects are usual, but they are also suitable for rural, isolated, and developing nations, where energy is frequently essential for human growth. In order to maximize the benefits of electricity, renewable energy is frequently used in conjunction with additional electrification. Electricity can convey heat or items effectively and is clean at the point of use. Renewable energy comes from ongoing natural processes that renew it. It comes from the sun or heat produced deep beneath the earth in one of its many forms. The term includes electricity and heat produced from renewable energy sources such as sun, wind, water, biomass, geothermal, and biofuels. It also includes hydrogen produced from renewable resources.

In comparison to technologies based on fossil fuels and nuclear, the generation of renewable energy from some sources, such as wind and solar, is more variable and geographically dispersed. Although it is conceivable to integrate it into the larger energy system, doing so does present some new difficulties, such as greater output volatility and lower system inertia. The risks and costs associated with deploying renewable energy can be decreased by establishing energy storage, a wide range of renewable energy technologies, and a smart grid where energy is automatically utilized as it is produced. Significant improvements in energy security and economic gains might be achieved by the quick adoption of renewable energy sources, energy efficiency measures, and technical energy source diversity. Wind and solar energy are becoming considerably more affordable. In certain instances, switching to these sources will be less expensive than continuing to utilize the present, inefficient fossil fuels. Additionally, electrification using renewable energy is more effective and thus results in large reductions in the need for primary energy. Additionally, it would enhance public health, lower the number of early deaths brought on by pollution, and cut related health expenditures, which may save trillions of dollars annually. Environmental pollution includes air pollution brought on by the combustion of fossil fuels.



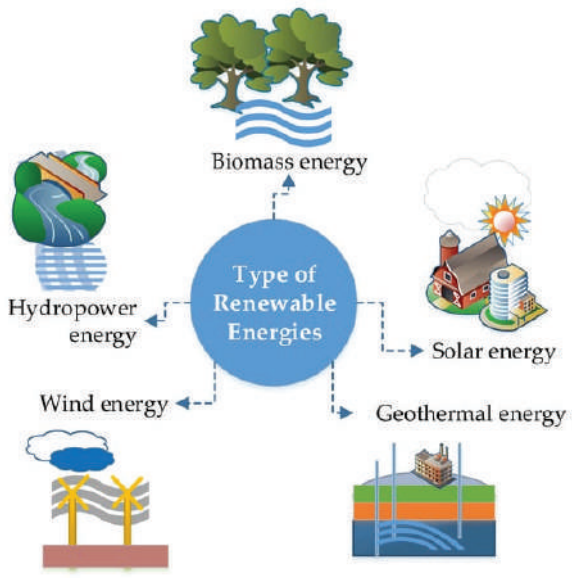
Other renewable energy technologies, such as cellulosic ethanol, hot-dry-rock geothermal power, and marine energy, are also in the process of development. These technologies have only limited commercialization or have not yet been widely proven. Many may have promise on par with other renewable energy technologies and are coming. Since they often improve energy security and generate far fewer greenhouse emissions than fossil fuels, renewable energy sources are crucial to the development of sustainable energy. Renewable energy projects can occasionally give rise to serious sustainability issues, such threats to biodiversity when regions with high ecological value are turned into wind or solar farms or bioenergy producing zones. The commercialization of renewable energy necessitates the implementation of three generations of renewable energy technologies that have been around for more than a century. Biomass, hydroelectricity, geothermal power, and heat are examples of first-generation technologies that are already developed and competitive from an economic standpoint. The deployment of second-generation technologies, such as solar heating, photovoltaics, wind power, solar thermal power plants, and contemporary bioenergy, is now underway. Third-generation technologies, such as enhanced biomass gasification, hot-dry-rock geothermal power, and ocean energy, call for ongoing R&D activities in order to make significant contributions on a worldwide scale.

In areas with an abundance of resources, first-generation technology are frequently deployed. The investigation of the remaining resource potential, particularly in emerging nations, and the resolution of issues with the environment and societal acceptability are necessary for their future usage. Second-generation technologies are now a significant economic sector in nations like Germany, Spain, the United States, and Japan, having previously been a niche interest for a select few. The issue is to increase the market base



Engr. Dr. Muhammad Nawaz Iqbal

Dr Muhammad Nawaz Iqbal is an academician. He is serving as an assistant professor at business administration department of Sir Syed University of Engineering and Technology. He also have a 13 years of corporate experience and have 260 publications include research papers, articles, patents, book, case studies.



for sustained growth on a global scale in the presence of several significant industrial businesses and financial institutions.

Technology for the third generation of renewable energy, such as enhanced biomass gasification, biorefinery technology, hot-dry rock geothermal power, and ocean energy, are currently being developed. The demonstration and commercialization of third-generation technologies are still in their early stages. Numerous emerging technologies may have potential on par with that of current renewable energy sources, but they must first get enough attention and funding for research and development.

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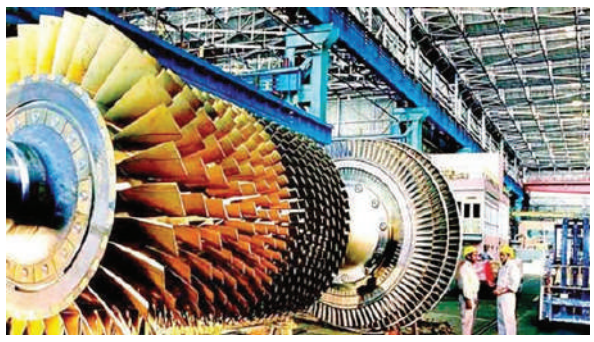
CPEC offers an Opportunity for Pakistan to boost Engineering goods Exports

The China-Pakistan Economic Corridor (CPEC) offers a significant boost to Pakistan's economy, particularly in engineering goods. Muhammad Ali Kemal, an expert from the Ministry of Planning, highlighted the advantages of this collaboration. By leveraging China's technology and infrastructure, Pakistan can enhance its industrial capabilities, reduce imports, and save foreign reserves. This partnership fosters large-scale production, lowering costs and making Pakistani goods more competitive globally.

Recent data from the Pakistan Bureau of Statistics shows a noteworthy 8.89% increase in engineering goods exports, reaching $207.445 million in the first 10 months of the current fiscal year. Key sectors like electric fans, transport equipment, electrical machines, specialized machinery,



auto parts, and accessories contributed significantly.

Despite a minor dip in April 2023, with exports at $20.694 million, the Trade Development Authority of Pakistan sees engineering goods as a driving force for Pakistan's industrial development. Proximity to diverse markets, including Africa, positions Pakistan advantageously. With the government's 'Look Africa Policy Initiative,' focused on doubling trade with Africa by 2025, Pakistani firms have a unique opportunity to expand their presence in this growing market.

Naran International Hotel & Bar-Be-Cue Delights Restaurant Collaborates with Pakistan Engineering Council

On September 4, 2023, the Pakistan Engineering Council (PEC) and Naran International Hotel & Bar-Be-Cue Delights Restaurant formalized a significant partnership at PEC's Regional Office in Karachi.

Under this agreement, Naran International Hotel & Bar-Be-Cue Delights Restaurant will offer engineers with valid PEC registrations a generous 50% discount on hotel stays and dining. Engineers registered with PEC and PEC staff members will also enjoy exclusive discounts on various hotel services.

The signing ceremony featured Mr. Waseem Tanoli, the owner of the Hotel, and the Honorable Vice Chairman of PEC, Engr. Mukhtar A. Sheikh.

Notable attendees included Engr. Muhammad Najeeb Haroon (Chairman PEC), Engr. Abdul Rehman Shaikh, Engr. Mohsin Ali Khan, Engr. Saleem Jaat (Members of PEC Governing Body), Engr. Mir Masood Rashid (Advisor to Chairman PEC), and other dignitaries.

This strategic partnership between PEC and Naran International Hotel & Bar-Be-Cue Delights Restaurant aims to recognize and support engineers' contributions while promoting tourism. Engineers can now enjoy exceptional amenities at discounted rates, marking a significant step toward mutual benefit.

NESPAK Secures $12.5 Million NEOM Project in Saudi Arabia

Pakistani engineering firm NESPAK has won a contract worth SR46.5 million ($12.5 million) for Saudi Arabia's NEOM project, a key element of Crown Prince Mohammed bin Salman's Vision 2030. NEOM aims to be a groundbreaking economic zone in northwestern Saudi Arabia, featuring a zero-carbon city powered by clean energy. NESPAK will provide construction management services for NEOM's energy sector, including high-voltage projects. This achievement is a significant milestone for an Asian company in a region historically dominated by Western enterprises.

NESPAK, with a strong presence in the Middle East, has secured 126 projects valued at $22 billion in Saudi Arabia. The close relations between Pakistan and Saudi Arabia, marked by the Saudi-Pakistan Supreme Coordination Council, continue to enhance diplomatic, defense, and trade ties, benefiting the millions of Pakistani expatriates in the Kingdom.

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Ask the Experts

This section offers you the opportunity to ask questions directly from the experts in the field of engineering or engineering education. Our experts will assist you regarding your issues related to various aspects anything starting from the career counseling till the advanced technical queries. You can send your questions at ***ep@logix-solutions.net***

As a civil engineer, which region should I consider for job opportunities: the Gulf countries, Asia, or Europe? (Umar from Karachi)

As you enter the realm of engineering, I'd like to offer you some important advice. To begin, consider exploring the increasing job opportunities within Pakistan's civil engineering industry. The choice of region for job opportunities as a civil engineer depends on your specific career goals and preferences. The Gulf countries offer rapid growth and competitive salaries, Asia provides diverse opportunities, and Europe is known for high-quality infrastructure projects. Consider your priorities and research each region to make the best decision for your career according to your preference.

I am an engineer, and I work in Kuwait. I didn't have anyone to guide me, so I somehow managed to work here. But no one told me how important communication skills are, and I wasn't taught that during my degree. I need advice. (Aftab from Lahore)

As an engineer working in Kuwait, it's not uncommon to face challenges in communication skills, which are paramount in any profession. To address this, consider enrolling in communication courses or workshops to enhance your abilities. Additionally, seek out opportunities for practical experience and actively engage in conversations with colleagues and peers to build confidence. Remember, effective communication skills are very important for all the professionals. You can also attend our online courses to enhance your communication skills.

I work as a civil engineer in a local company in Karachi, most of the time we don't follow safety rules and directions and I am afraid this may cause accident. I have talked to the owners of the company many times but they do not take this much seriously. What I should do please advise. (Ammar from Karachi)

You are right. It is very dangerous and can cause any mishap at any moment. You should take all precautionary measures that are written in manual on your own to ensure your own and your teammates' safety. And keep on telling the importance of safety to the owners again and again until they don't realize it.

I hold a degree in telecom engineering, yet I find myself facing a challenging job market. What steps can I take to secure an exciting opportunity in my field? (Arif from Karachi)

The job market is very saturated nowadays for all fields and especially for telecom engineers, rarely there are opportunities. In these circumstances; it's important to take a well-rounded approach. Focus on building your professional network, customize your job applications to match specific requirements, and please attend some short courses or certifications to stay updated and equip yourself for international job market.

I hold a degree in electronic engineering, and I have a strong passion for pursuing a career in operations and maintenance. Should I consider obtaining additional certifications, and what actions should I take to achieve this goal? (Usman from Karachi)

Certainly, graduation is only first step to enter into the job market. I always advise the youth who are ambitious to pursue their career in field jobs to go for certification.

This year, I'll be appearing for my twelfth-grade exams. Could you recommend an engineering field that offers promising career opportunities in Pakistan? (Rizwan from Lahore)

As you prepare for your twelfth-grade exams and intend to consider engineering as your career path. In Pakistan, fields like electrical engineering, computer science, and civil engineering have promising career prospects. However, I recommend exploring your interests and strengths to align with a specific engineering discipline that resonates with you. Conduct research, talk to professionals in the field, and consider your long-term career goals. Ultimately, your passion and dedication to your chosen field will play a significant role in your success.

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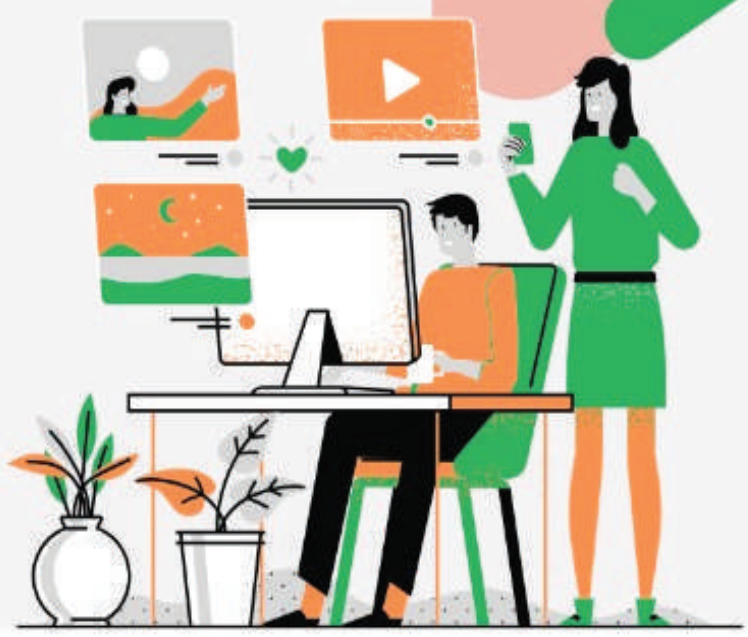

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