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BOOK OF ABSTRACTS

International Conference on The Future Reimagined: Innovation through Science, Social Science & Global Collaboration (FutureCON-2026)

FEBRUARY
10-12
2026

Organized by:

Women University Mardan, Pakistan

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International Conference on The Future Reimagined: Innovation through Science, Social Science & Global Collaboration (FutureCON-2026)

February 10 – 12, 2026

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International Conference on "The Future Reimagined: Innovation through Science, Social Science & Global Collaboration (FutureCON-2026)
February 10-12, 2026

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PREFACE

The International Conference on "The Future Reimagined: Innovation through Science, Social Science & Global Collaboration" (FutureCON-2026) will be held on 10–12 February 2026 at Alhamra Hotel, Mardan, Khyber Pakhtunkhwa, Pakistan. The conference is organized by Women University Mardan in collaboration with national and international academic and research partners.

The theme of the conference reflects the growing need for interdisciplinary approaches to address contemporary global challenges. The conference provides a platform for discussion on emerging innovations in science and technology, social sciences, and collaborative research frameworks that contribute to sustainable development and societal progress.

The conference has attracted a large number of research submissions from researchers, academicians, engineers, policymakers, industry professionals, and young scholars representing diverse national and international institutions. Following a rigorous peer-review process, selected high-quality papers have been accepted for presentation and publication in the conference proceedings. These papers are organized into multiple sub-themes (i). Scientific Frontiers: Redesigning Life for Tomorrow, (ii) Society 2050: Transforming Lives through Social Innovation (iii) AIverse: Intelligent Futures & Human-Tech Synergy (iv) Human Renaissance: Art, Culture & Creativity in the Digital Age (v) Ethics & the Sacred: Moral Horizons in an Uncertain World.

The accepted papers are expected to stimulate new ideas, encourage scholarly dialogue, and promote a strong research and innovation culture. The conference also aims to strengthen linkages between academia, research organizations, industry, and policy institutions, fostering meaningful national and international collaborations.

The primary objective of the FutureCON-2026 is to explore new directions for research and development by bringing together experts from diverse disciplines on a common platform. We hope that this conference will prove to be intellectually stimulating and professionally rewarding for all participants. The organizing committee is confident that the conference will serve as a prestigious international forum for sharing research findings, exchanging knowledge, and building lasting academic and professional networks.

Patron-in-Chief
Prof. Dr. Razia Sultana
Vice Chancellor
Women University, Mardan

MESSAGE FROM VICE CHANCELLOR

It is my great privilege and honor to extend a warm welcome to all distinguished guests, delegates, scholars, and participants to the FutureCON-2026, an upcoming International Conference on "The Future Reimagined: Innovation through Science, Social Science and Global Collaboration", being held at Alhamra Hotel, Mardan, Pakistan.

The primary objective of this conference is to serve as a global, cross-disciplinary platform that brings together diverse stakeholders to collaboratively generate innovative and action-oriented solutions for sustainable development. Through meaningful dialogue and knowledge exchange, the conference aims to address pressing global challenges while promoting inclusive growth, climate resilience, and the empowerment of future leaders. FutureCON-2026 provides an excellent opportunity for faculty members, researchers, and students to network, share ideas, and engage with emerging research trends. This conference is the result of the tireless efforts and dedication of the organizing committee, who worked diligently on all aspects of the event, including local arrangements, paper solicitation, and the rigorous evaluation and screening of submissions. I sincerely congratulate the entire team for successfully organizing this remarkable academic event. I would also like to express my sincere appreciation to the reviewers for dedicating their valuable time and expertise to ensure the selection of high-quality research papers for presentation and publication. Their contribution has been vital in maintaining the academic standards of the conference. I am confident that the participation of national and international scholars and researchers in FutureCON-2026 will significantly strengthen collaboration among academia, industry, and research & development organizations. The diverse collection of quality research papers, keynote addresses, and invited talks presented at this cross-disciplinary forum will provide valuable insights into emerging technologies, societal transformations, scientific innovations, and ethical perspectives, thereby highlighting recent trends and shaping future research directions across multiple interconnected fields. I wish FutureCON-2026 every success and hope that all participants find this conference intellectually stimulating, productive, and rewarding.

Prof. Dr. Razia Sultana
Vice Chancellor
Women University, Mardan

OUR ESTEEMED SPONSORS & PARTNERS

FutureCON-2026 proudly celebrates the invaluable support of our distinguished sponsors and partners

Their commitment to advancing research, innovation, and global collaboration has made this international conference possible.

***HEC** (Higher Education Commission): The Women University Mardan, gratefully acknowledge the Higher Education Commission (HEC), Pakistan, for its generous sponsorship and support of FutureCON-26. HEC's commitment to promoting research, innovation, and academic collaboration has played a vital role in the successful organization of this conference. We sincerely appreciate their continued efforts in strengthening higher education and research culture in the country.*

Co-Organizer:

COMSTECH *(Standing Committee on Scientific and Technological Cooperation of the OIC): We extend our deepest gratitude to COMSTECH for their visionary support and leadership in co-organizing FutureCON-2026. Their contribution, including travel sponsorship for invited international participants, has been instrumental in bringing together scholars and innovators from across the globe.*

Platinum Sponsor:

Samsons Group of Companies ***(****Championing cross-disciplinary innovation and excellence) :We sincerely thank Samsons for their extraordinary support as a Platinum Sponsor. Their commitment to fostering innovation, research excellence, and international collaboration has greatly elevated the scale and impact of this conference. Samsons Group of Companies is a diversified Pakistani conglomerate with operations spanning manufacturing, agriculture, hospitality and tourism, education, healthcare, and real estate. Guided by a long-term vision and strong governance, the Group is committed to sustainable growth, operational excellence, and creating lasting economic and social value across its businesses.*

Gold Sponsor:

PASTIC *(Pakistan Scientific & Technological Information Center): We gratefully acknowledge PASTIC for their invaluable support in promoting research excellence and advancing scientific knowledge. Their contributions as a Gold Sponsor have been critical in facilitating meaningful dialogue and collaboration among scholars and professionals.*

Other Sponsors:

Abdul Wali Khan University, Mardan: *We extend our sincere appreciation to* ***Abdul Wali Khan University, Mardan*** *for its invaluable support and collaboration in co-organizing* ***FutureCON-2026****. The University's academic leadership, institutional facilitation, and commitment to research excellence have played a pivotal role in the successful planning and execution of this event. Its support has greatly contributed to fostering an environment of scholarly exchange and innovation, bringing together researchers, academicians, and professionals from diverse disciplines under a shared vision of scientific and technological advancement.*

Alhamra Hotel, Mardan: *We extend our sincere gratitude to* ***Alhamra Hotel, Mardan*** *for its generous hospitality and support in connection with* ***FutureCON-2026****. The hotel's excellent facilities, professional services, and warm accommodation arrangements greatly contributed to the comfort and convenience of our guests, particularly invited speakers and participants. Alhamra Hotel's cooperation and commitment to quality hospitality played an important role in ensuring a welcoming environment and the overall success of the conference.*

Ehsan Chappal House (ECS) *is a well-known footwear brand recognized for quality craftsmanship, comfort, and affordability. With a strong presence in the local market, ECS supports community development, youth empowerment, and educational initiatives. By sponsoring FutureCON 2026, ECS demonstrates its commitment to promoting innovation, learning, and social responsibility while encouraging collaboration between academia, industry, and society.*

ACKNOWLEDGMENT

It is our great pleasure to welcome all participants to the **International Conference** on **"The Future Reimagined: Innovation through Science, Social Science & Global Collaboration."** We extend our sincere appreciation to all authors and researchers for their valuable contributions in the form of oral and poster presentations, which have enriched the scientific and academic content of the conference.

We are deeply grateful to our distinguished keynote and invited speakers from academia, industry, and research organizations for sharing their expertise and insights. Their scholarly addresses have provided valuable guidance and inspiration, contributing significantly to the advancement of knowledge across diverse disciplines.

We would also like to express our heartfelt gratitude to our esteemed sponsors and supporting organizations, whose generous support made this international event possible. In particular, we acknowledge the ***COMSTECH Islamabad, Pakistan Scientific and Technological Information Centre (PASTIC)***, ***Pakistan Science Foundation (PSF)***, ***Higher Education Commission (HEC)***, ***SAMSONS Group of Companies*** and other collaborating academic and industrial partners for their continued encouragement and cooperation.

Our sincere thanks are extended to the organizing team, managing organizers, ORIC WUM, reviewers, session chairs and volunteers who worked tirelessly with dedication and professionalism to ensure the successful planning and execution of the conference. Their commitment and hard work were instrumental in maintaining the high academic standards of this event.

Finally, we are grateful to all participants for their active engagement and contributions. We hope that this conference provides a stimulating platform for knowledge exchange, fosters meaningful collaborations, and contributes to the promotion of research, innovation, and scientific culture at national and international levels.

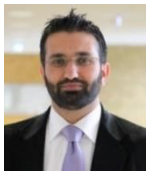
OUR ESTEEMED SPEAKERS

Prof. Dr. Manzoor Hussain Soomro is a distinguished Pakistani scientist and academic leader with extensive experience in education across the board, research & development, science popularisation and science diplomacy. He has served as Chairman of Pakistan Science Foundation (PSF), where he played a pivotal role in strengthening research culture, problem solving, and international S&T collaboration. An accomplished scholar in the field of biological sciences, Prof. Soomro has served FAO of United Nations pioneering technical education of farming communities in Pakistan, and has held key academic and administrative positions at leading institutions, contributing significantly to research capacity building, policy formulation, and innovation-driven education especially for youth. He has also represented Pakistan on international scientific platforms, advocating for science-led sustainable development. He is an Honorary Professor in Chinese Universities and as a Distinguished Overseas S&T Expert in Chinese institutions. He is winner of French award- Order of Academic Palms and the Chinese Government Friendship Award and serves on the Governing Boards of numerous International UNESCO Centres on STI. Prof. Dr. Soomro is widely respected for his visionary leadership, commitment to academic & research excellence, and lifelong dedication to advancing science, technology & innovation, and higher education in Pakistan and beyond. He has to his credit so far five industrial patents and over 250 publications including research papers, books, book chapters and popular articles.

Prof. Dr. Muhammad Rasul Jan is Professor Emeritus at the University of Peshawar and a former Vice Chancellor of the University of Malakand, University of Peshawar, and University of Poonch Rawalakot (AJK). He holds a PhD from University College Cork, Ireland, and has served as a Fulbright Scholar and Visiting Scientist in the USA. A Fellow of the Pakistan Academy of Sciences and Chemical Society of Pakistan, his research focuses on electroanalytical chemistry, sensor fabrication, and environmental and biological chemical speciation. He has over 276 publications, more than 2,600 citations (H-index 24), and is a recipient of the Pride of Performance and Sitara-e-Imtiaz.

Dr. Qibla Ayaz holds a PhD in Islamic and Middle Eastern Studies from the University of Edinburgh, United Kingdom. He is currently a member of the Shariat Appellate Bench at the Supreme Court of Pakistan. Dr. Ayaz has an illustrious academic career, having served as Vice-Chancellor of the University of Peshawar and Islamia College Peshawar, as

well as Professor and Dean of the Faculty of Islamic and Oriental Studies at the University of Peshawar. His areas of expertise include constitutional studies, law and governance, education and society, religious diversity, interfaith dialogue, and social harmony. He has also served as Chairman of the Council of Islamic Ideology (CII) for two terms: from 2017 to 2020 and then from April 2021 to April 2024. Dr. Ayaz has extensive international academic exposure and a strong research profile with significant citations and scholarly impact.



Prof. Dr. Iftikhar Ahmad is Professor and Program Director of the Master of Software Engineering at the University of Europe for Applied Sciences (UE) Innovation Hub, Potsdam, Germany, where he teaches and researches in software engineering and related disciplines. He has extensive academic and professional experience with expertise in machine learning, responsible AI, explainable AI, and social network analysis. His work spans higher education teaching, administration, and consultancy in AI and software systems. Dr. Ahmad earned his doctoral degree in engineering sciences from the University of Saarland, Germany, and has contributed significantly to research and innovation in computing and AI.

Prof. Dr. Muhammad Afzal (Pride of Performance) is Deputy Chief Scientist, Group Leader, and Head of the Environmental Monitoring Laboratory at the National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad. He is a Professional Wetlands Scientist and a leading authority in soil and environmental biotechnology. He holds a PhD in Microbial Ecology/Phytotechnology from Australia and serves in the Soil & Environmental Biotechnology Division at NIBGE. His outstanding scientific contributions have been recognized with the **President's Award for Pride of Performance**, **Pakistan Academy of Sciences Gold Medal**, and the **Nature Research Award for Driving Global Impact**. He is widely known for his pioneering research in environmental monitoring, bioremediation, and sustainable biotechnological solutions in Pakistan.

Prof. Dr. Ghulam Nabi is an internationally recognized wildlife eco-physiologist and conservation biologist specializing in the physiological and molecular responses of endangered species to anthropogenic stressors, climate change, and pollution. He has held academic and research positions in China and Poland and is currently leading an EU-funded Marie Skłodowska-Curie research project on wildlife stress and reproduction. With more than 100 high-impact publications, over 5,700 citations, and editorial roles in leading international journals, he is a prominent contributor to global biodiversity conservation and eco-physiological research.

Prof. Dr. Farhat Jabeen is Dean, Faculty of Life Sciences, Government College University Faisalabad, and Vice Chairperson of The Applied Zoological Society of Pakistan. She holds an MPhil and PhD from Quaid-i-Azam University Islamabad and completed two postdoctoral fellowships at Newcastle University, UK, funded by the Islamic Development Bank and HEC Pakistan. She has served as Principal Investigator for six funded research projects (three international and three national) and has published over 200 research articles in reputable journals. She is the recipient of several prestigious awards, including *Zoologist of the Year 2025*, HEC Best University Teacher Award, Chancellor's Gold Medal, and Excellent Leadership Awards from the Islamic Development Bank.

Prof. Dr. Neelma Munir is Professor of Biotechnology at Lahore College for Women University, specializing in Plant and Algal Biotechnology. With over 15 years of academic and research experience, she has published more than 100 research papers, holds an H-index of 25, and has over 2,000 citations. Her research focuses on nanotechnology, algal biomass, saline agriculture, renewable energy, phytoremediation, and algal biofuels. She has supervised over 100 graduate students, led major HEC-funded projects, secured more than PKR 17 million in research grants, and holds a granted patent for her innovative contributions to sustainable biotechnology.

Dr. Davut Sahbaz, Associate Prof. University of Ankara, Turkey**,** completed his undergraduate studies in Urdu Language and Literature at Ankara University, Faculty of Languages, History and Geography. He earned his MA with a thesis on the influence of Romanticism on Urdu prose and completed his PhD on the establishment of Pakistan within the framework of the Two-Nation Theory, with a focus on the Kashmir issue. He also completed degrees in Business Administration at Anadolu University and Public Relations at Ankara University. In 2022, he conducted post-doctoral research at Heidelberg University, South Asia Institute, where he served as a visiting faculty member. He carried out extensive field research in Pakistan between 2014 and 2024. He received the title of Associate Professor in 2021 and was awarded the Nayyar Adbi Award for his international contributions to Urdu studies. His research interests include Urdu literature, Translation Studies, Indo-Muslim cultural history, and South Asian history.

Dr. Fiaz Ahmad, China is an Associate Professor specializing in Microbiology, Biotechnology, and Resource Management. His research focuses on microbe–microbe and microbe–material interactions for bioremediation, carbon capture, and green recovery of minerals and metals, promoting sustainable environmental practices and the circular economy. He has received several awards, including the International Cooperation Award**,** Best Paper Award (Lisbon, 2019)**,** HEC Best Research Paper of the Year**,**and Outstanding Doctoral Graduate Student Award**.** Dr. Ahmad completed postdoctoral research atHainan University, China**,** holds09**,** has published35+ papers**,** contributed two book chapters, and delivered keynote talks internationally.

Dr. Zoltán Kelemen is Assistant Professor at Corvinus University of Budapest (CUB) since 2016. In the academic year 2017-2018, he was tutor at Central European University (CEU) where was teaching International Relations and Political Science. Zoltán has an MA in History and a Ph.D. in International Relations. In 2021, he won the 'Lecturer of the Year Award' at CUB. In 2022, he won a Fulbright Scholarship to the University of Pittsburgh to instruct the David C. Frederick Honors College Course 'Rule of Law and Democracy in Europe'. In 2023, he was Eötvös scholar at Ludwig-Maximilian University's Project House Europe in Munich.

Dr. Noha Nijjim Palestine is an accomplished academic leader and economist with nearly 20 years of experience in higher education. She has served as Acting Dean of the Faculty of Economics and Administrative Sciences at Al-Azhar University, Gaza where she also played a key role on the International Relations strengthening during the challenging times for the region. Moreover, she has actively collaborated contributed to international academic collaboration and has worked with international organizations on education and economic development projects as a training and grants specialist. Her research interests inclue conflict and uncertainty economics, consumer well-being, women's economic empowerment, and Islamic economics.

Ali Raza Khan is the Founder & CEO of YES Network Pakistan and the creator of the globally recognized Trust-First Changemaking Model, a framework that activates young people as changemakers by placing trust before proof. As Ashoka Fellow and Sauvé Scholar, he has built one of the world's largest youth-led ecosystems, engaging over 500,000 young people across 1,200+ institutions. His work has influenced youth policy and been implemented with partners including British Council, USAID, GIZ, and USIP, with replication across Asia and Africa. Ali has spoken on

international platforms in 25+ countries and shared insights with global leaders including President Bill Clinton. He currently teaches and advises universities and institutions worldwide on embedding trust-based, impact-driven changemaking cultures.

Dr. Akhtar Rasool is an Assistant Professor at the University of Swat, Pakistan, with a distinguished academic and research background in zoology and life sciences. He has extensive experience in teaching undergraduate and graduate courses, supervising research projects, and contributing to scientific advancement in his field. Dr. Rasool's research interests include molecular biology, ecological studies, and applied biological sciences. He is recognised for his commitment to student mentoring, curriculum development, and fostering academic excellence within the department. Through his scholarly activities and collaborations, Dr. Rasool continues to contribute to both national and international scientific communities.

Mr. Fazli Sattar Durrani is a distinguished academic and cultural leader serving. With over 23 years of teaching and administrative experience, he holds advanced qualifications from the University of Catania, Italy, and the University of Peshawar. His academic expertise spans Communication Design, Art History, Cultural Economics, and Art Administration. He is the Founding Principal of PCA and has served as a Member of the Board of Governors, PNCA (2016–2019), Executive Member of ICOM (2016–2022), and South Asian Expert for IGCAT, Spain. He has been a Member of NCRC since 2013 and Co-Convener for NCRC (2025). He is a recipient of the UNESCO Best Teacher Award (2005).

Dr. Shahzadi Pakeeza is Associate Professor and Chairperson of the Department of Islamic Studies at Fatima Jinnah Women University, Rawalpindi, serving since 2013. She earned a gold medal in her Master's and completed postdoctoral fellowships at the University of Texas, Austin (2015) and University of California (2022) under HEC scholarships. Recipient of HEC's Best University Teacher Award, she has over 80 publications in national and international journals and has led research projects, including the Digital Arabic Language Lab. She has organized multiple national and international conferences and workshops and actively contributes to curriculum review and scholarly forums globally.

Dr. Ali Talha Khalil is an Associate Professor and Associate Dean (Research) and an internationally recognized scientist in precision oncogenomics, biomaterials, and ethics of science and technology. He established a state-of-the-art molecular biology laboratory and has published over 96 journal articles, 12 book chapters, and 3 edited books, with more than 9,000 citations (h-index 52). He is the recipient of the Pakistan Academy of Sciences Gold Medal and a TWAS Young Affiliate (2026–2030). Dr. Khalil actively serves global scientific organizations, is a Fellow of ASM and UNESCO Chair, a PNAC assessor, and a certified science diplomacy expert.

OUR PANELISTS

Prof. Dr. Hazir Rahman (PhD, Germany) is the Chairman of Department of Microbiology and Medical Laboratory Technology at Abdul Wali Khan University Mardan, Pakistan, with over 120 peer-reviewed publications and 2,700+ citations. His research focuses on antimicrobial resistance threats, drug-resistant bacterial pathogens, and proteomics-driven diagnostics for infectious diseases affecting blood and systemic health. Dr. Rahman is IFBA-certified in biorisk management, a recipient of the HEC Best University Teacher Award, and multiple national research excellence awards. His work bridges preventive medicine, AMR surveillance, and sustainable healthcare systems, particularly in low- and middle-income settings.

Professor Dr. Taj Ali Khan, is a professor of Medical Microbiology with over 18 years of experience in higher education, clinical diagnostics, and research on antimicrobial resistance, host–pathogen interactions, primary immunodeficiencies, & microbial genomics. Holds a PhD from the University of São Paulo, Brazil, with postdoctoral training in Denmark & the USA. Has led research and diagnostic laboratories, managed national and international funded projects, & supported infectious disease diagnosis, outbreak response, & AMR surveillance at Khyber Medical University. He is committed to building autonomous, research-driven universities through transparent governance, innovation, & sustainable growth.

Dr. Gulab Fatima Rani is an Assistant Professor of Hematology at the Institute of Pathology & Diagnostic Medicine, Khyber Medical University, Pakistan, with over 10 years of clinical & academic experience. She holds an MBBS, MPhil, and PhD from the University of York, UK, and has expertise in immunology, hematology, & infectious diseases. Her research focuses on immune regulation, hemoglobinopathies, myeloproliferative disorders, primary immunodeficiencies, and genomic approaches to various diseases. She has an extensive publication record, serves as Co-PI on research grants, actively supervises postgraduate students, and contributes to bioethics & biosafety governance at institutional level.

Dr. Zia Ashraf is serving as Assistant Professor at Government College University, Faisalabad, with IFBA certification in Biorisk Management, Biocontainment Facility Design and Maintenance, Biological Waste Management, Biosafety Cabinet Care, Use and Installation, and Biosecurity. Serves as Master Trainer with the Pakistan Biological Safety Association, Fellow of the UN-Youth for Biosecurity Fellowship, and Global Mentor with IFBA, GHSA, and ASM FLMF programs. Actively engaged in biosafety capacity building, training, and mentoring to strengthen biosecurity, laboratory safety, and responsible life sciences practices in Pakistan.

ABOUT PASTIC

The Pakistan Scientific & Technological Information Centre (PASTIC) is a constituent organization of the Pakistan Science Foundation (PSF) operating under the Ministry of Science and Technology (MoST), Government of Pakistan. PASTIC is a premier national institution specialized in the collection, organization, management, and dissemination of Scientific and Technological Information (STI) to support research, development, and industrial innovation across the country.

The PASTIC National Centre is located at the Quaid-e-Azam University Campus, Islamabad, with a nationwide network of six Sub-Centres in Karachi, Lahore, Peshawar, Quetta, Faisalabad, and Muzaffarabad, ensuring broad regional outreach.

Since its inception, PASTIC has played a pioneering role in supporting Pakistan's research community, particularly during the early stages of national S&T infrastructure development. Its services historically included the supply of scientific and technical literature, abstracts and indexes, bibliographies, translations, patent information, science reference library services, technological information transfer, computer-based information dissemination, and reprographic and publication services.

For further details visit: www.pastic.gov.pk

PASTIC Objectives

- Development of National Scientific & Technological Information (STI) resources (databases)
- Dissemination of Scientific & Technological Information through contemporary reference information tools
- Collaboration & Cooperation with institutional libraries/repositories for resource sharing
- Promotion of R&D based industrial development
- Printing of S&T/R&D Publications
- Capacity/skill development of researchers, information professionals, innovators & entrepreneurs
- Development of collaborations with national and international information networks

PASTIC Functions

S&T Publications

- *Technology Roundup:* Publish bi-monthly bulletin by repackaging of latest global Trade and Technology information.

- Abstract Books of Conferences: PASTIC supports publication/printing of Abstract Books of Conferences organized by various S&T universities (on request).

PASTIC Online databases

- Pakistan Science Abstracts (PSA): Abstracts of research published in Pakistani S&T Journals & Conference Proceedings etc.
- National Digital Archive (NDA): Full text digital repository of National Journals
- PakCat: Union Online Public Access Catalogue (OPAC) of books available in Scientific & Technological Libraries of Pakistan
- Digital Repository of Indigenous S&T literature
- Directory of Scientific Periodicals of Pakistan: An index of scientific periodicals (e.g., Journals, Magazines etc.) published in Pakistan.
- Database of R&D Projects executed in Pakistan
- Database of Books published by Pakistani authors
- National Scientists Directory (NSD)
- Industry related databases (e.g., Industries, Industrial challenges etc.)

Promotion of Commercializable Technologies & Industrial Products

Organize STEM and IT Expo for promotion of local R&D, SMEs, technologies/products/services, as well as empowering youth and general public on new and faster ways of delivering and accessing information.

National Science Reference Library Facility

A state-of-the-art Traditional Library facilitating the researcher through following services: Reference & Referral Services; Reader Service; Internet Service, Journal Listings; Photocopying & Scanning Services.

Skill Development/Capacity Building

Organize Seminars/Workshops /Trainings/ for capacity building of:

- Young Researchers on Data analysis, Reference Management etc.
- Women Entrepreneurs on E-marketing &E-business skills
- Library Professionals on Library automation & digitization
- Journal Publisher/Editors on E-Journal management & publishing
- Researchers and Innovators on Intellectual Property Rights, Media Information Literacy

CONFERENCE PROGRAM

Day 1 – Tuesday, February, 10, 2026

Time	Activity
09:30–10:30	Participants registrations, seating and arrival of the guests
10:30–11:00	**Tea**
	Opening Ceremony (Crystal Hall, Alhamra Hotel, Mardan)
11:00–11:05	Recitation
11:05–11:10	National Anthem of Pakistan
11:10–11:20	Welcome Note by **Prof. Dr. Razia Sultana,** Vice Chancellor, Women University Mardan
11:20–11:40	Opening Keynote, **Prof. Dr Manzoor Hussain Soomro (**Advisor and Immediate Past President, ECO Science Foundation, Former Chairman, Pakistan Science Foundation and Vice President of Belt & Road Science Education Consortium/BRISEC) Industrial Transformation for Economic Development and the Need for AI Education
11:40–12:00	**Prof. Dr. Farhat Jabeen (**GC University Faisalabad) Decoding Our Blueprint: Genetic Disorders from Bench to Bedside
12:00–12:20	**Dr. Noha Nijim (**Al-Azhar University, Gaza, Palestine) Impact of Innovation on the Economic Empowerment of Women during Conflicts: A Case Study on Palestinian Women in Gaza, Palestine
12:20–12:40	**Dr. Zoltan Kelemen** (Corvinus University of Budapest, Hungary) Democratic Backsliding and Neomedievalism: A Longue Durée Explanation of Sovereignism in East Central Europe
12:40–12:55	Address by **Prof. Dr. Muhammad Akram Sheikh (**Director General PASTIC)
12:40–01:00	Address by the Guest of Honor, **Prof. Dr. Muhammad Rasul Jan (**Professor Emeritus, University of Peshawar)
01:00–01:15	Address by the Chief Guest
01:15–01:30	Presentation of Souvenirs
01:30–02:30	**Opening Lunch/Networking**

Keynote Talks and Technical Session-I
(Hall-A, 2:30-4:20 pm)
Theme 1: Scientific Frontiers: Redesigning Life for Tomorrow

Chair: Prof. Dr. Aurangzeb Khan (AWKUM, Ex-Vice Chancellor ULM)
Co-Chair: Dr. Zia Ashraf (GC University Faisalabad)
Moderator: Dr. Huma Fatima (WUM**)**

Keynote Talks

02:30-2:50	**Keynote Talk: Prof. Dr. Ghulam Nabi (**University of Swat) Anthropogenic activities accelerate biodiversity extinction: Lessons from China
02:50 – 3:10	**Keynote Talk: Dr. Fiaz Ahmad** (NPU, China) Innovations in Biofuel Production: Powering a Cleaner and Healthier Future

Technical Talks

03:10–03:20 **Kosar Wafa** (University of Makran, Panjgoor) Morphological Characterization of Different Date Palm Varieties in Panjgur Balochistan Pakistan

03:20–03:30 **Aqsa Ali (**WUM**)** Whole Transcriptome Sequencing of the Immunologically Categorized TB Patients

03:30–03:40 **Dr. Naveen Dilawar (**WUM) Potential of Rhizospheric Fungi to Reduce Copper and Lead Toxicity in Riticum aestivum L.

03:40–03:50 **Sabiha Kanwal (**Capital University of Science and Technology) Identification of Bacterial Leaf Blight Resistance Genes in Diverse Local Rice Germ-plasm

03:50–04:00 **Nazma Bibi (**Hazara University, Mansehra) Protein Profiling of Diverse Local and Exotic Taramira (*Eruca sativa* Mill.) germplasm using SDS-PAGE analysis

04:00–04:10 **Noor Saba (**University of Haripur) Synthesis and Characterization of Mo-Doped SnO_2 Nanostructure-Based Photoanodes

04:10–04:20 **Lubna Gul (**Bacha Khan University Charsadda) The Investigation of Chia Seeds on the Lipid Profile of Adult Residents with High Cholesterol

04:20–04:30 **Certificate Distribution by the Chair of the Session**

Hall-B

Theme 2: Society 2050: Transforming Lives through Social Innovation

Chair: Prof. Dr. Romana Bangash (NUST Business School, Islamabad)
Co-Chair: Prof. Dr. Zoltan Kelemen (Corvinus University of Budapest, Hungary)
Moderator: Dr. Asma Saeed, WUM

Keynote Talks

02:30–2:50 **Keynote Talk: Mr. Ali Raza (**CEO Yes Network Pakistan) The Architecture of Change: Why Trust Must Precede Transformation

Technical Talks

02:50–3:00 **Prof. Dr. Hikmat Afridi (**Lt.Col. Director Academics, APSCS, Sialkot) Global Migration and Refugee Policy: Challenges, Impacts, and Pathways to Human Security

03:00–3:10 **Dr. Juliyana Usman (**University of Karachi) The role of global governance in Upholding International Law and Human Rights

03:10–3:20 **Muhammad Talha (**Air University, Attock Campus) Exploring Customer Centric Metaverse Adoption: Transforming Virtual interaction into Sustainable Engagement **(online)**

03:20–3:30 **Tehmeena Hanif (**FJWU, Rawalpindi) Translation and Adaptation of Urdu Version of Mindfulness-Based Stress Reduction for Students **(online)**

03:30–3:40 **Muskan Seher (**Air University, Attock Campus) Platform Design, Perceived Autonomy, and Value Co-Creation in Social Media Applications **(online)**

03:40–3:50 **Dr. Syeda Razia Bukhari (**SZABIST, Islamabad) The Impact of Parental Expectation on Academic Achievement: Role of Academic Self-Efficacy

03:50–4:00 **Mariam Akbar (**NUML) Exploring the Relationship between Emotional Intelligence, Work-life Balance, and Occupational Burnout among Lawyers in Pakistan

04:00–4:10 **Marvee (**WUM) Isolation and Alienation in Technological Future: A Critical Study of the Machine Stops

04:10–4:20 **Certificate Distribution by the Chair of the Session**

Day 2–Thursday, February, 11 2026

Morning Parallel Sessions (9:30–11:10)

Panel Discussion (Hall-A)

Theme: From Hospitals to Habitats: Healing Humans & the Planet Together

Chair: Dr. Fazal Akbar (University of Swat)
Co-Chair: Prof. Dr. Muhammad Hidayat Rasool, Director**,** Institute of Microbiology, GC University, Faisalabad
Moderator: Dr. Gulab Fatima Rani (Khyber Medical University, Peshawar)
Panelists:
Prof. Dr. Hazir Rehman (Abdul Wali Khan University Mardan)
Prof. Dr. Taj Ali Khan (Khyber Medical University, Peshawar)
Dr. Zia Ashraf (UN Youth for Biosecurity Fellow, GCUF)
Dr. Ali Talha Khalil (Lady Reading Hospital Peshawar)

09:30-09:45 **Introduction and brief by Moderator**
09:45-10:30 **Discussions**
10:30-10:50 **Q & A session**
10:50-11:00 **Closing remarks by the Session Chair**
11:00-11:10 **Certificates and Shields distribution by the Session Chair**
11:00-11:20 **Tea Break**

Keynote and Technical Session-II (Hall-B)

Theme 3: AIverse: Intelligent Futures & Human-Tech Synergy

Chair: Prof. Dr. Noha Nijim (Al-Azhar University, Gaza, Palestine)
Co-Chair: Dr. Rakhshinda Sadiq (Women University Mardan)
Moderator: Dr. Ambreen Shehnaz (Women University Mardan)

Keynote Talk

09:30-10:00 **Keynote Talk: Prof. Dr. Iftikhar Ahmad (**University of Europe, Germany/PHC) Global, Governing AI in Healthcare–Challenges in Designing Guidelines, Policies, and Regulations (Online)

Technical Talks

10:00-10:10 **Dr. Atta Ullah Khan (**NUMS, Islamabad) Bridging the Human-Technology Divide: The Impact of Artificial Intelligence on HR Functions
10:10-10:20 **Dr. Asif Saleem (**Bacha Khan University, Charsadda) The role of AI in through The Deep fakes and Misinformation
10:20-10:30 **Dr Antalzia (**SBBWU, Peshawar) Use and Effectiveness of Artificial Intelligence in Urdu Research
10:30-10:40 **Nida Andaleeb Khatak (**AWKUM) Judging Creativity in the Age of Algorithms: How Artificial Intelligence Reshapes Studio Pedagogy and the Evaluation of Art
10:50-11:00 **Ms. Mehwish Munir (**WUM) From Print Culture to Digital Culture: A New Renaissance of Human Creativity
11:00-11:10 **Dr. Mehnaz (**WUM) Numerical Solution of Space Fractional Partial Differential Equations
11:00-11:20 **Tea Break**

Parallel Sessions: 11:20 am-1:30 pm

Technical Session-III (Hall-A)

Theme 4: Human Renaissance: Art, Culture & Creativity in the Digital Age

Theme 5: Ethics & the Sacred: Moral Horizons in an Uncertain World

Chair: Prof. Dr. Hikmat Afridi (Director Academics, APSCS, Sialkot)

Co-Chair: Dr. Rani Begum (Women University Mardan)

Moderator: Dr. Nelofar Ikram (Women University Mardan)

11:20-11:40	**Keynote Talk: Dr. Davut Sahbaz (**University of Ankara, Turkey) (online)
11:40-12:00	**Keynote Talk: Dr. Fazali Sattar Durrani (**AWKUM) Human Renaissance: Art, Culture & Creativity in the Digital Age
12:00-12:20	**Invited Talk: Dr. Shehzadi Pakeeza (**FJWU, Rawalpindi) Sacred Ethics and Human Rights: Harmonizing Divine Command and Universal Norms
	Technical Talks
12:20-12:30	**Nighat Zia (**AWKUM) Fashion Designing in the Digital Era
12:30-12:40	**Dr. Syed Ali Asad Naqvi (**GC University Faisalabad) Geographical Information Systems in the Era of the Fourth Industrial Revolution: From Digital Mapping to Real-Time Geospatial Intelligence
12:40-12:50	**Ms. Mariam Bibi (**WUM) From Flesh to Filters: A Feminist Critique of Digital Beauty Standards in Pixel Flesh
12:50-01:00	**Dr. Raheela Bibi (**SBB Women University Peshawar) Interfaith Ethics and Global Solidarity (Novel: Hasil by Umera Ahmed)
01:00-01:10	**Dr. Ayesha Snober (**SBK Women University Quetta) Prophetic Leadership: An Ethical and Strategic Framework for Crisis Management
01:10–01:20	**Certificate Distribution by the Chair of the Session**
01:20-02:30	**Lunch and Prayer**

Technical Session-III (Hall-B)

Theme 6: Healthscapes of Tomorrow: Rethinking Wellbeing in a Sustainable World

Chair: Prof. Dr. Ghulam Nabi (University of Swat)

Co-Chair: Dr. Akhtar Rasool (Deptt. of Biotechnology, University of Swat)

Moderator: Dr. Naila Zubair (Women University Mardan)

11:20-11:40	**Keynote Talk: Prof. Dr. Neelma Munir (**Lahore College for Women University)
11:40-12:00	**Keynote Talk: Dr. Akhtar Rasool (**University of Swat) Effect of environment on the brain anatomy of brown trout (Salmotrutta) relative to their body weight and length
12:00–12:20	**Invited Talk: Dr. Ali Talha Khalil (**Lady Reading Hospital Peshawar) Distinct Mutational Landscapes in DNA Repair Genes Reveal Novel Pathogenic Variants in Breast Cancer Patients of Pakhtun Ethnicity
12:20-12: 40	**Invited Talk: Dr. Gulab Fatima Rani,** Guest of Honor**, (**KMU, Peshawar) Awareness about genetic disorders: Inheritance, treatment and prevention

Technical talks

12:40–12:50	**Rida Asif (**NUMS, Islamabad) Mapping the Network: A Stakeholder Analysis of Child and Maternal Nutrition Governance in Pakistan during the MDGs Era (2000-2015)
12:50–1:00	**Ishtiaq Ahmad Awan (**Bacha Khan Medical Complex, Swabi) Role of Resilience on Fear of Infection Among Caregivers of HIV Patients
01:00-1:10	**Mehtab Hussain (**AIOU, Islamabad) Optimizing Legibility of Urdu Handwriting amongst Students with Learning Disabilities Employing a Cognitive Load-Aware Scaffolded Program (CLASP-H)
01:10-1:20	**Certificate Distribution by the Chair of the Session**
01:20-2:30	**Lunch and Prayer**

Closing Ceremony
Date: February 11, 2026
Time: 3:00 pm-5:00 pm
Venue: Crystal Hall, Alhamra Hotel, Mardan

03:00–3:10	Recitation
03:10–3:25	Address by the Vice Chancellor, Women University Mardan
03:25–3:50	Remarks by the speakers/participants
03:50–4:10	**Prof. Dr. Qibla Ayaz (**Shariat Appellate Bench, Supreme Court of Pakistan)
03:10–4:30	Address by the Chief Guest
04:30–4:50	Presentation of Souvenirs
04:50–5:00	Group Photo
05:00	Tea
07:00–8:30	Dinner/Bonfire

Day 3–Thursday, February 12, 2026

Visit to UNESCO Heritage Site, Takht-i-bai
10:00–1:00 pm
DEPARTURE

ABSTRACTS

KEYNOTE

Reimagining the future from the perspective of Chemical sciences

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Rapid industrialization and intensive agricultural practices have led to a significant increase in environmental contamination by heavy metals, pesticide residues, and endocrine-disrupting chemicals (EDCs), posing serious risks to ecosystems and human health even at trace concentrations. Addressing these complex challenges requires reimagining the future through innovative scientific approaches, informed societal engagement, and strengthened global collaboration. This presentation highlights recent advances in analytical and environmental chemistry, with particular emphasis on the development of sensitive, selective, and sustainable analytical methods for the determination of heavy metals in water, pesticide residues, and EDCs. Focus is placed on modern sample-preparation strategies, including green and miniaturized extraction techniques, as well as the application of advanced instrumental methodologies. The role of the social sciences in shaping public awareness, risk communication, and evidence-based policy development is also explored, ensuring that scientific findings are effectively translated into practical environmental action. In addition, the importance of global collaboration is discussed, particularly in relation to harmonizing analytical protocols, sharing environmental data, and strengthening research capacity through international partnerships.

Keywords: Environmental contamination; Heavy metals; Pesticide residues; Endocrine-disrupting chemicals (EDCs).

Application of an indigenous and local knowledge-driven floating treatment Wetlands technology for wastewater treatment for SDG-6

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In Pakistan, due to very high capital and operational costs of conventional technologies, > 99% wastewater is discharged in water bodies untreated. This wastewater contaminates the water, soil and food. To address this issue of high cost of wastewater treatment, a very low-cost floating treatment wetlands (FTWs) technology has been developed using locally designed and developed floating mat and available indigenous plants and microbes. FTWs are a low cost, sustainable, and environment friendly technology for wastewater treatment and reuse. It requires ~100 times lower capital investment than conventional technologies, without any operational cost. Until now 500,000 sq ft FTWs have been sapplied at more than 100 sites in Pakistan and it improves the quality of about 500 million cubic meter

wastewater annually, and sequesters 300 tons of carbon per year. It removes (up to 90%) both organic and inorganic pollutants from the wastewater, and treated water is being safely discharge in the environment or reuse in agriculture and horticulture.

Keywords: Wastewater treatment; Floating treatment wetlands (FTWs); Sustainable water management; Water–soil–food contamination; Carbon sequestration; Nature-based solutions; Pakistan

Anthropogenic activities accelerate biodiversity extinction: Lessons from China's Conservation Successes

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Pakistan, the 5th populous country in the world, is the most vulnerable and affected country by extreme weather, overpopulation, enormous air and water pollution, and habitat degradation and fragmentation. These unfavourable conditions have threatened the existence of many iconic wild species in the aquatic and terrestrial environment. Several species in Pakistan, including mammals, birds, and fish, are either locally extinct or near extinction. If the current rate of environmental deterioration continues, more species will face the risk of extinction. China experienced massive biodiversity loss in the past. However, due to their well-organized national biodiversity conservation plan, China has recovered hundreds of species from the brink of extinction. Understanding their conservation strategies, including *in-situ*, *ex-situ*, population monitoring programs, artificial breeding, strengthening the legal framework of wild protection, and investing in scientific research could provide fruitful lessons for wildlife conservation in Pakistan.

Keywords: Anthropogenic pressure, Biodiversity, Conservation, China, Extinction, Pakistan

Decoding Our Blueprint: Genetic Disorders from Bench to Bedside

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Genetic disorders result from alterations in DNA structure, function, or regulation and are a major cause of morbidity, disability, and early mortality worldwide. They reflect a biological continuum in which genomic changes affect molecular and cellular pathways, leading to organ dysfunction and diverse clinical phenotypes across neurodevelopmental, metabolic, sensory, and neuromuscular systems. Population genetics plays a central role in shaping disease burden. Consanguinity and population structure significantly

increase the prevalence of autosomal recessive disorders in many regions, posing public health challenges while offering opportunities for gene discovery, precise risk assessment, and population-specific screening and preventive strategies. Advances in genomic diagnostics have transformed identification and characterization of genetic disorders. High-throughput sequencing complements traditional cytogenetic and biochemical approaches, enabling precise molecular diagnosis, early detection, and improved prognostic prediction. Therapeutic strategies are evolving from symptomatic management to targeted, disease-modifying interventions, including gene- and RNA-based therapies and emerging gene-editing technologies. Translating these insights into clinical practice requires integration of molecular understanding with ethical, equitable, and population-informed care. Collectively, this framework highlights the potential of genomic medicine to improve patient outcomes, reduce disease burden, and guide informed strategies for diagnosis, treatment, and prevention across diverse populations.

Keywords: Genetic Disorders, Molecular Pathogenesis, Genotype–Phenotype Correlation, Consanguinity, Genomic Diagnostics, Precision Medicine, Gene Therapy, Translational Genomics

Redefining the Future of Natural Sciences in the era of AI: From Microscope to Machine Learning

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The integration of Artificial Intelligence (AI), particularly Machine Learning (ML) and Deep Learning (DL), marks a profound paradigm shift in the natural sciences, fundamentally altering traditional research methodologies. This abstract explores the transformative impact of AI, moving the frontier of discovery from the visual analysis of the microscope to the rapid, data-centric insights of Machine Learning. AI systems are now indispensable tools for managing the unprecedented scale and complexity of data generated across disciplines, from genomics and materials science to astronomy and environmental monitoring. In cellular and molecular biology, AI-driven applications, such as in microscopy image analysis, enable automated, high-throughput segmentation, object detection and morphological characterization with accuracy and speed far surpassing manual human capability. This enhances the ability to study cellular dynamics, disease pathology, and drug effects. However, the effective adoption of AI necessitates addressing critical challenges, including ensuring data quality and standardization, improving model interpretability (avoiding "black box" outcomes), and establishing ethical governance to mitigate biases and ensure reproducibility. In conclusion, the convergence of AI with natural sciences is redefining the essence of scientific practice. By augmenting human intellect

and automating complex tasks, AI does not replace the scientist but acts as an indispensable partner, driving faster, more accurate, and globally collaborative discoveries that promise to expand the frontiers of knowledge and deliver societal benefits.

Keywords: Artificial Intelligence, Machine Learning, automating complex tasks, societal benefits

From Pollution to Resource: Microalgae–Bacteria Systems for Metal Recovery and CO_2 Capture

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As we transition from hydrocarbon reliance to clean energy, the demand for metals crucial to energy production and storage is rapidly increasing. These metals are essential for manufacturing clean energy technologies and batteries. However, the non-renewable nature and toxicity of these metals underscore the urgent need for sustainable, cost-effective, and eco-friendly technologies for their recovery from waste resources and spent energy storage batteries. Central to addressing these challenges are the interactions between microalgae, bacteria, and minerals, which play a significant role in both the health and degradation of Earth's ecosystems. Despite significant advances in understanding how microorganisms influence aquatic ecosystems, the roles of microalgae and bacteria in polluted waters and waste resources have often been studied in isolation. Our research systematically examines the tripartite interactions between microalgae, bacteria, and metals/minerals to elucidate microbial survival mechanisms under elevated metal stress. We provide insights into the modulation of the photosynthetic system, and the production of hormones and proteins, all contributing to survival and metal mitigation. Additionally, we have designed a self-sustained, solar-powered system for the sustainable recovery of metals, such as Ag, Pb, Cu, Li, Co, and rare earth elements (REEs)achieving metal removal rates of up to 99.6%. The role of specific extracellular proteins in these microbes has been validated in vitro, shedding light on the mechanisms underlying metal recovery and upcycling. Notably, our recent findings demonstrate for the first time how extracellular silicification in green microalgae significantly enhances their survival and metal removal capacity. This research lays a strong foundation for developing pathways to recover metals, sequester atmospheric CO_2, and ensure a sustainable metal supply for clean energy production. Additionally, it suggests the potential for microalgae biomass to contribute to the production of clean energy, such as hydrogen or biofuels, through the development of a self-sustained system with zero waste production.

Keywords: Clean energy transition; Waste resource valorization; Microalgae–bacteria interactions; Bio-recovery of metals; Sustainable energy materials; Zero-waste systems

Molecular Evolution Meets Public Health: *Aedes* Mosquito Resistance and Global Strategies for Sustainable Dengue Control

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Dengue fever remains a significant public health issue worldwide, especially in tropical and subtropical regions where mosquitoes, primarily Aedes, are highly effective vectors. The high rate of insecticide resistance development in Aedes aegypti and Aedes albopictus has greatly reduced the effectiveness of traditional vector control methods, despite ongoing control efforts. Therefore, understanding the molecular evolutionary processes that have enabled this resistance is crucial for rethinking sustainable dengue control in the future. This discussion covers recent advances in the molecular evolution of Aedes mosquito resistance, including genetic, genomic, and adaptive mechanisms that allow mosquitoes to rapidly adapt to chemical and environmental pressures through selection. It highlights key mutations linked to resistance, metabolic systems involved in detoxification, and the population dynamics that influence how resistance emerges and spreads. By integrating molecular data with ecological and epidemiological approaches, the presentation demonstrates how evolutionary concepts can inform evidence-based vector management. Alongside laboratory and field discoveries, the talk underscores the importance of interdisciplinary and international collaborations in translating molecular knowledge into population health solutions. Novel strategies such as resistance surveillance based on molecular markers, combined vector control measures, community participation, and region-specific policy models are discussed as vital components of sustainable dengue management. Ultimately, this presentation suggests that advancing dengue transmission control relies on aligning molecular evolution research with public health initiatives.

Keywords: *Aedes* mosquitoes; Insecticide resistance; Molecular evolution; Genetic and genomic adaptation; Resistance-associated mutations; Resistance surveillance

Impact of Innovation on the Economic Empowerment of Women during Conflicts: A Case Study on Palestinian Women in Gaza, Palestine"

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This paper examines the impact of innovation on women's resilience and the restoration of economic empowerment during and after conflict, with a specific focus on the opportunities and challenges faced by Palestinian women during the ongoing war on Gaza since October 7, 2023. The study views innovation not only as a technological or economic tool, but also as a social and adaptive mechanism that enables women to cope, survive, and rebuild amid extreme instability.Given the lack of official data on women-led enterprises, due to the dangerous and rapidly changing conditions of the war, the research adopts a qualitative approach. In-depth interviews were conducted with ten female entrepreneurs and social activists involved in community support, small-scale economic activities, and innovative survival strategies throughout the conflict. These women represent diverse fields, including digital services, home-based work, education support, crafts, and humanitarian efforts, offering insight into grassroots innovation under crisis. Findings show that innovation has been essential in helping women maintain educational access, sustain income-generating activities, and create alternative job opportunities despite movement restrictions, infrastructure destruction, and psychological stress. Whether through digital tools, adapted business models, community-based initiatives, or informal networks, innovation has strengthened women's resilience and reinforced their agency and leadership. The paper concludes that innovation-driven approaches are vital for promoting long-term economic empowerment for Palestinian women during reconstruction. Supporting women-led innovation in post-conflict development can help rebuild livelihoods, encourage inclusive growth, and enhance community resilience in Gaza.

Keywords: Women's resilience; Economic empowerment; Innovation in conflict; Palestinian women; Post-conflict recovery

Democratic Backsliding and Neomedievalism: A Longue Durée Explanation of Sovereignism in East Central Europe

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Scholars writing on the sovereignism of east central Europe have used different labels and explanations for the region's political transformation in the last decade. The concepts of democratic backsliding, illiberal democracy,

hybrid regime and spin dictatorship have all been applied to make sense of this tendency. The explanations for the authoritarian turn included globalization, regional reluctance to give up freshly gained sovereignty to supranational organizations after 1989, the financial crisis of 2008, the consequent dwindling of the middle classes and old authoritarian reflexes from the interwar and the Cold War eras. A common theme is that they all focus exclusively on 20th and 21st century developments. In this lecture, I aim to uncover some of the longer-term shifts underlying this transformation by using a systemic longue durée approach. To achieve this, I will rely on the theory of neomedievalism in International Relations (IR) and the mixed constitutional understanding of the European Union. I will first address the transformation of the international system and then its consequences for the European Union and democracies in east central Europe. I will argue that the modern period of internalizing the limits of political power has come to an end which can explain both the power sharing mechanisms of the European Union and the challenges of liberal democracy in its member states.

Keyword: Sovereignism; East Central Europe; Democratic backsliding; Neomedievalism; European Union governance

The Architecture of Change: Why Trust Must Precede Transformation

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We live in a time defined by relentless evaluation systems that assess, filter, and optimize at the expense of human potential. This culture burns out high performers, discourages emerging talent, and leaves institutions struggling for innovation and genuine inclusion. Fear of failure becomes stronger than the courage to begin. This keynote introduces the Trust First Change-making Model, a paradigm shift for leaders, educators, and innovators. It reveals a fundamental flaw in our approach: we demand proof before offering possibility, validation before value, and outcomes before trust. Sustainable change cannot grow in a climate of skepticism. Drawing on psychology, systems theory, and real-world cases, I explain how the Trust First principle works at two levels. The Inner Game shows how trusting mindsets quiet the inner critic, build resilience, and unleash authentic performance. The Outer System demonstrates how trust-centered outreach, on boarding, and operations democratize opportunity, create psychological safety, and fuel inclusive innovation. This is not a soft skill. It is a strategic framework. Attendees will leave with a clear understanding of how to:

- Redesign gateways to invite potential rather than merely filter credentials.
- Cultivate environments where process is trusted as much as outcome is measured.

- Lead change by building the foundational trust that makes risk-taking, creativity, and genuine human growth possible.

Join me to explore how we can build systems that don't just manage people, but that believe in them first and watch as that belief becomes the most powerful catalyst for change we have.

Key Takeaways:

- The psychological and systemic costs of an "Evaluate First" culture.
- The three pillars of the Trust First Change-making Model.
- Practical strategies to apply "Trust First" in outreach, onboarding, and ongoing development.
- A new narrative for leadership that prioritizes human potential as the primary asset.

Governing AI in Healthcare - Challenges in Designing Guidelines, Policies, and Regulations

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Artificial intelligence is increasingly embedded in healthcare, but its role here is fundamentally different from its use in other sectors. In clinical settings, AI systems do not merely optimize efficiency; they shape diagnoses, influence treatment decisions, and affect who receives care, when, and on what terms. As a result, failures in healthcare AI are not abstract technical errors, but in fact can translate directly into patient harm, erosion of trust, and contested clinical accountability. We aim to examine how such failures emerge when governance mechanisms are weak or misaligned with real-world practice. Drawing on concrete cases where algorithmic predictions overrode clinical judgment, we will explore how seemingly neutral models can embed risk, amplify uncertainty, and shift decision-making power in ways that are often invisible to patients and clinicians alike. These cases highlight why governance is not an afterthought, but a core component of safe and ethical AI deployment. We will review the governance toolbox that surrounds healthcare AI, distinguishing between guidelines, policies, and regulations, and discussing the distinct role each plays in shaping accountability, oversight, and implementation. Particularly, we will discuss global developments such as guidance from the World Health Organization and regulatory regimes like the EU AI Act, which classify many clinical AI systems as “high-risk”. Rather than treating these frameworks as abstract compliance exercises, we will connect them to practical questions faced by health systems, regulators, and developers: who is responsible when AI causes harm, how risks should be assessed before deployment, and what safeguards are needed after systems enter clinical use.

Keywords: Artificial Intelligence; Healthcare; AI Governance; Algorithmic Accountability; Clinical Decision-Making

Human Renaissance: Art, Culture & Creativity in the Digital Age" *(Arts & Humanities)*

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The digital era has ushered in a new phase of human development often described as a modern or "human renaissance." Much like the European Renaissance revived art, culture, and intellectual thought, today's digital revolution has redefined creativity, artistic expression, and cultural exchange. This paper explores how digital technologies have transformed art and culture, expanded creative possibilities, democratized access to artistic platforms, and reshaped human identity and expression. It also examines the challenges posed by digital dependence and questions the balance between technology and human originality.

Keywords: Digital renaissance, human creativity, art and technology, cultural exchange, artistic expression, modern creativity

Ethics and the Sacred: Navigating Moral Horizons in an Uncertain Global Landscape

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In an age marked by rapid technological disruptions, geopolitical instability, and widening socio-cultural divides, the need to re-examine the foundations of ethics and the sacred has become increasingly urgent. This study explores how traditional moral frameworks, spiritual wisdom, and emerging ethical paradigms can collectively guide humanity toward more just and compassionate futures. By integrating philosophical inquiry with contemporary challenges such as AI-driven decision-making, ecological degradation, and human rights dilemmas the research highlights the role of ethical imagination in shaping responsible global citizenship. The paper further analyzes the impact of moral consciousness, interfaith dialogue, and sacred values on conflict resolution, social harmony, and sustainable development. Emphasizing the interconnectedness of human and moral well-being, this work proposes a multidimensional ethical model that bridges spirituality, rationality, and global cooperation. The study ultimately argues that re-centering ethics and sacred values is indispensable for navigating uncertainty and cultivating resilient, humane societies capable of thriving in the future.

Keywords: Ethics, Sacred Values, Moral Imagination, Global Citizenship, Interfaith Dialogue, Conflict Resolution, Sustainability, Spiritual Wisdom, Human Rights, AI Ethics

From Iqbal to the Digital Age: Reimagining Moral Consciousness in the Urdu Intellectual Tradition

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Moral consciousness has long occupied a central place in the Urdu intellectual tradition, shaping debates on selfhood, responsibility, and the ethical meaning of modern life. From the philosophical vision of Muhammad Iqbal to contemporary forms of digital expression, this tradition reflects a sustained engagement with questions of moral agency in changing historical contexts. Iqbal's thought, particularly his dynamic conception of the self (khudi), articulated morality as an active and creative force rather than a static set of norms. His intellectual legacy continues to inform Urdu debates on individuality, community, and ethical purpose. In the decades following Iqbal, Urdu intellectual discourse encountered new social, political, and technological realities that reshaped its moral vocabulary. Postcolonial transformations, global cultural flows, and the rise of mass media introduced both opportunities and tensions, challenging earlier ethical frameworks while also extending their reach. In the present digital age, these challenges have intensified. Digital platforms have altered modes of reading, writing, and moral judgment, producing new forms of visibility and authority while often privileging speed, fragmentation, and emotional immediacy over reflection and ethical depth. Within this context, contemporary Urdu literature and intellectual production reveal a complex negotiation between inherited moral ideals and digitally mediated experience. Ethical concerns related to selfhood, responsibility, and collective life persist, yet they are expressed through new idioms shaped by virtual interaction and algorithmic influence. Revisiting Iqbal's emphasis on moral selfhood and purposeful action offers a critical lens for understanding these transformations. Such a perspective enables a reimagining of moral consciousness that neither rejects digital modernity nor abandons ethical seriousness. The Urdu intellectual tradition thus emerges not as a closed canon but as a living moral discourse, capable of renewal and critical engagement in the twenty-first century.

Keywords: Moral consciousness; Urdu intellectual tradition; Iqbal's philosophy; Moral selfhood (khudi); Digital modernity

Sacred Ethics and Human Rights: Harmonizing Divine Command and Universal Norms

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Contemporary human rights discourse is largely framed within secular universalism, while religious moral systems derive authority from divine command. This apparent epistemological divide has often been portrayed as

a source of tension between sacred ethics and universal human rights norms. However, Islamic ethical tradition offers a rich framework for reconciling divine command with universal moral principles through concepts such as *maqāṣid al-sharīʿah*(higher objectives of law), *karāmah al-insān*(human dignity), and *ʿadl*(justice). This paper explores how sacred ethical imperatives can coexist with and reinforce universal human rights values in an age marked by moral uncertainty, cultural pluralism, and socio-political instability. Using a qualitative textual analysis of Qur'ānic moral injunctions, classical jurisprudential principles, and contemporary human rights frameworks, the study examines convergences and divergences between divine-command-based ethics and secular rights-based paradigms. Particular attention is given to issues of dignity, freedom of conscience, gender equity, and social justice. The paper further highlights emerging models of faith-based ethical reasoning that contribute constructively to global human rights debates without compromising religious authenticity. By proposing a harmonized framework of sacred ethics and universal norms, this research argues that religious moral traditions—rather than being obstacles, can serve as vital resources for nurturing shared moral horizons and fostering inclusive, just, and resilient societies in an uncertain world.

Keywords: Sacred ethics, human rights, Islamic moral philosophy, divine command, universal norms, human dignity, maqāṣid al-sharīʿah.

Distinct Mutational Landscapes in DNA Repair Genes Reveal Novel Pathogenic Variants in Breast Cancer Patients of Pakhtun Ethnicity

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We report comprehensive genomic profile of breast cancer (BC) susceptibility genes within the understudied Pakhtun population of Khyber Pakhtunkhwa, Pakistan, derived from whole-exome sequencing (WES) of 19 invasive ductal carcinoma (IDC) tumor samples and 6 matched normal tissues. Two parallel investigations identified a spectrum of novel and recurrent pathogenic variants. The first study characterized mutations in moderate-penetrance genes ATM, CHEK2, PALB2, and XRCC2, revealing 18 mutations (14 somatic, 4 germline) with ATM as the most frequently altered gene. Recurrent variants PALB2 p.Q559R (31.5%), XRCC2 p.R188H (26.3%), and ATM p.D1853N (21.1%) were identified, with in silico and molecular dynamic simulations confirming their pathogenic potential and destabilizing structural effects. The second study delineated the mutational burden in high-penetrance genes, reporting 10 mutations in BRCA1 and 27 in BRCA2, with a significant proportion predicted as deleterious. Distinct mutational clustering was observed, with 70% of BRCA1 variants on exon 9 and 40% of BRCA2 variants on exon 11. These variants correlated with higher tumor grade and demonstrated destabilizing

protein effects. Collectively, these findings define a unique population-specific mutational architecture in critical DNA repair pathways. The identification of these novel pathogenic and recurrent variants underscores the necessity for developing ethnicity-tailored genetic screening panels and informs the advancement of personalized therapeutic strategies for this patient cohort.

Keywords: Breast cancer genomics; Whole-exome sequencing; DNA repair genes; Population-specific pathogenic variants

ABSTRACTS

ORAL PRESENTATIONS

FutureCON-2026-01: Effect of environment on the brain anatomy of brown trout (*Salmo trutta*) relative to their body weight and length

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The current study was started to check the effect of the captive environment on the brain relative to the body weight and length of brown trout (*Salmotrutta*) as compared to 10 wild fishes. For this purpose, the brown trout specimens were collected from both environments (wild and hatchery). Before dissecting the specimens for brain study, morphometric measurements were done. For brain study, several parameters, including brain weight, brain length, myelencephalon, cerebellum, optic lobe and telencephalon, were measured. The measured parameters were compared for the collected samples of *S. trurta* between both environments. The current findings revealed that the mean brain length of wild fish (15.28+2.86mm) relative to their brain size was almost larger as compared to the captive. Similarly, the means of brain sub-structure of brain myelencephalon (5.46+0.56mm) was larger as compared to the captive body length. However, the means of brain other including cerebellum (4.83+0.21mm), optic lobes 4.6 (3.54+0.23) were slightly less as compared to the optic lobes 7.45+0.41, and telencephalon 4.61.

Keywords: Brain anatomy, Salmo trutta, brain weight, brain length, myelencephalon

FutureCON-2026-02: Comparison of Bioethanol production from Fruit and Vegetable Peels using Saccharomyces cerevisiae

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The struggle to stop global warming and preserve the environment is becoming more and more important every year. Now more than ever, we are aware of the damaging effects that our current dependence on fossil fuels holds for our collective futures. One of the key solutions? Sustainable energy. The present work consists of producing bioethanol from fruit and vegetable peels (potato, orange, banana, water melon and pumpkin) individually and as mixture using Saccharomyces cerevisiae. The different physicochemical and biochemical analyses showed that theses peels are rich in nutritional elements that make them favorable to alcohol fermentation. The total soluble sugars content, the pH value and the ethanol content were evaluated. The results indicated limited ethanol production. The addition of yeast extract, peptone and urea to the fermentation medium improved the

ethanol yield produced by the yeast. The physicochemical characterization of purified bioethanol revealed that density, boiling temperature and refractive index are close to those of absolute ethanol. The *in vitro* antibacterial activity of bioethanol was tested on *Escherichia coli*, Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus subtilis and Bacillus cereus. Significant inhibition zones were observed. This study showed that potato, orange, banana, watermelon and pumpkin peel waste individually and as mixture can be a feedstock for bioethanol production.

Keywords: Methanol, Fruit peels, yeast, antibacterial activity, Sustainability

FutureCON-2026-03: In Silico Analysis of the CXCL1 Mutations Reveals Structural and Functional Disruption in CXCR2 Signaling

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Chemokine C-X-C motif ligand 1 (CXCL1), also known as growth-regulated protein α (GRO-α), is a chemotactic cytokine belonging to the CXC chemokine family. It plays a central role in recruiting neutrophils to sites of infection, inflammation, and tissue damage. Its receptor, C-X-C motif chemokine receptor 2 (CXCR2), is a G-protein–coupled receptor that regulates leukocyte trafficking, angiogenesis, and tumor progression. The CXCL1-CXCR2 interaction is critical for maintaining innate immune responses; however, dysregulation of this signaling axis has been frequently associated with cancer initiation, tumor growth, and metastasis. Considering the functional significance of CXCL1 in immune modulation and cancer biology, we employed a comprehensive bioinformatics strategy to analyze the structural and functional consequences of oncogenic missense mutations in CXCL1 and their effect on CXCR2 activation. Using advanced computational methods, we identified the molecular features responsible for altered activity, receptor binding, and potential disease involvement. A three-dimensional structural model of CXCL1 containing the identified mutations was generated using the I-TASSER algorithm. The impact of each mutation on protein stability, folding, and function was assessed using multiple predictive tools. Furthermore, molecular dynamics simulations performed through WebGro allowed us to explore the conformational changes and dynamic behavior of mutated CXCL1 variants. Among the screened missense mutations, we identified several high-risk pathogenic variants predicted to compromise CXCL1 structure and receptor-binding capacity. Notably, mutations affecting conserved cysteine positions critical for disulfide bond formation showed the most substantial destabilizing effects. These alterations disrupted chemokine folding and significantly modified CXCL1-CXCR2 interaction patterns. Our findings suggest that structural perturbations induced by specific missense mutations may impair CXCR2

activation, influence downstream signaling pathways, and potentially modify susceptibility to inflammation-driven diseases and cancer progression.

Keywords: CXCL1; CXCR2; Molecular dynamics simulation; Missense mutation; Inflammation; Cancer progression

FutureCON-2026-04: Comparative Study of Hard Ticks (Ixodide) in the Cattle of Swat

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Species comparison is an essential process in nature to understand evolutionary events and changes. Sometimes, one species is different morphologically due to living in different habitats and environments. This study was conducted in Tehsil Kabal and Matta of District Swat, Pakistan, to demonstrate the occurrence of tick species. The comparative study was conducted during the hot seasons of October 2022 to December 2022. The main aim of the study was to elaborate the presence of ectoparasite in two different tehsils. A total of 360 tick specimens were collected from 60 animals, including 20 buffaloes and 40 cows. Several species of ticks were identified which are parasitized on these animals. In most abounded species found with the highest rate is *Boophilusmicroplus* (Asian blue ticks) (75 % in Cattle) followed by *Rhipicephalusboophilus annulatus* (20 % in cattle) *Rhipicephalus appendiculatus* (brown ear ticks 3%) *Rhipicephalus boophilusdecoloratus* (1% African blue ticks). In this study, the age-wise prevalence showed the 2nd age group animal (37 to 72 months) was more infested as compared to 1st (1 to 36 months) and 3rd group (72 months or older). The gender-wise result showed that females were more infested than males. Based on health conditions and low health conditions animals were more infected as compared to healthy ones. Several other factors like humidity, temperature, habitat, rainfall, and food of animals also restrict the distribution of tick species.

Keywords: Ticks, Cattle, Diversity, Ectoparasites, health conditions

FutureCON-2026-05: Protein Profiling of Diverse Local and Exotic Taramira (Eruca sativa Mill.) germplasm using SDS-PAGE analysis

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Genetic diversity study is important for the identification of elite genotypes. In this study, 150 local and exotic Taramira (*Eruca sativa* Mill.) genotypes were evaluated for total seed storage protein profiling using Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis (SDS PAGE) method. A 12.25% polyacrylamide gel was employed, revealing 14 distinct protein sub units

across the genotypes. Among these, 11 bands were polymorphic while 3 were monomorphic, with molecular weights ranging from 10 to 180 kDa. The presence or absence of specific bands and variations in banding patterns reflected significant genetic variability among genotypes. The Dice similarity coefficient ranged from 74% to 100%, with the highest similarity observed in most accessions and the lowest between accessions 34910 and 34750. Cluster analysis grouped all genotypes into five major clusters. Overall, high polymorphism indicated substantial diversity among the studied genotypes. For more refined protein characterization, the use of 2-D gel electrophoresis is recommended.

Keywords: Genetic Diversity; Polymorphism; Seed Storage Proteins; SDS-PAGE; Taramira

FutureCON-2026-06: Identification of Bacterial Leaf Blight Resistance Genes in Diverse Local Rice (*Oryza sativa*) Germplasm

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Rice (*Oryza sativa*) is the most consumable food all over the world. Pakistan is tenth Rice producing as well as fourth Rice exporting country. Among many biotic as well as abiotic factors affecting Rice crop yield, Bacterial Leaf Blight (BLB) caused by *Xanthomonas oryzae* (*Xoo*) is most serious threat to rice production. Inner genetic resistance of rice plants to BLB is most useful way to overcome the disease being more economical and ecofriendly approach. To date no comprehensive study is available on local Rice germplasm. Therefore, the current study is conducted to identify and characterize locally collected Rice genotypes for BLB resistance. Total 23 rice genotypes were collected from KPK and Punjab regions and being subjected to genetic analysis for presence of *Xa5* and *Xa7* resistance genes. The results revealed that *Xa5* and *Xa7* were present in all genotypes except UD-205 and UD-201. UD-205 lacked *Xa5* but had *Xa7* gene whereas UD-201 possessed *Xa5* but lacked *Xa7* gene. Genetic similarity analysis on basis of genes present, divided the local germplasms in three main clusters showing genetic diversity in rice germplasm. Further dendrogram analysis revealed strong genetic relationship among rice germplasms. This research provides valuable insights into the genetic diversity of BLB resistance in local rice germplasm and contributes to the development of more resistant and climate-resilient rice cultivars, improving the sustainability of rice production.

Keywords: Bacterial leaf blight, Pakistan, Xanthomonas oryza, Rice, Xa5, Xa7

FutureCON-2026-07: Investigation of 2-Amino-6 Methoxybenzothiazole based Sensor for the detection of metal ions and its antioxidant properties employing Fluorescence and UV-Vis Spectroscopy

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Industrial and human activities significantly contribute to heavy metal ion (HMI) pollution, causing serious toxicological effects on aquatic organisms, plants, and animals. This study evaluates 2-amino-6-methoxybenzothiazole (C-1) as a sensor for metal ions detection using fluorescence and UV–visible spectroscopy, and also investigates its anti-inflammatory and antioxidant potential through *in-vitro* and *in-vivo* assays. Sensor and metal-ion solutions were prepared and analyzed using fluorescence and UV–vis spectroscopy, revealing that C-1 shows strong selectivity and sensitivity toward Fe^{3+} over competing metal ions including K^{1+}, Co^{2+}, Ni^{2+}, Zn^{2+}, Cd^{2+}, Pb^{2+}, Mn^{2+}, Sn^{2+}, and Cr^{3+}.In *in-vitro* COX-1/2 and 5-LOX assay the C-1 displayed excellent potential with IC_{50} value 24.24, 1.76 and 1.95 μM.. In ABTS, DPPH, and H_2O_2 assays, C-1 exhibited good to moderate scavenging activity with IC_{50} values of 62.09, 47.44, and 200.69 μM.. In *in-vivo* studies, C-1 demonstrated significant anti-inflammatory activity from the 1st to the 5th hour. The mechanism of C-1 was further evaluated using various phlogistic agents. The development of dual COX-2 and 5-LOX inhibitors has led to more potent and safer anti-inflammatory agents. The objective of this research was to discover and create novel dual COX-2 and 5-LOX inhibitors, and to evaluate their efficacy in inhibiting these enzymes. The finding suggests the promise of C-1 as a dependable tool for metal ions detection, good therapeutic agent comprehending anti-inflammatory potential, opening avenues for further research in environmental monitoring and pharmaceutical industry for treatment of various inflammatory conditions.

Keywords: Sensor, Metal detection, fluorescence , UV-vis ,COX-2 and 5-LOX inhibitors, Antioxidants

FutureCON-2026-08: The Investigation of Chia Seeds on the Lipid Profile of Adult Residents with High Cholesterol

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Chia seed, scientifically termed as Salvia hispanica L., is a good source of omega-3 fatty acids, antioxidants, and dietary fiber all are essential for helping as functional food. The objective of this study was to evaluate the effects of the intake of chia seeds on the lipid profiles and body mass index (BMI) in individuals with high cholesterol. A sample of one hundred District Mardan participants were chosen and divided into two groups, with and

without chia seeds, (n=50) and (n=50). Chia seed intake group was supplied with 24 g of chia seeds per day during the month, i.e. three times a week, and no supplementation was provided to the control group. The body size and lipid levels were measured prior to and after an intervention, according to standard rules. Findings displayed critical improvements ($p < 0.05$) in the chia seeds consumed group in terms of elevated HDL-C and decreased triglycerides (TG), overall cholesterol (TC), in addition to LDL-C and BMI. Mean decreases in BMI of 1.2 kg/m 2 and 1.46 mg/dL (250.19 to 248.73 mg/dL) cholesterol levels. The consumption of chia seeds was tied to improved lifestyle and diet as well. Finally, chia seeds may be a functional food with the ability to assist weight management and decrease cardiovascular risk factors.

Keywords: Chia seeds, Salvia hispanica L., lipid profile, body mass index (BMI), cardiovascular risk

FutureCON-2026-09: Biodegradation of Phenol Red: Isolation and Screening of Decolorizing Bacterial Species from Domestic Wastewater

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Triphenylmethane (TPM) dyes are highly toxic even at low concentrations and are widely used in various industries. Derivatives such as phenol are both naturally occurring and man-made aromatic compounds, serving as key intermediates in the biodegradation of industrial and natural aromatics. Compared to physio-chemical methods, biological treatment offers an environmentally friendly and energy-efficient approach, highlighting the need for sustainable strategies to remove such toxicants from water and soil. This study investigates the decolorization and degradation of phenol red (PR), a TPM dye, by bacterial strains isolated from wastewater in Swabi City, KPK. Thirteen isolates (ZS3–ZS8, ZS10, RS3, RS4, RS7–RS10) were enriched. While RS8 and ZS3 showed minimal color change, all other isolates achieved significant decolorization at an initial PR concentration of 100 mg/L. All isolates tolerated high salt concentrations (up to 5%), with ZS4 and RS4 exhibiting the highest degradation activity under acidic and neutral pH conditions. Morphological and biochemical characterization identified ZS4 as *Alcaligenes* and RS4 as *Azotobacter*. The isolates also demonstrated low sensitivity to tested toxic antibiotics, suggesting their resilience under diverse environmental conditions. These characteristics indicate their potential for the biodegradation of phenol red in versatile biological and chemical settings. Overall, this study provides insight into the application of bacterial isolates for remediating TPM-contaminated water and soils. It contributes to the development of green technologies for pollutant removal and expands the current knowledge base on environmentally friendly bioremediation strategies. Future research should

focus on optimizing degradation processes, including synergistic approaches, to enhance removal efficiency and advance sustainable treatment of contaminated environments.

Keywords: Triphenylmethane dyes, phenol red, bacterial biodegradation, wastewater remediation, green technology

FutureCON-2026-10: Morphological Characterization of Different Date Palm (*Phoenix dactylifera L*) Varieties in Panjgur Balochistan Pakistan

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Date palm (*Phoenix dactylifera* L.) is an economically important fruit crop widely cultivated in arid and semi-arid regions due to its adaptability and high commercial value. The present study aimed to evaluate and compare the morphological characteristics of five date palm varieties cultivated in Panjgur District, Balochistan, Pakistan, namely Washkolont, App Dandaan, Hasni Zard, Shakri, and Dandari. Key morphological traits, including fruit length, fruit diameter, fruit weight, seed length, and seed diameter, were assessed to determine varietal performance and commercial potential. For each variety, five fruit samples were randomly selected at the ripening stage, and standard measurement procedures were applied to ensure accuracy and reliability. The results revealed significant variation among the studied varieties for all measured traits. Hasni Zard exhibited the highest values for fruit length and fruit weight, indicating superior fruit quality and strong potential for commercial cultivation. Washkolont showed relatively consistent and moderate performance across most traits, while Dandari produced fruits of average size, suggesting suitability for general growing conditions. In contrast, App Dandaan and Shakri recorded comparatively smaller fruit and seed dimensions, with Shakri demonstrating the least favorable morphological characteristics. Statistical analysis using one-way analysis of variance (ANOVA) confirmed highly significant differences among varieties for all traits ($p < 0.001$). A positive association between fruit size and seed size was also observed, indicating that larger fruits tend to produce larger seeds. Overall, the study underscores the importance of morphological evaluation and variety selection for improving fruit quality, enhancing commercial production, and supporting sustainable date palm cultivation in the region.

Keywords: Date palm, *Phoenix dactylifera* L., morphological traits, fruit size, seed size, varietal performance, one-way ANOVA, Panjgur District, Balochistan, commercial cultivation

FutureCON-2026-11: Evaluating DNA Damage and Anti-Diabetic Efficacy of Herbal Diabetic Patch in Sprague Dawley Rats

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Diabetes is a long-lasting illness or condition that occurs when a person's blood sugar level is constantly elevated than it's supposed to be as well as having an unusual metabolism of proteins and fats. The present study is aimed to evaluate anti-diabetic efficacy of herbal diabetic patch in alloxan monohydrate-induced Sprague Dawley rats. Nine rats were divided into three groups, used for this experiment. One group served as control and was treated with herbal patch only, one experimental group was treated with both Alloxan monohydrate and the herbal patch, whereas another experimental group received only alloxan monohydrate without any patch. In order to evaluate their potential for causing any DNA damage and changes in blood glucose levels, the Sumifun herbal patch containing traditional ingredients that are known to be effective in managing diabetes, was studied. Blood glucose levels were regularly monitored while comet assays, micronucleus assays, and complete blood count (CBC) tests were performed to check for possible DNA damage. The daily monitoring of blood glucose levels reduced from an average of 200 mg/dL to 160 mg/dL in alloxan monohydrate plus herbal patch-treated groups showing that its anti-diabetic effect was moderate. No DNA damage could be detected in the treated groups, and tail moments obtained with the comet assay were at all times either at or near zero. No rat examined showed any scored micronuclei. CBC analysis further supported these findings, showing no adverse changes in blood parameters. It is inferred that diabetes can be managed safely and effectively using Sumifun herbal diabetic patch and other traditional herbal extracts which actually do not pose risks of damaging DNA or causing any danger to the human body.

Keywords: Anti-diabetic efficacy, Herbal diabetic patch, Alloxan-induced diabetes, Comet assay,Sprague Dawley rats.

FutureCON-2026-12: Role of Resilience on fear of Infection among Care Givers of HIV Patients

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Caregivers of individuals having HIV often experience fear of infection which can significantly impact their caregiving effectiveness and wellbeing. This study examines the role of resilience in the fear of infection among caregivers of individuals with HIV. The study recruited 200 caregivers from Swabi and Swat. Resilience was measured using the Brief Resilience Scale, while fear of infection was assessed through a Perceived Risk of HIV Scale.

Results indicate a significant relationship between resilience and fear of infection, with caregivers demonstrating higher resilience and high fear of infection in upper class, nuclear families and graduate and post graduate individuals. Furthermore, the results also suggest that married individuals are more resilient as compared to single. These findings emphasize the importance of resilience-building interventions, such as training in stress management. This study contributes to the growing body of literature emphasizing the psychological resilience of caregivers and offers practical implications for HIV-related caregiving programs.

Keywords: HIV, Fear of infection, caregivers, resilience

FutureCON-2026-13:Synthesis and Characterization of Mo-Doped SnO_2 Nanostructure-Based Photoanodes for Efficient Dye-Sensitized Solar Cells

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Herein, pure and molybdenum-doped tin oxide (Mo-doped SnO_2) nanoflowers-like morphology with different dopant percentages (3, 5, and 7%) were synthesized by a hydrothermal approach. Then, X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), Fourier-transform infrared (FTIR) spectroscopy, scanning electronic microscopy (SEM), energy-dispersive X-ray (EDX) analysis, elemental mapping, and ultraviolet-visible (UV-vis) spectroscopy were used to characterized the as-synthesized materials. The nanostructures were then utilized as photoanodes in dye-sensitized solar cells (DSSCs) to evaluate their photovoltaic performance. The UV-Vis absorption spectra showed that the absorption edge was red-shifted by increasing the dopant concentration. This red shift indicated that band gap energy is decreased from 3.72 eV to 3.44 eV, suggesting that the Mo dopant has improved the light absorption capacity of pure SnO2. XRD patterns confirm that the samples have a tetragonal structure with no additional peaks, which suggests that Mo ions replace the regular Sn sites in the SnO2 crystal structure. The SEM images showed the nanoflower-like morphology of the Mo-doped SnO2 nanomaterial. Upon doping, the dimension of nanostructures increased, which ultimately increased the surface area of pure SnO2. The synthesized nanocomposite was employed as a photoanode in DSSCs. The result indicated that 7% Mo doping showed the highest power conversion efficiency (2.01%) as compared to other corresponding samples. The enhanced efficiency may be attributed to improving the light absorption ability and charge separation.

This research work will provide interesting ground to design efficient and low-cost photovoltaic nanomaterials.

Keywords: Molybdenum-doped SnO_2; Tin oxide nanoflowers; Hydrothermal synthesis; Band gap engineering; Dye-sensitized solar cells; Photovoltaic performance

FutureCON-2026-14: Improved Short Circuit Current Density and Electrochemical Impedance Spectroscopy Characteristics of Efficient PbS/CdS/CdSe Quantum Dots Sensitized Solar Cells with Inexpensive Novel Silver Counter-Electrode

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This article addresses the Optical Performance and Improved Electrochemical Impedance Spectroscopy of cost-effective and efficient FTO/TiO_2/PbS/CdS/CdSe/ZnS Quantum Dots Sensitized Solar Cell with economically silver (Ag) deposited Counter Electrode. The as-fabricated solar cell devices display an increase in PCE with a maximum value of 6.43% for 3 PbS/CdS/CdSe QDs SILAR cycles. The UV-Vis spectrum indicates that the band gap value reduces for the samples 1PbS/3CdS/3CdSe and 3PbS/3CdS/3CdSe than samples of 3PbS/3CdSe and 6Pb SILAR cycles photoanode. In addition, the size of PbS and CdSe QDs becomes more remarkable with increasing SILAR cycles. However, the size of CdS QDs decreased with an increase in the SILAR cycles, which is due to capping of PbS and CdSe on CdS QDs. Electrochemical Impedance Spectroscopy study demonstrates that recombination resistance increased for the efficient device. The efficient device's recombination resistance and capacitance were found to be ~156 Ω and 17.97 x 10-3 F, respectively.

Keywords:CdS QDs, Cost effective, Solar cell, High photo-conversion efficiency

FutureCON-2026-15: Exploration of Diversity, Abundance & Cultivation of Indigenous Microalgae for Biodiesel Production

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Petroleum based fuels are unsustainable due to the diminishing supplies, instable prices and carbon dioxide accumulation. Microalgae utilize a large fraction of solar energy and have the potential to produce 45 to 220 times higher amounts of triglycerides than terrestrial plants. Algae have fast growth rates, have great photosynthetic efficiencies, require minimal nutrients and are capable of growing in saline waters which are unsuitable for agronomy. Hence the use of microalgae as the renewable source of biofuel could be helpful in producing eco-friendly economical transport fuels. The objective of this study was to collect, cultivate and find the

abundance of various algal strains. The sampling was focused on collection of local microalgae species due to a competitive advantage under the local climatic and ecological conditions. The identification based on morphological and physiological parameters identified the Cyanobacteria (24%), Charophyta (8%), Heterokontophyta (8%) and Chlorophyta (60%) algal groups. Eight algal Species viz., *Chlorella vulgaris., Cladophora sp., Hydrodictylium sp., Oedogonium sp., Oscillotoria sp., Spirogyra sp., Stigeocolonium sp.* and *Ulothrix zonata* were selected for biodiesel production on the basis of their relative abundance and biomass productivity in Lab. The species identification was confirmed by 18SrDNA and Internal Transcribed Spacer Region (ITS). The optimum growth was achieved with constant aeration and florescent light at pH 6.8 – 7.5, temperature 25- 38^{o}C at 3rd/4th week in 2 liters Bold basal medium (BBM) and Blue green medium (BGM). Maximum growth rate for *Chlorella vulgaris* (13.6 ± 0.36g) was obtained at pH 6.8 and temperature 25°C. *Hydrodictyon sp.* yields biomass (6.8 ± 0.17g) at 7.5 pH and 38^{o}C. Oedogonium sp. yield biomass (8.8 ± 0.05g) at 37^{o}C, *Oscillatoria sp*. yield biomass (15.6 ± 0.03g) at 31^{o}C, *Spirogyra sp.* obtained biomass (9.8 ± 0.04g) at 26^{o}C, *Ulothrix zonata*yields a biomass (19.2 ± 0.05g) at 38oC and pH 7 in BBM, while *Stigeoclonium* sp. gave biomass (6.6 ± 0.05g) at pH 7.5 and temperature 31^{o}C. Hence *Ulothrix zonata* biomass (19.2 ± 0.26g) was found highest among all the algal species.

Keywords: *Chlorella vulgaris*, *Ulothrix zonata*, Bold basal medium (BBM), 18SrDNA

FutureCON-2026-16: Synthesis of Metallic Nanoparticles Using *Citrus Sinensis* and *Prunus Armeniaca* Extracts and Its Medicinal Uses

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Nanoparticles are viewed as fundamental building blocks of nanotechnology. The use of nanoparticles is gaining attention in the present century as they possess defined chemical, optical and mechanical properties. Herein, we reported a green approach for the synthesis of NiO-NPs using *Citrus sinensis* and *Prunus armeniaca* extracts which has several advantages over the conventional methods. The as-synthesized NiO-NPs were confirmed with the help of UV-Vis spectroscopy, FT-IR, and SEM techniques. The SEM images showed that *C. sinensis* NiO-NPs were roughly spherical and rectangular type while *P. armeniaca*NiO-NPswere irregular in shape. Both the NiO-NPs showed good antibacterial activity against *E.coli* followed by other bacterial species. The *C. sinensis* NiO-NPs and *P. armeniaca*NiO-NPs showed good antioxidant activity with an IC_{50} value of 143.30 and 184.61 µg/mL respectively at highest concentration of 1000 µg/mL. Similarly, *C. sinensis* NiO-NPs and *P. armeniaca*NiO-NPs showed significant inhibition of alpha amylase enzyme with an IC_{50} value of 253.25 and 229.2 µg/mL

respectively at 1000 µg/mL. The NiO-NPs were biocompatible with HRBCs at highest concentration. The overall results of this study suggest that the NiO-NPs of *C. sinensis* and *P. armeniaca*extracts could be used in various biomedical applications.

Keywords: Nanoparticles, *Citrus sinensis*, *Prunus armeniaca*, NiO-NPs, Antioxidant, Antibacterial, Alpha amylase inhibition assay

FutureCON-2026-17: Potential of Rhizospheric Fungi to Reduce Copper and Lead Toxicity in *Triticum aestivum L.*

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Industrial effluents and sewage discharge release persistent heavy metals into agricultural soils, posing serious threats to plant productivity and environmental health. Microbial bioremediation offers an effective, eco-friendly strategy for heavy metal detoxification. In this study, eight rhizospheric fungal strains were isolated from *Parthenium hysterophorus* L. and screened for tolerance to lead (Pb) and copper (Cu). Their agronomic traits and metal detoxification capacities were evaluated. Among all isolates, *Aspergillus tamarii* (S1; GenBank Acc. No. MT722141.1) and *Aspergillus terreus* (NB; GenBank Acc. No. KT310979.1) exhibited the highest metal tolerance, maintaining stable biomass under Pb (100–800 ppm) and Cu (600–4800 ppm), while other isolates showed marked inhibition at elevated concentrations. Biochemical profiling revealed strong metabolic responses: NB produced four-fold higher flavonoids under 800 ppm Pb stress and increased lipid content by 98% at 4800 ppm Cu, compared to an 88% increase in S1. Both strains significantly improved physiological and biochemical parameters in *Triticum aestivum* under Pb (25 and 75 ppm) and Cu (100 and 200 ppm) stress. Rhizo fungal colonization enhanced shoot length (142%), root length (98%), fresh weight (24%), dry weight (73%), protein content (31%), and total soluble sugars (40%) versus the control. Photosynthetic pigments also improved: S1 increased chlorophyll a by 99% under 200 ppm Cu and 98% under 75 ppm Pb, while NB enhanced chlorophyll b by 98% under similar conditions. Both isolates mitigated oxidative stress by elevating antioxidant enzymes and regulating reactive oxygen species, with NB showing stronger induction of salicylic acid (60%). Reduced ROS levels corresponded with lower MDA content, indicating improved membrane stability.*A. tamarii* and *A. terreus* enhanced metal tolerance, reduced metal uptake, and promoted wheat growth, with NB showing superior antioxidative defense and S1 better supporting photosynthetic performance.

Keywords: bioremediation, heavy metal stress,rhizofungi, oxidative stress, *Triticum aestivum*

FutureCON-2026-18: Screening and Characterization of Antibiotic Producing Bacteria from Sewage Contaminated Soil

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Soil counts for large mass of earth's organic matter that serves as a natural habitat for large number of microorganisms. These microorganisms include bacteria, algae, fungi, yeast, and protozoa in which bacteria is the largest group. Today large numbers of antibiotic producers are the soil bacteria because bacterial strains are easily isolated, maintained and grown in laboratory. Generally, it was assumed that antibiotic production help the microorganism in their survival and give them advantage over other competitors. Furthermore rise in antibiotic resistance and the development of new infections make it essential to screen for antibiotic producing bacteria. Therefore, the present study was designed to isolate antibiotic producing microorganisms from sewage contaminated soil. The sewage soil sample was collected from the Premier Sugar Mills and Distillery of Mardan, KP Pakistan. The collected soil was serially diluted and cultured on nutrient agar media. The colonies producing zone of inhibition were isolated for further screening and characterization. The antimicrobial activity of the bacterial isolates against different pathogenic bacteria including *Pseudomonas aeruginosa, Staphylococcus aureus, E. coli,* and *Acinetobacter bauminaii* were determined and confirmed using agar well diffusion method. The potential microorganism was identified by gram staining and different biochemical tests including catalase, oxidase, TSI and urease test. Further identification of the strain was carried out by 16s rRNA sequencing. A total of 10 isolates were primary screened from the sewage contaminated soil. Among the 10 bacterial colonies isolated and checked for antimicrobial potential only RK-1 isolate was most effective strain showing maximum zone of inhibition against *S. aureus* (7 ± 0.29) followed by *E.coli* (6.5 ± 0.21). Biochemical analysis of RK-1 isolate revealed that it was gram negative, TSI alkaline, catalase and urease positive whereas oxidase negative. Moreover, the molecular identification of RK-1 using 16s rRNA sequencing revealed the isolate as K. pneumonia. These findings suggested that the isolated strain of K. pneumonia produced a broad spectrum antibiotic which can be used for the treatment of different diseases. Further characterization of this isolate for growth media requirements and optimization of incubation conditions such as temperature, pH and aeration could enhance the antibiotic production more efficiently at industrial scale.

Keywords: Sewage soil, Antibiotic producer, Biochemical tests, 16S rRNA sequencing, *K. pneumonia*

FutureCON-2026-19: Global Migration and Refugee Policy: Challenges, Impacts, and Pathways to Human Security

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Global migration and refugee movements have emerged as defining phenomena of the twenty-first century, shaped by conflict, environmental change, economic inequality, and political instability. These movements pose complex challenges for national governance, international cooperation, and the protection of human security, encompassing access to shelter, healthcare, education, and livelihoods. This paper examines the multidimensional risks associated with large-scale migration, including socio-economic pressures, security concerns, and social integration challenges. It further analyzes responses at local, national, and international levels, highlighting the evolution of refugee policies, humanitarian interventions, and adaptive governance strategies. Drawing on the theoretical frameworks of human security and migration governance, the study employs a mixed-method approach, combining secondary data analysis, comparative case studies, and policy review to identify effective strategies. The paper emphasizes the need for sustainable solutions that integrate rights-based approaches, community engagement, and international collaboration to protect vulnerable populations while promoting social cohesion and resilience. Findings suggest that addressing migration crises effectively requires a holistic, forward-looking framework that balances humanitarian imperatives with socio-economic and political stability.

Keywords: Global Migration; Refugee Policy; Human Security; Forced Displacement; Governance; Sustainable Solutions

FutureCON-2026-20: The role of global governance in Upholding International Law and Human Rights: A case study Palestine, Kashmir, Myanmar and Sudan

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The role of global governance is to accelerate peace, fostering cooperation and collaboration among the nations. The primary task of global governance is to prevent the risk of war either it is global or civil war. But unfortunately, since eighty years the global institutions are facing crisis to maintain world peace order. In this scenario, the research study explores the complex conflicts of Palestine, Kashmir, and Myanmar and Sudan. The unresolved issues raise many questions on the efficacy of the institutions of global governance, countries exponents of international law, and the organizations of human rights. It has been observed that the global institutions could not deliver the meaning solution of the complex conflicts. The research study

explores the root causes of these conflicts and to identify effective strategies for addressing these issues that is very essential for promoting peace and stability in an increasing complex and interconnected world. It is very crucial for the resolution of these issues. In case of failure increase the risk of destabilizing international peace and security. The prospect of a large-scale conflict signifies the requirement of urgent collective action and collaboration. The data has been collected by secondary sources such as research journals, books, websites and the columns of the newspapers.

Keywords: Global Governance, International Law, Rights, World conflicts, War

FutureCON-2026-21: Translation, Cultural Adaptation, and Psychometric Evaluation of an Urdu Version of Mindfulness-Based Stress Reduction for Students with Visual Impairment

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This study culturally adapted and translated the MBSR for Students with Visual Impairment by using the Heuristic model (Barrera & Castro, 2006; Barrera et al., 2012). The current study was conducted in five stages: Information Gathering, Preliminary Adaptation Design, Preliminary Adaptation Testing, Adaptation Refinement and Cultural Adaptation Trial. Preliminary Adaptation Testing with Students with Visual Impairment and feedback interviews were conducted with stakeholders to gain cultural equivalence, followed by the final adaptation refinement step. In order to measure pre-post intervention changes in Emotional/Behavioral Problems, such as Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, and Peer Relationship Problems, the MBSR was administered to fifty (n=50) students with Visual Impairment as part of the Cultural Adaptation Trial. Pre–and post-intervention analyses demonstrated significant reductions in emotional symptoms, hyperactivity/inattention, and peer relationship problems following participation in the MBSR program. However, no significant change was observed in conduct problems from the pre-intervention to the post-intervention period. These results suggest that while the translated and modified MBSR program had a minimal effect on conduct-related behaviors, it was successful in enhancing emotional regulation, attentional functioning, and peer-related challenges. The findings showed that the fundamental ideas of the intervention's components were universal. However, language, reading material length, metaphorical expressions, and an additional orientation audio recording were among the significant surface structure changes. For upcoming intervention adaptation studies, the study offers a practical methodological application. In conclusion, while conduct issues persisted, the modified Urdu MBSR program showed efficacy in enhancing emotional and attentional functioning as well as peer relationships. With ramifications for inclusive psychological

services and future intervention improvement, these results validate its application as a culturally appropriate mental health intervention for students with visual impairment.

Keywords: Mindfulness-Based Stress Reduction (MBSR); Cultural Adaptation; Urdu Translation; Visual Impairment

FutureCON-2026-22: Gender Equality in Governance

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This conceptual study analyzes the participation of women (Gender Equality) in local governance and decision-making processe within the specific socio-cultural and Islamic context of the Buner, district of Khyber Pakhtunkhwa (KP). Buner is a conservative, Pashtun-majority district deeply influenced by interpretations of Islamic traditions and the tribal code of life known as Pashtunwali. The research examines how interpretations of Islamic teachings can be reconciled with local traditions to achieve gender equality at governmental and societal levels.The path to women's inclusion in governance here is fundamentally blocked by the strict principles of Purdah (veiling/seclusion), the concept of tribal honor (Ghairat), and a traditional Islamic understanding based on Patriarchy (male dominance). Women's political participation is largely confined to Reserved Seats, where they often remain under the influence of male relatives rather than making independent decisions. However, certain Islamic principles, such as a woman's Right to Property and Justice in basic human rights, provide a legal foundation for women to raise their voices in political and social matters. The study concludes that promoting gender equality in Buner requires a Contextual Ijtihad (reinterpretation/re-evaluation) at the local level, which separates Islamic teachings from the negative customs of Pashtunwali. This Ijtihad should legitimize the inclusion of women in local councils and consultative processes parallel to the traditional Jirga (tribal assembly) in light of Sharia requirements. Furthermore, by promoting religious scholars and local women's leadership, there is a need to introduce an enlightened interpretation of Islamic principles that aligns with the psyche of the people of Buner and encourages women to play an active role in education, health, and local governance

Keywords: Gender Equality, Governance, Khyber Pakhtunkhwa, Buner, Islamic Studies, Pashtunwali, Local Governance

FutureCON-2026-23: Youth Empowerment Through Community Based Initiatives in Pakistan: A Qualitative Review

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This paper sets out to investigate the role of community-based initiatives in promoting youth empowerment in Pakistan. Youth constitute a significant segment of the population, yet many face barriers related to education, employment, social inclusion, and civic participation. Community led programs, local organizations, and grassroots volunteer networks have emerged as important platforms for addressing these challenges. In this study, we will explore how such initiatives influence young people's skills, opportunities, and agency within their communities. The proposed research will adopt a qualitative review design, relying primarily on secondary data sources such as academic literature, policy documents, NGO reports, community project evaluations, and published case studies. Using thematic and content analysis, we will systematically examine existing evidence to identify common patterns, enabling factors, structural constraints, and areas requiring further policy attention. Ultimately, the research seeks to contribute to national level discussions on sustainable empowerment strategies and the importance of community engagement in achieving long-term developmental outcomes.

Keywords: Youth Empowerment, Community Based Initiatives, Pakistan, Qualitative Review, Secondary Data, Thematic Analysis, Community Development, Youth Policy.

FutureCON-2026-24: Reflections of Family Life in Domestic Crusaders by Wajahat and Twilight in Delhi by Ahmed Ali

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This study is involved in the field of humanities about the lives of two Muslim families living in two different eras i.e. Post 9/11 America British India in 1910s.The two literary works chosen for research purpose are a novel *Twilight in Delhi* (1940) by *Ahmed Ali* and a play *The Domestic Crusaders* (2005) by *Wajahat Ali*. It explores both eras socially and politically highlighting their respective impacts on both families and their domestic lives, keeping in view the similarities and differences between the two literary works. These literary works articulate about the domestic lives of parents and children, their mutual relationships, father and son conflicts, social and cultural contexts, the generation gap, women's status, difference of ideologies, contemporary political scenarios, and parental expectations. The discussion steers through both works with the help of *Family Developmental Theory* by *Evelyn DuVall*. It dives deep into the selected aspects and brings forth the relatable family reflections of Muslim origin. The politics and society influence the dynamics of Muslim families to much extent. They are imbued by contemporary political scenarios. This study analyses authentic historical evidence to support the research objectives i.e. British colonialism of 20th century subcontinent and post 9/11American history. This study is descriptive at large. It examines the disintegration

among the families; finding the reasons for their disagreements through closely studying their personalities, family backgrounds, mental and emotional sides, linking them to the catastrophic episode of 9/ll and British rule that has influenced the literary works at large and characters in many dimensions.

Keywords: Muslim Families, Post 9/11 America, British India, Parents vs Children, Generation Gap, Contemporary Politics and Society, Family Disintegration and Dynamics & Conflicting opinions.

FutureCON-2026-25: Isolation and Alienation in a Technological Future: A Critical Study of *the Machine Stops*

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This study critically examined E. M. Forster's The Machine Stops through the lens of existentialism; a philosophical movement focusing on themes of alienation, isolation, and inauthentic existence in a technologically dominated society. The short story depicts a future in which humans live in isolated cells, entirely dependent on an omnipotent Machine, resulting in the loss of freedom, genuine contact, responsibility, and meaningful human connection. Using existentialist concepts such as authenticity, and freedom of choice, the research analyzed how technological dependence suppresses human agency and fosters inauthentic living. The contrast between Vashti's passive conformity and Kuno's pursuit of authentic experience illustrates the existential struggle between submission and self-determination. The study concluded that Forster's narrative serves as a cautionary tale, highlighting the dangers of surrendering human autonomy to mechanical systems and the importance of reclaiming

freedom and authenticity.

Keywords: Existentialism, Alienation, Isolation, Technology, Inauthentic Existence, Human Agency, E. M. Forster

FutureCON-2026-26: Platform Design, Perceived Autonomy, and Value Co-Creation in Social Media Applications: A Research Proposal

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The research proposal will aim at examining the relationship between the features of platform design and user autonomy, value co-creation, and adoption intention in social media applications. Social media are increasingly reliant on interface-level functionality such as digital nudges, personalization, and delivering content according to algorithms; however, no studies have been conducted on the psychological and behavioral outcomes

of these functionalities in non-Western cultures. The Self-Determination Theory and Service-Dominant Logic-based study develops a single model that determines the effect of exposure to digital nudges, perceived personalization, privacy concerns, and cognitive overload on the perceived autonomy, which, in its turn, results in customer-to-customer, functional, and hedonic values co-creation behaviors. The study design adopts a quantitative one and involves. an online survey of the active social media users in Pakistan, the data of which were processed in terms of structural equation modeling. The research will probably contribute to the body of literature on digital nudging and social media adoption, and also offer a practical contribution to the design of autonomy-supportive and sustainable encounters on a platform by focusing on the processes of autonomy and value co-creation.

Keywords: social media, digital nudging, perceived autonomy, value co-creation, adoption intention

FutureCON-2026-27: The Impact of Parental Expectation on Academic Achievement among Metric and Intermediate Students: A Mediating Role of Academic Self-Efficacy

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This study is aimed at investigating the impact of parental expectation on students' academic achievement along with the mediating variable of academic self-efficacy. For this study I have taken a sample of 300 metric and intermediate students. Three questionnaires (AAQ, ASE, and PPEI) were used to collect data from students. Statistical analysis was conducted using correlation, regression, t- test and mediation analysis. The only variable parental expectation has demonstrated gender differences showing that higher number of males are perceiving higher expectations from parents. The confidence interval does not include zero, and the p-value is less than .001, indicating a statistically significant difference. Males reported significantly higher perceived parental expectations (M = 86.65, SD = 28.01) than females (M = 74.44, SD = 14.97), $t(298) = 4.71$, $p < .001$, mean difference = 12.21, 95% CI [7.11, 17.31]. This study has analysed that the rise in the level of parental expectation leads to the rise in the level of academic achievement. The mediator variable also has mediated the relationship between parental expectation and academic achievement.

Keywords: Parental expectation, academic achievement, academic self-efficacy Metric and Intermediate Students.

FutureCON-2026-28: Perspectives of University's Students and Teachers about the use of ChatGPT in Learning in District Peshawar

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This study was designed to explore the perspectives of university's students and teachers about the use of ChatGPT in Learning. The research is quantitative in nature. Two self-constructed questionnaires were used having 40, 40 items. One was designed for students and the second one was designed for teachers. These scales have four perspectives. Acquaintance, Use of ChatGPT in learning/Teaching, Benefits of using ChatGPT and barriers of using ChatGPT. The results indicate that the perspectives of SBBWU university and UOP students are the same. The mean values for teachers suggest a notable difference (19.32) between the two groups, with SBBWU teachers having more positive perspectives on ChatGPT in Learning.

Keywords: Perspectives, ChatGPT, Learning, University's Students, University's Teachers

FutureCON-2026-29: Trade Openness and Poverty: The Empirical Analysis of Pakistan Economy

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Many studies examine the relationship between trade openness and poverty. This study examine the relationship between trade openness and poverty economy by using data from 2004-2023. Poverty is used as dependent variable while GINI, PER capita, trade openness and FDI are use as independent variables. To find the stationary between Variables the ADF test is used. There ordinary least square (OLS) is use to find the relationship between poverty and trade openness. Mostly variables have insignificant relationship with poverty. In case of Pakistan GINI has significant and positive relationship with poverty and per capita has negatively related with poverty. Per capita and FDI has insignificant relationship with poverty.

Keywords: Pakistan, poverty, trade openness, FDI, GDP per capita,GINI coefficient, ADF, Johansen co integration test, Ordinary least square (OLS).

FutureCON-2026-30: From Print Culture to Digital Culture: A New Renaissance of Human Creativity

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The emergence of digital culture has changed methods of human creativity in the modern age. Over the year print media developed to become an important tool for shaping public opinion and disseminating information. However, the development of digital culture in the late 20th century started a new era of human creativity. Internet and digital technologies has change the ways of disseminating information. Moreover, digital culture enabled the rapid dissemination of information all across the globe. This paper examines how the development of digital culture has introduced new form of human reliances by changing information literacy creative expression and intercultural community communication. The objective of the study is to explore the change from conventional print culture to digital mode of expression and how the digital culture enlarges the scope of human expression. The study adopts qualitative and theoretical research methodology draws upon literary and cultural theories of print culture. The paper critically evaluates selected examples of digital storytelling, online literary platforms and multimodal text. Comparative analysis is used to highlight major differences between print and digital modes of expression. The findings indicate that digital culture promotes creativity and raise marginalised voices and providing multiple platforms for cultural engagement. Digital form of expression promotes human imagination and connectivity. Conclusively, the shift from print culture to digital culture mark a new analysis of human expression. Digital culture revolutionises human imagination and creativity expanding artistic possibilities while maintaining core humanistic values. In addition, digital culture did not replace print culture rather than reshape print culture by acknowledging the enduring relevance of humanistic values in the technological age.

Keywords: print culture, digital culture, technology, literary creativity, human renaissance.

FutureCON-2026-31:Beyond Borders: A Linguistic Exploration Of Internet Language in The Global BTS Fandom On Instagram

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This research explores the manifestations of internet language in the comments section of BTS's official Instagram account, analyzing language features according to Crystal's (2001) and Thurlow's (2003) frameworks. Focusing on a significant post commemorating BTS's 10th anniversary, 1,000 comments were scrutinized from the 4,000 on that post. Emojis and abbreviations emerged as prevalent linguistic features, showcasing the

distinct online communication style within the global BTS fandom. Additionally, the study reveals multilingualism, reflecting the diverse linguistic backgrounds of BTS fans worldwide. The findings contribute to a nuanced understanding of how internet language constructs a shared identity and fosters global connections within the BTS fandom. This study is significant for researchers investigating internet language dynamics within online fan communities, offering real-life insights from BTS's Instagram comments. It provides valuable resources for students studying language and communication, offering practical examples of internet language use in a global fandom context. By focusing on a widely followed group like BTS, the study contributes to understanding contemporary digital communication trends. Its findings not only aid researchers but also enhance educational resources in the field, serving as a foundation for future studies.

Keywords: Internet language, BTS fandom, Computer-mediated communication, Multilingualism, Digital discourse, Social media linguistics.

FutureCON-2026-32: Bridging the Human -Technology Divide: The Impact of Artificial Intelligence on HR Functions through the Mediating Role of Innovativeness and the Moderating Role of Knowledge Sharing

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This study is aimed to address the transformative impact of Artificial Intelligence (AI) on Human Resource (HR) functions, a critical area of organizational change characterized by evolving human-technology collaboration dynamics. Focusing on the telecommunications sector of Pakistan, a high-growth, high-tech environment, this research would rigorously examine the direct and indirect pathways through which AI integration influences HR functional effectiveness. The study is based on Innovation Diffusion Theory (IDT), which hypothesized a significant interplay of internal organizational factors. Specifically, the analysis aims to delineate the mediating mechanism of organizational innovativeness in translating AI adoption into superior HR outcomes, while also assessing the moderating influence of knowledge sharing practices on this pivotal relationship. A quantitative research design is aimed to be employed using a convenience sampling technique to collect data from respondents in Pakistan's telecom sector. Data would be gathered through a structured questionnaire based on a five-point Likert scale, measuring AI adoption, innovativeness, knowledge sharing, and HR functional outcomes. Smart PLS would be utilized for statistical analyses to test the direct and indirect effects among the key constructs. The findings of the study are expected to enhance organizational adaptability, learning, and collaborative efficiency.

Preliminary expectations suggest that AI adoption positively influences HR functions, with innovativeness serving as a significant mediator that enhances the effectiveness of AI implementation. Additionally, knowledge sharing is expected to strengthen this relationship, fostering improved adaptability and collaborative learning within organizations. The study is intended to contribute into the growing body of research on Artificial Intelligence by concurrently elucidating the mediating influence of innovativeness and the moderating role of knowledge sharing, two constructs that have received limited integrated attention in AI-HR research, particularly in emerging economies like Pakistan. As a quantitative study, the findings may face generalizability and contextual limitations and future research could benefit from mixed-method or longitudinal designs to capture deeper organizational dynamics.

Keywords: Artificial Intelligence (AI), Human Resource, Innovation Diffusion Theory (IDT)

FutureCON-2026-33: Positive energy Condition and conservation Laws in Kantowski-Sachs Space-time via Noether Symmetries

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This article is devoted to a complete classification of the Lagrangian of Kantowski–Sachs spacetime according to their Noether symmetries. The determining equations are obtained using the corresponding Lagrangian of above- mentioned space-time in Noether symmetry condition. Furthermore, several values of metric functions are used to solve these equations, which lead to finite dimensional Noether algebras. These include 5, 6, 7, 8, 9 and 11 dimensional algebras. Moreover, comparison of Noether symmetries with other well-known symmetries like Killing and homothetic vector fields is also studied. It is observed that the positive energy condition is satisfied for most of the obtained metrics.

Keywords: Kantowski–Sachs metric, Noether symmetry, Conservation Laws, Energy conditions, Einstein Field Equations

FutureCON-2026-34: Robust AI-Driven Email Threat Detection System Using Large Language Models and Mathematical Explainability

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LLM-based phishing schemes are rapidly proliferating, creating a new and highly deceptive class of cyberattacks that traditional detection systems fail to capture. Unlike classical phishing, emails generated by large language models exhibit human-like tone, contextual logic, and linguistic subtlety, allowing them to bypass keyword and rule-based filters. This research

presents a novel AI-driven email threat detection architecture that integrates multi-modal transformers, ensemble learning, adversarial robustness, and explainable AI (XAI) to effectively address these advanced and adaptive phishing threats. The proposed system analyzes both textual content and metadata—including email headers, structural patterns, and URL-domain reputations—allowing for deep contextual understanding across multiple modalities. A multi-modal transformer encoder captures semantic and structural cues, while adversarial training improves resilience against LLM-generated and perturbed phishing samples. Predictions from fine-tuned transformer models are combined with TF-IDF classifiers and URL-risk scoring models using a stacking and soft-voting ensemble strategy, providing reliable performance across diverse attack types. Preliminary results demonstrate that the multi-modal and adversarial training approach increases detection accuracy, improves generalization to unseen phishing variants, and strengthens robustness against adversarial manipulations. Furthermore, an explainability layer using SHAP and LIME provides feature-level insights, and a Streamlit visualization dashboard delivers actionable, interpretable feedback for cybersecurity analysts. The novelty of this research lies in bridging cybersecurity with mathematically grounded explainability, offering a system that is not only accurate and robust but also transparent and auditable. By combining advanced AI reasoning with interpretable mathematical frameworks, this work establishes a new benchmark for trustworthy phishing detection in modern cybersecurity environments.

Keywords: Phishing Detection, LLM-generated Attacks, Multi-modal Transformers, Adversarial Robustness, Explainable AI (XAI)

FutureCON-2026-35:The role of Al in through The Deep fakes and Misinformation

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The rapidly growing digital sphere, artificial intelligence (AI) is reshaping the politics in Pakistan. One of the most striking developments in this context is the rise of deep fake generated videos and audios which are blurring the line between fact and fabrication, leading to the questions about truth, trust, and the health of democratic debate. This study explores how deep fakes are emerging as a new instrument in Pakistan's political landscape. It manipulates and damage reputation that is hard to undo. The media, which is already highly polarized, deep fakes in the social media platforms, find an audience that is quick to react, but often slow to verify. Factors such as uneven digital literacy, weak fact-checking infrastructure and the absence of comprehensive legal safeguards make the personalities and institutions vulnerable to AI- driven misinformation. At the same time, the competitive and often adversarial nature of party politics encourages the tactical use of such tools. This research argues that it is also deeply political

and social AI driven phenomena. Countering deepfakes will require more than just advanced detection software; it demands coordinated efforts among lawmakers, civil society, the tech sector and the public. Education in media literacy, stronger regulatory frameworks and ethical commitments from digital platforms are all part of the solution. By examining deepfakes through the lens of Pakistan's digital political life, this study aims to contribute to broader debates about AI's role in transforming democratic spaces. The challenge is not just to expose fabricated truths, but to preserve the fragile trust on which meaningful political discourse depends.

Keywords: Politics, AI, Deepfakes, Democracy, Polarization

FutureCON-2026--36: Numerical Solution of Space Fractional Partial Differential Equations based on Fractional Derivatives of Radial Basis Functions

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In this study, radial basis functions are combined with fractional derivatives to determine the numerical solution of multi-term space fractional partial differential equations. Caputo and Riemann-Liouville definitions are used to evaluate the fractional derivatives of radial basis functions. Local radial basis functions are applied to get the stable and accurate solution. The exact solution of the problems is not known therefore; the double mesh procedure is used to evaluate the method's accuracy. Numerical results are plotted for different values of fractional orders to illustrate the impact of adding fractional derivative. Moreover, the numerical solutions are plotted for different values at time levels to show that the method produces smooth solution for large values of t as well.

Keywords: Radial basis functions, Caputo fractional derivative, Riemann-Liouville fractional derivative, Space fractional PDEs

FutureCON-2026--37: Geographical Information Systems in the Era of the Fourth Industrial Revolution: From Digital Mapping to Real-Time Geospatial Intelligence

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The twenty-first century is characterized by a transformative shift driven by the principles of Industry 4.0, where rapid technological innovation has turned previously speculative concepts into practical applications. In this evolving digital landscape, geography—supported by Geographical Information Systems (GIS)—has emerged as a powerful discipline contributing meaningfully to both scientific advancement and societal development. Geospatial technology stands among the key enablers of the industry 4.0 revolution, benefiting from the integration of the Internet of

Things (IoT), high-speed connectivity, cloud-based platforms, remote sensing, and other disruptive technologies. These developments have significantly expanded the capabilities and relevance of the geospatial sector. As a result, it has become essential for geospatial professionals, researchers, and decision-makers to understand these technological transitions to support sustainable development goals. This research explores the evolutionary trajectory of GIS, tracing its progression from conventional cartographic practices to dynamic, real-time geospatial data analytics. It highlights the application of GIS across diverse domains, including smart city planning, three-dimensional urban modelling, business and location-based intelligence, transportation systems, telecommunications, public education, healthcare services, and public safety management. Furthermore, it also examines the role of GIS in land-use analysis and resource-oriented decision-making, emphasizing its importance in natural resource management, disaster risk reduction, agricultural surveillance, and environmental evaluation. It concludes by addressing the contribution of GIS to open-data platforms, geospatial portals, and citizen participation, underscoring its growing influence in fostering transparent governance and sustainable development practices.

Keywords: Geographical Information Systems, Fourth Industrial Revolution, Digital Mapping

بین المذاہب اخلاقیات اور عالمی یکجہتی :FutureCON-2026--38
(عمیرہ احمد کے ناول" حاصل "کے تناظر میں)

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اسسٹنٹ پروفیسر شہید بے نظیر بھٹو ویمن یونی ورسٹی پشاور

اللہ تعالی نے اپنی مخلوقات میں انسان کو شرف اور فضیلت بخشی ہے .بولنے ،سننے ،چلنے،پھرنے،کھانے ، پینے کے علاوہ سوچنے سمجھنے جیسی صلاحیت دے کر انسان کو دوسری مخلوقات سے بر تر کردیا ہے اور پھر اس کے ساتھ ایک امتیازی وصف جس سے دیگر مخلوقات کو متصف نہیں کیا گیا۔ وہ انسان کی رہنمائی کیلئے مذاہب کو لے کر آنا ہے۔جب سے دنیا بنی ہے اور جب سے اس دنیا میں انسان بسنا شروع ہوئے ہیں۔ان کی ہدایت اور راہ راست سے آشنائی کے لئے کم و بیش ایک لاکھ چوبیس ہزار پیغمبر اور رسول بھیجے گئے ہیں .جو سب سچے ،برحق اور نیک نفس تھے۔ مذاہب ،الہامی کتب اور صحائف کا گاہے گاہے دنیا میں آنا ہدایت اور رشد کا بڑا سرمایہ اور ذریعہ رہا . سو تاریخِ عالم بتاتی ہے کہ خاص اللہ کی جانب سے ہدایت کے راستے پر لانے والے ادیان اور پیغمبران کی ایک طویل فہرست موجود ہے . بین المذاہب اخلاقیات اور عالمی یکجہتیجدید علوم کا ایک ابھرتا ہوا موضوع ہے تقابل ادیان کی ضرورت اس لیے بھی محسوس کی جاتی ہے کہ:

"دنیا میں بے شمار چیزیں ایسی ہیں جن کی حقیقت ،اہمیت اور برتری اپنے مد مقابل سے ہوتی ہے،چیزیں اپنے اضداد کی بہ نسبت نکھرتی اور پہچانی جاتی ہیں ،اسی اصول کے تحت اگرچہ مذاہب اور مختلف ادیان کو ہم نہیں پرکھ سکتے،کیونکہ ان ادیان کی اصل اور جڑ ایک ہے ،یہ ادیان جن تنوں کی شاخیں ہیں ان کی جڑ اور بیج ایک ہی ہے۔دنیا کے مشہور ادیان و

مذاہب اللہ تعالیٰ ہی کے عطاکردہ ہیں۔یہودیت ،عیسائیت اور اسلام ان میں زیادہ مشہور و معروف ہیں۔اللہ تعالیٰ نے سب سے آخر میں دین اسلام بھیجا،نبی آخر الزمان محمدؐ کو بھیجا ،آخری کتاب قرآن حکیم کو بھیجا،انہی کی وساطت سے ہمیں یہودیت اور عیسائیت کو پہچاننے کا موقع ملا،جب ہم نے روشن اور واضح کتاب قرآن میں یہود و نصاریٰ کی من مانیوں ،حرماں نصیبوں اور کوتاہ اندیشیوں کے تذ کرے پڑھے توہماریآنکھیں کھل گئیں----------اسی طرح جب ہم "کتاب مقدس "بائبل کا مطالعہ کرتے ہیں اور دیگر مذاہب کے لٹریچر اور تہذیب کا مطالعہ کرتے ہیں تو ہمیں کچھ دیر کے لئے رکنا پڑتا ہے ۔ہمیں ان مذاہب کی تعلیمات کا موازنہ کرنا پڑتا ہے"

دور جدید میں ماڈرن ازم کی شدید لہر نے پڑھے لکھے طبقے اور خاص طور پر نوجوان نسل کو شکوک و شبہات کی گہری دھند کی لپیٹ میں لے رکھا ہے ۔نسلوں کے تفاوت اور غیر ضروری دوری نے نوجوان نسل میں مذہب پسندی کو ہرگز منتقل نہیں ہونے دیا ۔بلکہ جدید نسل کو تو مذہب شناسی تک سے محروم رکھا گیا ہے۔جس کا نتیجہ مذہب سے مایوسی،بے زاری ،نا امیدی اور عدم اطمینان کی صورت میں سامنے آیا۔مگر جس پہلو نے سب سے زیادہ شدت اختیار کی وہ ہے مذہبی شک پسندی ۔جس نے نوجوان نسل کے دل میں اپنے مذہب کو بد گمانی کے چشمے کی اوٹ سے دیکھنے پر مجبور کردیا ۔اور یوں مذاہب کے تقابل کی ایک لہر نے جنم لیا ۔دوسری جانب الیکٹرانک میڈیا اور خاص طور پر سوشل میڈیا نے مختلف ملکوں میں مختلف مذاہب اور مختلف النواع اقوام کے نوجوانوں کوانتہائی قریب لاکھڑا کیا ۔جہاں وہ آزادی اور انتہائی آسانی سے ان کے تقابل پر اپنا تبصرہ اورموقف پیش کرنے میں کوئی عار محسوس نہیں کرتے ۔ادیان کے موازنے کو ہر مذہب کے اسکالرز اور ارباب دانش نے علمی ریفرنسز کے تناظر میں پیش کیا ہے۔اور اسی طرح یہ تقابل کافی حد تک علمی اور معلوماتی ہے ۔مگر بین المذاہب اخلاقیات اور عالمی یکجہتی بہرحال ایک انتہائی نازک اور حساس موضوع ہے۔ عمیرہ احمد کے زیرِ تحقیق ناول "حاصل "میں اسلام اور عیسائیت کا موازنہ باریک بینی اور غیر جانبداری سے کیا گیا ہے۔ادب میں پہلے بھی مذاہب پر بحث کی گئی ۔تنقیدی تبصرے متوازن بھی رہے اورکہیں کہیں متعصبانہ انداز نے تبصروں کو تنقیدی بھی بنا دیا۔ مگر عمیرہ احمد نے ناول "حاصل "میں متوازن اسلوب کا مظاہرہ کرتے ہوئے ادیان کو بحث اور تکرار کا ذریعہ بننے سے بچاتے ہوئے درست تجربے کے ذریعے قاری کے دل و دماغ کے دروازوں کو وا کیا ہے۔اس موضوع پر بات کرنا ادیب اور خاص طور پر نا ول نگار کے لیے انتہائی ہمت اور دلیری کی بات ہے اور اس سے مثبت رویوں کے ساتھ عہدہ برآ ہونا نا صرف حساس قاری کو چونکا دیتا ہے بلکہ نقادوں کے لیے بھی تنقید کے نئے زاویے واکرتا ہے ۔

FutureCON-2026-39: عالمی چیلنج انتہاء پسندی کے حل میں بین المذاہب اخلاقی اصولوں کا کردار

The Role of Interfaith Ethical Principles in Addressing the Global Challenge of Extremism

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عصر حاضر میں انتہاء پسندی عالمی امن، سماجی ہم آہنگی اور انسانی باہمی اعتماد کے لیے ایک گہرا چیلنج بن چکی ہے۔ مذہبی غلط فہمیوں، سیاسی مفادات، معاشی عدم توازن اور سماجی محرومی جیسے عوامل نے اس رجحان کو مزید تقویت دی ہے، جس کے نتیجے میں معاشرے تقسیم، تشدد اور بداعتمادی کا شکار ہوتے ہیں۔ اس صورتحال میں بین المذاہب اخلاقی اصول اس بات کی طرف توجہ دلاتے ہیں کہ دنیا کے بڑے مذاہب میں ایسی مشترکہ

اقدار موجود ہیں جو انتہاء پسندی کو فکری طور پر کمزور اور سماجی طور پر غیر مؤثر بنا سکتی ہیں۔

اسلام میں احترامِ انسانیت کی بنیاد ''وَلَقَدْ كَرَّمْنَا بَنِي آدَمَ''جیسے اصول پر ہے، اور عدل کے قیام کو ''اِعْدِلُوا هُوَ أَقْرَبُ لِلتَّقْوَى''کے ذریعے اخلاقی ذمہ داری قرار دیا گیا ہے۔ مسیحیت میں کا تصور انسان دوستی اور ہمدردی کی مرکزی قدر "Love your neighbour as yourself" ہے، جبکہ یہودیت میں ''تِقْ دِن'' (عدل کرو)، ''اَحَب لِریعَک'' (پڑوسی سے محبت کرو) جیسی تعلیمات سماجی عدل اور ذمہ داری کی بنیاد فراہم کرتی ہیں۔ بدھ مت میں عدم تشدد، رحم اور باہمی خیر خواہی کو انسانی رویے کا بنیادی معیار قرار دیا گیا ہے، جبکہ ہندو دھرم میں ''اہنسا'' اور ''دھرم'' جیسے اخلاقی اصول معاشرتی توازن اور انسانی احترام کی ضمانت سمجھے جاتے ہیں۔ان تمام مذہبی روایات میں مشترکہ موضوع احترام، عدل، مکالمہ اور انسانی خیر ہے، جو انتہاء پسندی کے ہر تصور کی ضد بنتے ہیں۔

اس مقالہ میں مقدس متون، بین المذاہب مکالمے کی عالمی دستاویزات، مثلاً Parliament of the World's Religions کے "Global Ethic" اعلامیے، اور بین الاقوامی امن فورمز کے تجربات کا تجزیہ پیش کیا جائے گا، جن سے حاصل ہونے والے نتائج سے واضح ہوگا کہ مشترکہ اخلاقی قدریں نہ صرف مختلف مذہبی کمیونٹیوں کے درمیان اعتماد سازی میں کلیدی کردار ادا کرتی ہیں بلکہ نوجوان نسل میں برداشت، تنوع کی قبولیت اور مکالمے کی روایت کو فروغ دیتی ہیں۔ مزید یہ کہ جب مذہبی قائدین، تعلیمی ادارے، پالیسی ساز اور میڈیا ان اقدار کو عملی شکل دے گے تو انتہاء پسند بیانیے کی کشش کم ہوگی اور افراد کو پرامن فکر اور ذمہ دارانہ اقدام کی طرف رہنمائی ملے گی۔

کلیدی الفاظ : انتہاء پسندی، مشترکہ اخلاقی اقدار،عدم تشدد،اعتماد سازی،مقدس متون۔

FutureCON-2026-40: The Role of Islamic Teachings In Promoting Peace in Conflict Ridden Societies

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"Peace" (امن) is a state, a feeling, and a sentiment of security, where every individual in society feels safe about their life, property, and other rights. Establishment of peace is a great blessing from Allah. Peace and security is an important and basic need of humanity, through which societal harmony and tranquility are established in the world. In today's world, peace and security are no less than a blessing and mercy from God, considering their significance. Peace and security are the strong fortress and shield of Islam. In its presence, people move freely from one place to another, fulfilling their economic, social, and other needs without fear or danger. This sense of security fosters an atmosphere of trust and calm, allowing people to pursue their daily lives, interact with others, and contribute to society without the shadows of fear, anxiety, or threat. Islam strongly advocates for reconciliation and peaceful coexistence, emphasizing principles of justice, fair mediation, forgiveness, and mutual respect. By promoting these values, it seeks to establish a society where harmony and tranquility prevail, benefiting both individuals and communities. The destruction of peace is akin to the destruction of a nation, as it unravels the very fabric that holds a

society together. The Quran emphasizes this by stating, **وَاللهُ لاَ يُحِبُّ المفسدين**"And Allah does not love those who spread corruption" (Surah Al Qassas: 77), highlighting that chaos and conflict go against the divine order. The Prophet Muhammad (peace be upon him) underscored the gravity of harming innocent lives, saying, "Whoever kills a non-Muslim citizen unjustly, Allah has forbidden Paradise for him," illustrating Islam's strong stance on protecting the sanctity of life and promoting coexistence. When disputes and conflicts escalate, they breed resentment, mistrust, and further violence, creating obstacles to achieving harmony and stability. Essentially, peace is a prerequisite for progress, and its disruption leads to suffering and decay. Every religion seeks the resolution of conflicts. Islam provides clear guidance that conflicts should be prevented in the first place, and if conflict arises, it is necessary to understand and identified its causes and factors. Citizens should inform about these differences in a simple way, and efforts made to resolve them.

Keywords: reconciliation, obstacles, mercy, mediation, disruption

FutureCON-2026-41: A Linguistic and Structural Study of the Language of Urdu Advertisements

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This study presents a linguistic and structural analysis of the language used in Urdu advertisements, exploring how lexical choices, syntactic patterns, and rhetorical devices shape persuasive communication. Drawing on contemporary linguistic theories, the research investigates the use of simplified, emotive, and impactful vocabulary; the prevalence of imperative and concise sentence structures; and the strategic incorporation of phonetic features that enhance memorability. From a structuralist perspective, Urdu advertisements are examined as systems of signs in which verbal, visual, and symbolic elements interact to construct layered meanings. The analysis further evaluates binary oppositions, narrative patterns, and semiotic relations that influence consumer perception and decision-making processes. Additionally, the study highlights how socio- cultural values, gendered representations, and cultural symbols embedded within advertisements contribute to meaning-making in the Urdu media landscape. Overall, the findings demonstrate that the language of Urdu advertising operates not merely as a descriptive tool but as a meticulously crafted linguistic and structural mechanism designed to persuade, influence, and shape consumer behavior.

Keywords: linguistic and structural analysis, Urdu advertisements, lexical choices, syntactic patterns, rhetorical devices, persuasive communication

FutureCON-2026-42: From Flesh to Filters: A Feminist Critique of Digital Beauty Standards in Pixel Flesh by Allen Atlanta

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This research critically explores the digital beauty myth through Atlanta's *Pixel Flesh*, using an intersectional approach. It focuses on how patriarchal power structures and capitalist systems shape unrealistic beauty standards, particularly affecting women of color. The study highlights how these beauty ideals are not just cultural preferences but deeply political tools of control that affect race, gender, class, and identity. The methodology used is qualitative textual analysis, allowing a detailed examination of how the chapters of *Pixel Flesh* reveal systemic oppression through media, filters, cosmetic surgery, and online expectations. Each line studied was linked with real-life examples of how digital beauty influences self-perception, mental health, and social status. The research investigates themes like aesthetic labor, misogyny, commodification of the female body, and digital violence. The results show that beauty is sold as freedom and self-expression, but in reality, it becomes a burden. It is a form of modern control where women are made to feel inadequate unless they perform beauty according to Eurocentric ideals. Girls as young as ten are shown to suffer under these pressures. Black and brown features are either erased or exploited while white features are idealized. The conclusion calls for resistance against these narrow beauty standards by promoting diverse, inclusive, and liberating representations of all women. It emphasizes that true empowerment can only come by dismantling systems that exploit women's bodies for profit and control.

Keywords: Digital beauty myth, intersectionality, Pixel Flesh, Ellen Atlanta, feminist theory, aesthetic labor, colonial power, body politics, patriarchy, media control.

FutureCON-2026-43: Narrative Transformation and Cultural Identity in Classical and Modern Urdu Literature

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Narrative has remained a fundamental element of Urdu literature, serving as a powerful medium for expressing cultural identity, social realities, and collective consciousness. Classical Urdu poetry and prose reflect deep-rooted traditions, moral values, and historical experiences, while modern Urdu literature increasingly engages with themes of change, identity, and modernity. This study aims to conduct a comparative analysis of narrative transformation in classical and modern Urdu literature, with a particular focus on how cultural identity is preserved, adapted, and reinterpreted over time. The study employs a qualitative literary analysis of selected classical and modern Urdu texts to examine shifts in narrative structure, thematic concerns, and modes of expression. The findings reveal that while classical

narratives emphasize symbolism, metaphysical reflection, and collective cultural values, modern narratives tend to foreground individual experience, social critique, and evolving cultural identities. Despite these differences, a strong continuity exists in the underlying cultural consciousness that defines Urdu literary tradition. The study concludes that narrative transformation in Urdu literature is not a rupture but an evolutionary process shaped by historical, social, and cultural forces. In the contemporary digital age, this transformation reflects a broader human renaissance where literature continues to negotiate between tradition and innovation, ensuring the survival and relevance of cultural identity in changing times.

Keywords: Urdu Literature, Narrative Transformation, Cultural Identity, Classical and Modern Literature, Literary Evolution

FutureCON-2026-44: Fashion Designing in the Digital Era

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The fashion industry has undergone a profound transformation with the integration of digital technologies. From design conceptualization to production, marketing, and consumption, digital tools have reshaped how fashion is created, presented, and experienced. Designers now leverage innovations such as computer-aided design (CAD), 3D modeling, artificial intelligence (AI), virtual reality (VR), and digital marketing platforms to streamline workflows, enhance creativity, and engage consumers in immersive ways. Digital fashion technologies not only improve efficiency but also facilitate sustainability through virtual prototyping and reduced material waste. This paper explores the multifaceted impact of the digital era on fashion designing, examining both opportunities and challenges. It discusses how technology-driven practices influence design accuracy, consumer interaction, trend forecasting, and global competitiveness. Additionally, the study highlights the role of digital platforms in democratizing fashion, enabling broader access to design education, collaboration, and e-commerce. By analyzing emerging trends and technological adoption, this paper provides insights into the future trajectory of fashion design in a rapidly evolving global industry. The findings underscore the transformative potential of digital integration to innovate, streamline, and sustain fashion practices.

Keywords: Digital Fashion, Computer-Aided Design (CAD), 3D Modeling, Artificial Intelligence (AI), Virtual Reality (VR)

FutureCON-2026-45: Prophetic Leadership: An Ethical and Strategic Framework for Crisis Management

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This study explores the principles of leadership in difficult and challenging situations in the light of the teachings of the Holy Prophet Muhammad (peace be upon him). The purpose of this research is to highlight how the Prophetic model provides timeless guidance for effective, ethical, and compassionate leadership during crises. Using a qualitative and analytical approach, the study examines selected events from the Seerah, including the Treaty of Hudaybiyyah, the Battle of Uhud, and the leadership practices in Madinah, to identify the Prophet's strategies of patience, consultation (shura), justice, and trust in Allah (tawakkul). The findings reveal that the Prophet's leadership was rooted in spiritual conviction, moral courage, and empathy, which enabled him to unite people and maintain stability even under extreme adversity. The study concludes that adopting Prophetic leadership principles can provide contemporary leaders with a model of resilience, ethical integrity, and visionary decision-making in times of hardship.

Keywords: Prophetic leadership, crisis management, ethical leadership, consultation (shura), justice, tawakkul

FutureCON-2026-46: Moral Courage in Times of Crisis

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Ethics in Islam addresses every aspect of a muslin's life from greeting to international relations. It is universal in it's scope and applicability and as a comprehensive way of life, it encompass a complete ethical system that is a key aspect of it's world view and has a profound impact on society as a whole. Morality refers to the national, natural traits and habits of a person, which are expressed without effort, meaning that actions are performed with great ease and convenience. There is no need for thought or deliberation to persons them. In other words, when a person's inner state and outward morals and habits go hand in hand, it is catted morals and qualities which the Quran confirms as follows.

وانک علی خلق عظیم.۱

"And indeed, yes are on a noble path". Morality is based on the God teaching of individual and social life, which are based on the permanent foundations of morality and spirituality, and not on material and religious interests. As a result of this behavior, religious interests should be achieved or destroyed. The first place is given to the guidance of God. A person has to go through countless hardships, difficulties, suffering and crises in life. Some hardships affect a person heart, some cause pain to a person's body, some cause a person to suffer financially, some cause him pain in the matter of children, hurt about him family and spouse. Therefore, a person has to face hardships and suffering from not one but many aspects. There hardships and suffering are tests from Allah Almighty. Whoever is patient with them, demonstrates good morals and fulfills their requirements, Allah Almighty grants him a

high position in this world and the hereafter. However, standing firm in the face of trials and submitted to the will of Allah Almighty is the work of people with great courage. All this shows the moral courage in a person. Moral courage in the ability the gives a person the courage to stand up crisis, despite fear, pressure and uncertainty in difficult times, self-interest helplessness or pressure often make a person weak, but true moral courage is. It is that a man should not only speak the truth but also stand firm for the truth helping the weak in such situations, prioritizing the collective good over personal gain and in the right path shows the height of a person's character. In a crisis, the society out of destruction and towards hope and goodness.

Keywords: Noble Path, Applicability, Habits, Spirituality, Character Building

FutureCON-2026-47: Time Series Forecasting of the Unemployment Rate of Pakistan Based bn Box-Jenkins Methodology

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Understanding future labor market dynamics is essential for economic foresight. The purpose of this research is aims to forecast Pakistan's unemployment rate through a rigorous applications of the Box-Jenkins methodology to reveal anticipate trends with statistical accuracy. The goal of this study is to forecast the unemployment rate in Pakistan and assess the effectiveness of the Box-Jenkins methodology particularly the ARIMA model in generating accurate and reliable economic forecasts. The study provides a data-driven understanding of future labor market trends in Pakistan. This analysis is based on quantitative annual time series data collected from the world development indicators (WDI) for the period 1991 to 2023. The Box-Jenkins methodology is employed through four key step; identification, estimation, diagnostic checking, and forecasting. In the identification stage the data was tested for stationarity using the (ADF) test. Since the original data was non stationary, it was transformed to a stationary series through first differencing. The final selected model ARIMA (1, 1, 0) is used to forecast unemployment rates up to 2028. Model performance is evaluated using standard forecasting metrics: (RMSE) (MAE) and (MAPE).The analysis forecasts a gradual increase in Pakistan's unemployment rate projecting it to reach 9.31% by 2028. The accuracy evaluation of the ARIMA model shows that the forecast results are moderately to reasonably reliable based on the performance metrics applied. The study provides useful insight into the future trajectory of unemployment in Pakistan. The results can be used as a foundation for future academic research in econometrics and time series analysis, and offer valuable input

for analysts and policymakers interested in understanding and monitoring long-term labor market trends.

Keywords: unemployment rate, forecasting, Box-Jenkins Methodology

FutureCON-2026-48: Knowledge, Awareness and Practices regarding Anemia and Hypertension among Antenatal Mothers

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Maternal morbidity and mortality in low and middle income countries (LMICs) remain driven by limited awareness of preventable pregnancy complications such as anemia and hypertension. This study aimed to assess predictors of maternal health awareness specifically regarding anemia and hypertension among pregnant women in Nowshera District, Pakistan. A cross-sectional, community-based study was conducted among 200 pregnant women. Data was collected through questionnaires. Descriptive statistics characterized the sample, while analyses (Chi-square tests, ANOVA, t-tests) evaluated associations between awareness and independent variables. The mean age of respondents was 23.4 years (SD = 3.2), with the majority being housewives (93%) and having intermediate-level education or below. Only 38% of participants were aware of hypertension risks, and 50% were aware of anemia despite widespread ANC engagement. This study reveals critical gaps in maternal health awareness among young, home-based women in Pakistan, despite regular interaction with the healthcare system. These findings advocate for ANC-integrated health education, community-based outreach tailored to housewives, and nutrition-focused programs that addresses both biological symptoms and structural poverty. Achieving meaningful reductions in maternal health risks requires not just service delivery, but also include empowerment, health literacy, and person-centered care.

Keywords: Maternal Health Awareness, Antenatal Care Utilization, Health Literacy, Predictive Modeling, Low-Resource Settings

FutureCON-2026-49: Reconnecting Ethics with the Sacred: Islamic Moral Thought as a Response to Contemporary Ethical Uncertainty

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Contemporary ethical uncertainty is not merely a result of rapid technological and social change,it reflects a deeper rupture between moral reasoning and the sacred foundations that once guided human conduct. This paper approaches the current ethical crisis through the lens of Islamic Studies, arguing that Islamic moral thought offers an internally coherent and spiritually grounded framework capable of addressing modern uncertainty.

Rather than treating ethics as a neutral or autonomous discipline, Islamic ethics situates moral action within divine accountability, purposeful existence, and social responsibility. Drawing upon Quranic moral discourse, Prophetic guidance, and the ethical insights of classical Muslim scholars, the study examines how concepts such as *amanah* (moral trust), *tazkiyah* (moral self-formation), and *khilafah* (ethical stewardship) shape a sacred moral horizon that integrates belief, action, and accountability. The paper further engages the framework of *Maqasid al-Shariah* to demonstrate how Islamic ethics responds to contemporary challenges, such as environmental degradation, moral relativism, and the ethical dilemmas of technological power without surrendering its normative foundations. The study contends that reconnecting ethics with the sacred, as articulated in Islamic moral thought, does not constrain ethical reasoning but deepens it. Such an approach enables a morally resilient vision of human responsibility, offering meaningful ethical direction in an increasingly uncertain world.

Keywords: Islamic Ethics, Sacred Morality, Maqasid al-Shariah, Moral Responsibility, Contemporary Challenges

Exploring Customer Centric Metaverse Adoption: Transforming Virtual interaction into Sustainable Engagement

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The metaverse, enabled by virtual and augmented reality technologies, is reshaping digital interactions and transforms the digital experience where it provides immersive, socially present, and emotionally engaging experience. In spite of the growing academic interest, the existing studies on metaverse adoption, in particular in the context of virtual tourism, are constrained by a lack of indicators of the immersive experience and a lack of socio-psychological processes that can explain the adoption behavior. Moreover, sustainability-centered communication, as the example of Sustainable Word of Mouth (SWoM) has undergone insufficient empirical research as an impetus to customer-oriented adoption of the metaverse. A framework is suggested in this paper to explore the role of metaverse attributes, i. e. individuality, empathy, naturalness, and immersion, on social presence, personal identification and Sustainable Word of Mouth (SWoM) to determine how metaverse adoption intentions are influenced. Based on the Embodied Social Presence Theory (ESPT) and the Social Identity Theory (SIT), the suggested model explains how the presence of immersive qualities increases the power of social presence, strengthens personal identification and invokes advocacy behaviors that can foster adoption. It follows a quantitative research design with the help of an online survey questionnaire that should be sent to around 300 participants with previous experience in using metaverse-based virtual tourism. The obtained data will be examined

using Structural Equation Modeling (SEM) to test the hypothesized relationships. Through incorporating immersive features, identity establishment, and sustainability communication into an integrative theoretical framework, this research aims to advance the understanding of the customer-centric metaverse uptake and delivers practical advice on how to create immersive and sustainable virtual tourism experiences.

Keywords: Metaverse Adoption, Metaverse Attributes, Social Presence, Sustainable Word Mouth (SWoM), Personal Identification

اردو تحقیق میں اے آئی کا استعمال اور افادیت

Antalzia

Shaheed Banazir butto women university Peshawar

نے علمی و تحقیقی میدان میں (Artificial Intelligence) عصرِ حاضر میں مصنوعی ذہانت نمایاں مقام حاصل کر لیا ہے، اور اردو تحقیق بھی اس سے مستثنیٰ نہیں رہی۔ اے آئی کی مدد سے اردو متون کی تلاش، درجہ بندی، تدوین، لسانی تجزیہ اور حوالہ جاتی نظام کو نہایت سہولت اور سرعت کے ساتھ انجام دیا جا سکتا ہے۔ تحقیق کے ابتدائی مراحل میں موضوع کے انتخاب، مواد کی فراہمی اور سابقہ تحقیقی کام کے جائزے میں اے آئی محقق کے لیے ایک مؤثر معاون ثابت ہوتی ہے۔

مزید برآں، اردو زبان کے نحوی و صرفی تجزیے، متن کی اغلاط کی نشاندہی، ترجمہ، خلاصہ نویسی اور اقتباسات کی ترتیب میں بھی اے آئی تحقیق کے معیار کو بہتر بناتی ہے۔ یہ نہ صرف وقت اور محنت کی بچت کا ذریعہ ہے بلکہ تحقیقی کام میں معروضیت اور تنظیم کو بھی فروغ دیتی ہے۔ تاہم، اے آئی کو محض ایک معاون وسیلہ سمجھنا ضروری ہے، کیونکہ تنقیدی شعور، فکری گہرائی اور تخلیقی بصیرت انسانی محقق ہی کی ذمہ داری رہتی ہے۔ یوں اردو تحقیق میں اے آئی کا استعمال افادیت، سرعت اور معیار کے نئے امکانات پیدا کرتا ہے، بشرطیکہ اسے محتاط اور ذمہ دارانہ انداز میں بروئے کار لایا جائے۔

FutureCON-2026-53. Optimizing Legibility of Urdu Handwriting amongst Students with Learning Disabilities Employing a Cognitive Load-Aware Scaffolded

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Handwriting is an indispensable academic skill and students with learning disabilities are frequently struggling with handwriting. Urdu handwriting tasks turn tougher for LD students due to the complexity of the language. This study was conducted in order to investigate the usefulness of the Cognitive Load-Aware Scaffolded Program for Handwriting (CLASP-H) to improve Urdu handwriting among LD Students. CLASP-H has roots in Cognitive Load Theory (CLT) and scaffolding principle. It was developed to target the distinct cognitive needs of LD students. A quasi-experimental design was utilized where the sample (n = 40) was split into two groups. The experimental group (n = 20) received 20 sessions of CLASP-H intervention, while the control group (n = 20) continued with traditional classroom instructions. A teacher-rated Urdu Handwriting Assessment Rubric (UHAR) ($\alpha = 0.87$; ICC = 0.83) was utilized as a pre-test and post-test data collection

tool. Data was evaluated using descriptive and inferential statistics. Performance of both groups at pre-test was similar ($p = .91$). Improvement in scores of the experimental group was noteworthy ($p < .001$, $d = .96$) as opposed to the control group ($p = .85$). Post-test between-groups additionally revealed that the experimental group performed significantly better ($p < .001$, $d = 1.44$) than the control group. Analysis of covariance additionally established the effectiveness of intervention after adjusting the pre-test score ($p < .001$). Hence confirmed that CLASP-H is a successful technique to improve Urdu handwriting among LD students. Findings endorse the utilization of cognitively aware instructions in special education schools.

Keywords: CLASP-H, Cognitive Load Theory, Scaffolding, Urdu Handwriting, Learning, Disabilities

Judging Creativity in the Age of Algorithms: How Artificial Intelligence Reshapes Studio Pedagogy and the Evaluation of Art

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The integration of Artificial Intelligence (AI) into artistic practice has significantly altered the foundations of studio-based art education. Although AI tools improve experimentation dfficiency, and accessibility in visual production, they concurrently undermine traditional pedagogical and evaluative structures. Art educators and evaluators now face the intricate challenge of not only fostering artistic development but also evaluating creativity, originality, authorship, and the processes involved in AI-assisted artworks. This research analyses the impact of AI on studio teaching and the increased challenges in assessing student artworks. Drawing from the lived experience of an art educator and examiner, the study employs qualitative, practice-based research methods including reflective teaching narratives, studio observations, and case analysis of AI-integrated student projects. The study uses qualitative, practice-based research methodologies, such as studio observations, case analysis of AI-integrated student projects, and reflective teaching narratives, based on the lived experience of an art educator and examiner. The paper identifies critical gaps in conventional assessment systems and proposes a Process Agency Reflection (PAR) Evaluation Model, designed to address the pedagogical and ethical challenges of AI-augmented studio learning. The research contends that significant evaluation in AI-driven studios should emphasize creative intent, human judgement, and critical reflection rather than soley visual or technical results.

Keywords: AI in Art Education, Studio Pedagogy, Art Evaluation, Assessment Models, Authorship, Creative Process

Exploring the Relationship between Emotional Intelligence, Work-life Balance, and Occupational Burnout among Lawyers in Pakistan

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Lawyers face intense workload, demanding schedule, long working hours, continuous demands by clients and prolonged stress situations. These demands lead to occupational stress and burnout impacting their personal life, and professional efficacy. Work-life balance impacts the level of burnout whereas Emotional Intelligence act as a protective factor against burnout. This research was conducted because of limited Research on Pakistani Lawyers and the challenging nature of their legal work. The study was aimed on determining the association between Work-life balance, Emotional Intelligence and Burnout as well as their subscales. Moreover, respective study seeks to access the gender differences between Emotional Intelligence, Work-life balance and burnout among Pakistani Lawyers. Emotional Intelligence was assessed across: Self Emotion Appraisal, Other Emotion Appraisal, Use of Emotions and Regulation of Emotion. Work-life balance was operationally defined on 3 aspects: Personal life interference with Work, Work interference with Personal Life and work personal life enhancement. Burnout was measured across 2 aspects: Exhaustion and Disengagement. The study encompasses framework and model including Job Demand resource model. A Cross-sectional, Quantitative study design was used and substantial data of 301 was gathered to draw meaningful analysis. The data was collected through snowball and purposive sampling via designed questionnaires. The instruments including Wong and Law Emotional Intelligence scale, Oldenburg burnout inventory and Hayman work-life balance scale were administered. Analysis was then performed using SPSS. The findings of the study revealed that there is a significant positive correlation between work-life balance and emotional Intelligence ($r = .26$, $p < .01$), a significant negative correlation in-between Emotional Intelligence and burnout ($r = -.42$, $p < .01$), as well as amid Work-life balance and Burnout ($r = -.55$, $p < .01$) along with their subscales. Significant gender differences also exist among all three variables ($p < .01$). Males scored higher score on Emotional Intelligence Scale (M=82.34, SD=16.94) than females (M=81.89, SD=15.89), t (299) = .22, p >.05. Whereas, it showed that females scored more on Work-Life Balance (M=50.48, SD=8.49), as compared to males (M=47.69, SD=8.23), t (299) = -2.64, p<. 01.Results also indicated that males scored higher on Burnout (M=37.02, SD=4.98) as compared to females (M=36.51, SD=5.53), t (299) = .78, p>.05. Overall, the study highlights and brings attention to the significance of Emotional Intelligence in improving Work-life balance,

hence reducing burnout and helps individual balance personal and professional life. These findings highlight the importance of emotional skills training and organizational policies aimed at improving work–life balance to promote psychological well-being and professional sustainability among Pakistani lawyers.

Keywords. Emotional Intelligence, Work-life balance, Burnout, Pakistani

ABSTRACTS

POSTER PRESENTATIONS

FutureCON-2026-50: Isolation and Characterization of lactic acid bacteria as probiotic from fruits and vegetables

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Live microorganisms that help to boost the host's health are known as probiotics. Lactic acid bacteria and bifidobacterium, are the utmost widely used probiotics. Probiotics can affect the host positively, the effect may be directly and indirectly, that includes altered intestinal microbiota, formation of antimicrobial agents, improvement in gut barrier function, alteration of the mucosal immune system, and helps in food digestion and absorption. Similarly, the lactic acid producing probiotic are utilized and consumed as functional food ingredients due to their numerous advantages and high profile of nutritional and medicinal benefits. Dairy products including cheese, yogurt, fermented milk, ice cream, infant formula, and powdered milk are extensively used as a source of probiotics. However, there is a demand for non-dairy products as a source of probiotic bacteria to satisfy the need of lactose-intolerants, dairy allergic population, vegetarians, individuals with high cholesterols consumption, and culturally ingrained dairy avoiders. Therefore, the current study is designed to screen and isolate the lactic acid producing probiotic bacteria from non-dairy product including vegetables (tomato, carrot, sugarcane and cabbage) and fruits (apple, pear, and banana). The vegetables and fruits samples were collected in sterile bags from local market. After passing from serial dilution method the samples were poured on MRS agar plate and incubated for 24-48 hours in order to get the pure colonies of each sample. The sample loops from each culture plate were streaked on Nutrient agar, incubated again for the further increasing the growth and for lactic acid producing bacteria isolation. The isolated LAB isolates stayed stored in glycerol stock for further experimentation. After that he isolated bacteria were tested for probiotic ability including; tolerance against NaCl, resistance to low pH, and the antimicrobial activity. The potential probiotics isolates were further identified and characterize by gram staining, microscopy, biochemical tests and 16s rRNA sequencing. The probiotics obtained from vegetables and fruits were alternative to those who consumed dairy product as source of probiotics.

Keywords: Lactic acid bacteria, antimicrobial activity, 16srRNA, gram staining, MRS media

FutureCON-2026-51: Comparative Study of Ph Tolerance on Alpha-Amylase Obtained from Different Bacterial Species

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Enzymes are biological catalysts which can speed up biochemical reactions in all living organisms. α-amylase is a starch degrading enzyme through hydrolysis, producing a mixture of glucose, maltose, maltoriose and dextrin. The industrial applications of α-amylase make it important in the market of enzymes. It can be obtained from various sources such as plants, animals and microorganisms. In the current research project total ten (10) bacterial strains were isolated on nutrient agar from soil sample of Women University Mardan, from raw milk and potato samples. Isolated strains were qualitatively analyzed on nutrient agar media with 2% starch supplemented for production of α-amylase. Among the isolated ten strains two strains P1 and M2 produced the clearance zone. The P1 strain produced the larger clear zone index of 3.7 mm while M2 produced the smaller clear zone index of 2.8mm. These strains were further morphologically and biochemically characterized including gram staining. On the basis of gram staining P1 strain is gram positive while M2 is gram negative. The Streptococcus P1 strain and *E. coli* M2 strain was quantitatively screened using nutrient broth supplemented with 2% starch and maximum α-amylase units were obtained after 24, 48 and 72 hrs incubation at 370C. After wards the effect of pH was evaluated on both strains (*Streptococcus, E. coli*) by optimizing the pH level at different range (pH 3, 4, 5, 7, 9 and 11) a maximum of 0.292 U/ml of P1 strain obtained at pH 9 after 72 hrs. of incubation at 370C and maximum of 0.204 U/ml of M2 strain obtained at pH 11 after 48 hrs. of incubation at 370C. In conclusion due to the starch degrading activity of α-amylase it constitutes a class of industrial enzymes having approximately many industries such as textile, biofuel, paper and pharmaceutical industries.

Keywords: α-amylase, Streptococcus, *E. coli*, DNS, Growth OD, Protein estimation, Clearance zone index

FutureCON-2026-52: The Critical Role of Particle Morphology on the Antibacterial Efficacy of Synthesized Monodispersed Zinc Oxide

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Monodispersed fine particles of zinc oxide with novel morphologies were fabricated in aqueous media using simple and economically feasible routes. Selected morphologies of the synthesized ZnO powders were then employed for *in-vitro* evaluation of antibacterial activity against various pathogenic bacteria. The synthesized particles were found to exhibit more antibacterial

activity towards Gram positive bacteria as compared to Gram negative bacteria. Moreover, the synthesized samples exhibited stronger antibacterial effects compared to commercial ZnO at the employed concentration at (20 µg/20 µL). Furthermore, the sample 1 and 4 demonstrated the highest antibacterial activity against all the tested strains. While, commercial ZnO showed the weakest antibacterial activity (9–12 mm) and no response against *P.aeruginosa* and *Enterobacter*. The obtained results indicated that the ZnO antibacterial efficiency is strongly morphology-dependant. The present study suggests that the application of our synthesized ZnO particles as antibacterial agent in biomedical side may be effective at inhibiting certain pathogens.

Keywords: ZnO (Zinc Oxide), Gram Positive, Gram Negative, Antibacterial, Biomedical.

FutureCON-2026-53: From Sunlight to Sustainable Power: The Emerging Era of Microbial Electricity Driven by Photosynthetic Cyanobacteria

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Cyanobacteria as photosynthetic microorganisms are able to produce slight amount of electricity consuming sunlight to continue their metabolism. They trap solar energy and turn it into chemical energy, producing electrons (as part of their photosynthesis). When such electrons are passed through an external circuit, they produce measurable amount of electricity. The procedure occurs in devices called bio-photovoltaic systems, where these microbes act like tiny solar panels that renovate themselves and continue working as long as they receive light and basic nutrients. Cyanobacteria are quite beneficial as they grow rapidly, exist in simple environment, and do not require costly materials. They are able to generate electricity while absorbing CO_2 and releasing O_2, making the procedure eco-friendly. Though the amount of electricity produced is still lower as compared to conventional solar panels, researchers are working to enhance efficiency by finding powerful strains, improving light capture, and making finer electrodes that can collect electrons more efficiently. This idea could one day be used for powering small sensors, low-energy devices, or systems in remote areas specially in mountainous regions where common electricity sources are not available. It can also help to make renewable energy solutions that merge electricity production with wastewater treatment. Electricity generation from non-renewable sources of energy not only not only pollutes the environment but also harms health, causes global warming and huge cost etc . In conclusion, bioelectricity from photosynthetic microorganisms like Cyanobacteria may offer an advantageous approach to renewable energy, showing biological activities that can be used in modern ecofriendly energy alternative ways.

Keywords: Photosynthetic microorganisms, cyanobacteria, eco-friendly, bioelectricity, low energy devices

FutureCON-2026-54: Whole Transcriptome Sequencing of the Immunologically Categorized TB Patients

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Next generation sequencing has revolutionized disease diagnosis by providing expression profiles of disease phenotypes compared to healthy controls. The current study was intended to profile the transcriptome of immunologically categorized TB phenotypes compared to healthy controls and TB-cured individuals. Methodology: RNA samples from eight individuals including duplicates of each phenotype underwent whole transcriptome sequencing utilizing the Illumina platform. The raw data after normalization was mapped onto the hg-19 reference human genome. Differential expression analysis of the four phenotypes in six pairwise comparisons was carried out on the FPKM values using DESeq2 Bioconductor package and finally GO ontology and KEGG pathway analysis was done using phyper package in R. Results: The transcriptome sequencing resulted in 3351 differentially expressed genes (DEGs) (fold change (FC) ≥ 2 and adj. p-value$\leq$0.001) comprising 2248 upregulated and 1103 downregulated genes among all comparisons. The highest number of DEGs were obtained between the TB-CU vs. HC pair (n=1066) and the lowest number of DEGs were obtained between the ATB vs. HC pair (n=76). Interestingly, most of the genes in ATB vs. HC were downregulated leading to an active disease state. Similarly, comparatively more genes in the TB-CU vs. HC pair were also downregulated. However, in LTBI vs. HC, the majority of the genes were upregulated which might reflect the activation of pathways leading to latency. Pathway analysis revealed the enrichment of many important pathways like antigen processing and presentation, Wnt signaling pathway and mTOR signaling pathway. Conclusion: The transcriptome analysis revealed significant dysregulation of gene expression patterns across different TB phenotypes compared to HC suggesting a distinct molecular signature associated with TB-CU phenotype. Future follow-up studies of the TB phenotypes with a larger patient cohort would be needed to strengthen the findings of this study.

Keywords: TB, whole transcriptome sequencing, Immunological ,

FutureCON-2026-55: Development of high-performance nanomaterials-based gas sensors of industrial importance

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With the rapid development of the industry, studies on environmental pollution, health, and safety are increasing. Air pollutants, toxic gases and

volatile organic compounds can threaten human health and need sensitive detection of their concentration. Gas sensors are indispensable because of their promising characteristics for detecting these gases. Gas sensors are promised to play a critical role in environmental monitoring, personal safety, and supervising toxic gases that are released from industries, fossil fuel consumption, etc. Gas sensors are low-cost, sensitive and portable devices with intensively studied to develop their sensing performances. These can be improved by using metal oxide nanostructures, including ZnO, SnO_2, and In_2O_3, due to the increased surface area which allow them to absorb gases chemically or physically. The other advantage of metal oxide nanoparticles is they can be used repeatedly.

Keywords: Gas sensor; metal oxides; environmental safety; nanoparticles; ZnO NPs

FutureCON-2026-56: Expression Profiling of Genes Through Rt-Pcr in Various Tb Phenotypes

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Background: Understanding the molecular mechanisms underlying TB pathogenesis and identifying potential biomarkers are crucial for improving TB diagnosis and treatment outcomes. Objective: This study aimed to validate the expression profiles of key genes associated with TB phenotypes in a Pakistani cohort and explore their potential as biomarkers for TB diagnosis and management. Methodology: A total of five genes, namely HLA-DQB1, TGFB2, CREB1, IFNA2, and IFNA6, were selected for expression analysis using quantitative real-time polymerase chain reaction (qRT-PCR). These genes were chosen based on their prominence in the gene co-regulation network identified for TB phenotypes. Gene expression levels were compared between 14 ATB, 6 LTBI, 16 TB-CU, and 16 HC individuals in triplicate. Results: The HLA-DQB1 gene exhibited differentiation across all four phenotypes, with decreased expression observed in ATB and LTBI compared to TB-CU and HC. Additionally, all five genes showed reduced expression levels in TB cases, indicating potential roles in TB pathogenesis. TGFB2 displayed upregulation in ATB, while CREB1, IFNA2, and IFNA6 were significantly downregulated in both ATB and LTBI compared to HC and TB-CU individuals. Conclusion: Our findings suggest that HLA-DQB1 could serve as a valuable potential biomarker for distinguishing TB phenotypes in the Pakistani population. The downregulation of key genes such as TGFB2, CREB1, IFNA2, and IFNA6 in TB cases highlights their involvement in TB infection. Further validation and exploration of these gene expression patterns may contribute to improving TB diagnosis and developing targeted therapeutic strategies in Pakistani patients.

Keywords: TB, Pakistan, RT PCR, Gene Expression,

FutureCON-2026-57: Spatio-temporal distribution of ticks by Geographical information system (GIS) in district Nowshera, KP, Pakistan

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Ticks are the obligate blood feeder in tropical and subtropical areas that afflict terrestrial and semi-aquatic species. Ticks are external parasites, living by feeding on the blood of mammals, birds and sometimes reptiles and amphibians. Ticks was considered as a vector of disease. They caused diseases in animals. Optimum temperature for the survival of ticks is approximately 32°C. The current study was about the spatio-temporal distribution of ticks that was conducted in district Nowshera. For the purpose of data collection, we visited three tehsil of district Nowshera. Different cattle's farms and local cattle had visited. For the latitude and longitude of the place from where ticks were collected, was recorded by Geographic Information System (GPS). By using QGIS the recorded data was collected and mapping was done on it. The overall distribution of ticks was high in humid areas while increased temperature caused the decrease in the ticks density.

Keyword: ticks, Geographic information system, GPS, temperature, humidity

FutureCON-2026-58: Experimental extraction of chitosan from fish, crab, and shrimp shells and its application in the edible coating of different fruits and vegetable

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Chitosan based coating is one of the best methods to prolong the shelf life of fruits and vegetable. In this report chitosan from fish scales, chitosan from crab shells and chitosan from shrimp shells were used with incorporation of different ingredients and compounds like honey, glycerol, aloe vera gel. The solution was applied through brushing method on fruits and vegetable like tomato, peach, apple, sweet cherry. By using chitosan with different ingredients and compound different result were obtain. In case of cherries the best result was shown by using a mixture of chitosan (fish, crab,shrimp) along with honey and glycerol. The standard shelf life of cherries is 1 to 3 days at room temperature. By using this solution, the shelf life of cherries was increased for upto 6 days at 30°C. Shelf life of ripe peach is 3 to 4 days at room temperature. For peaches, the effective solution is chitosan from fish scales and aloe vera gel. This solution increases the shelf life of peach for upto 6 days at 30°C. The shelf life of banana is 2 to 3 days. For banana the effective solution is a mixture of chitosan, glycerol

and honey. This solution increases the shelf life of banana for upto 9 days at 30°C. The shelf life of tomato is 2 to 3 days at room temperature. For tomatoes, the effective solution is a mixture of chitosan, gylcerol and honey. The solution increases the shelf life of tomato for upto 9 days at 30°C. Chitosan from shrimp shell and aloe vera gel increases shelf life of tomato for upto 9 days at 30°C. The shelf life of tomato can be extended by using aloe vera gel for upto 5 days at 30°C. The obtained result demonstrates that the edible covering of chitosan may preserve the tested samples's postharvest characteristics with also extending its shelf life.

Keywords: Chitosan-based coating, shelf life extension, fruits and vegetables, edible coating

FutureCON-2026-59: Bioethanol production from yam peels using Saccharomyces cerevisiae

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Fossil fuels, also known as conventional fuels, are dwindling in availability. Bioethanol, a renewable energy source, presents a potential alternative. One method of producing bioethanol involves using yam peels, a type of lignocellulosic agricultural waste. Saccharomyces cerevisiae yeast is employed as a fermentation agent in this process. With the global population rising rapidly and fossil fuel reserves depleting, there is increasing concern about finding sustainable energy solutions. Numerous physicochemical and biochemical analyses have demonstrated that yam peels possess high nutritional value, making them suitable for alcohol production. In this investigation, yam peels were cut into 3-5 cm pieces to facilitate drying and grinding. The samples were dried in an oven at 100°C for a full day after drying, each sample was milled individually. Laboratory studies were then conducted to produce bioethanol from yam peels, involving steps such as pretreatment, hydrolysis, fermentation, and distillation. Measurements were taken for total soluble sugar concentration, pH, and ethanol content. The results indicated a modest level of ethanol production. However, adding yeast extract, peptone, and urea to the fermentation medium improved the ethanol yield produced by the yeast. The antibacterial activity of bioethanol was tested in vitro against *Escherichia coli* and Staphylococcus epidermidis, revealing significant inhibitory zones. This study proved that leftover yam peels can be a useful feedstock for making bioethanol. It implies that rather than being thrown away, waste from fermentable fruits that contain sugar might be converted into useful goods. One can use products such as bioethanol as a substitute energy source.

Keywords: Yam peels, Bioethanol, Hydrolysis, Fermentation, Pretreatment, *Saccharomyces cerevisia*

FutureCON-2026-60: Biodegradation and Subsequent Reduction in Toxicity of Polyaromatic Hydrocarbons (PAHs) through Degrading Bacterial Strains

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Polycyclic aromatic hydrocarbons (PAHs), a class of ubiquitous, recalcitrant, and toxic organic pollutants, persist in terrestrial and aquatic environments due to anthropogenic activities, posing significant ecological and human health risks. Conventional physicochemical remediation strategies are often costly, invasive, and may generate secondary pollutants. Consequently, microbial bioremediation, harnessing the catabolic versatility of specialized bacteria, presents a sustainable and eco-friendly alternative. While the isolation and characterization of PAH-degrading bacterial strains are well-documented, a critical, mechanistic understanding of the complete degradation pathways, the genetic and enzymatic determinants governing substrate specificity and efficiency, and most importantly the direct correlation between structural biodegradation and the reduction in ecotoxicological endpoints remains a pivotal research frontier. The study involves systematic isolation, purification, and characterization of indigenous PAH-degrading bacteria, followed by molecular identification through 16S rRNA sequencing. Degradation experiments are optimized under varying environmental parameters to enhance bacterial performance. Advanced analytical techniques, including GC–MS, HPLC, enzyme characterization and protein analysis, are employed to monitor degradation kinetics, determine metabolic intermediates, and elucidate complete mineralization pathways. Genomic and enzymatic analyses provide insights into key functional genes and dioxygenase enzymes responsible risks to both ecological and human health for PAH ring hydroxylation, cleavage, and downstream catabolism. Ecotoxicological assays using seed germination tests, microbial inhibition studies, and cell viability assays evaluate the reduction in toxicity of PAH metabolites after biodegradation. The results demonstrate that the selected bacterial strains exhibit high degradation efficiency, adaptability to PAH-rich environments, and strong potential for consortium-based bioremediation. This work contributes to the development of sustainable, cost-effective, and environmentally benign strategies for remediating PAH-contaminated ecosystems, while deepening our mechanistic understanding of microbial degradation processes. The study intends to improve biodegradation processes by identifying critical factors impacting enzyme activity, thereby contributing to cost-effective and efficient bioremediation solutions.

Keywords: Polycyclic aromatic hydrocarbons, bioremediation, microbial degradation, environmental pollution, sustainable remediation

FutureCON-2026-61: Synthesis, Characterization and in-virtro assessment of antibacterial activity of CuO and ZnO nanoparticles against clinically significant pathogens

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The use of inorganic nano-metal oxides has become a promising alternative to drug resistant antibiotics traditionally because of their wide ranges of antimicrobial activities against Gram-negative and Gram-positive bacteria. In this study, copper oxide (CuO) and zinc oxide (ZnO) nanoparticles were synthesized in aqueous medium using a simple and low cost precipitation method. The metal oxide nanoparticles were characterized by using Scanning Electron Microscope (SEM) to determine particle distribution and surface morphology, Fourier Transform Infrared spectroscopy (FTIR) to identify functional groups, X-ray diffraction (XRD) to identify crystalline structures and Brunauer-Emette Teller (BET) analysis to determine surface area and porosity. The SEM micrographs revealed that the CuO and ZnO nanoparticles were irregular and spherical in shape. The FTIR results showed that the nanoparticles were free from organic surfactants and impurities which was confirmed by XRD. X-ray diffraction showed CuO and ZnO NPs were crystalline with average crystallite size of 9.7 nm and 21 nm, respectively while the surface area of CuO was found to be 42.763 m^2/g and that of ZnO was 17.893 m^2/g. The antibacterial activities of nanoparticles were investigated against Gram-negative strain *Escherichia coli, Pseudomonas aeruginosa* and Gram-positive bacteria *Staphylococcus aureus* and *Streptococcus mutans* using disk diffusion method. The results provide excellent insights into the advantages of using copper oxide and zinc oxide NPs as alternatives to traditional antibiotics as well as imply their future usage in medicine and biomedical industries with enormous benefits in terms of biocompatibility and cost.

Keywords; Copper oxide; Zinc oxide; Antibacterial activity; Disk diffusion assay; Zone of inhibition

FutureCON-2026-62: Dragonfly Species Composition and Distribution in District Mardan, Khyber Pakhtunkhwa, Pakistan

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The present study was aimed to determine the bionomics dragonflies and heavy metal accumulation in their bodies and environment. The data were collected from the species in tehsils Mardan, Katlang and Takht Bhai of District Mardan, Khyber Pakhtunkhwa, Pakistan. A total of 1683 dragonflies were collected from May to September, 2018 in 4 Tehsils (administrative

subdivisions) of District. Dragonflies displayed preferable abundance within agricultural lands and on elevation ranging from 206 to 506 m. Heavy metal analysis of sediments and water samples from 4 tehsils showed significant differences in mean concentrations of Pb, Zn, Cu, and Fe. During the study we collected four dragonfly species belonging to family *Libellulidae. Orthetrum chrysis* 96 (33.10%) was the most abundant species followed by *Trithemis aurura* 88 (30.34%) and *Trithemis Festiva* 72 (24.82%). *Orthetrum anceps* 34 (11.72%). was least abundant species. Dragonflies' highest abundance was recorded in July and least in October 2018. Highest concentration of Cu (17.28=.18 mg/kg) and Fe (68.79=.43 mg/kg) was observed in thorax of *Trithemis Festiva* and (Cu, 10.55=.02 mg/kg) (Fe, 85.67=29 mg/kg) in sediments. The Cr highest concentration was observed in wings of *Orthetrum chrysis* (28.79=.04 mg/kg) and in water sample (0.4=.07 mg/kg). The highest concentration of Pb (3.43=.05 mg/kg) and Mg (110.22=.96 mg/kg) was observed in wings of *Trithemis Festiva* and (Pb, 3.69=05 mg/kg) (Mg,115.17=.05 mg/kg) in sediments while the highest concentration of Zn was observed in wings of *Trithemis aurura* (125.65= 1.15 mg/kg) and in sediment sample (29.06=.38 mg/kg).

Keywords: Dragonflies; Heavy metals concentration; Pakistan; Spatial distribution

FutureCON-2026-63: Comparative Study Of Prevalence of Ovarian Cyst In Females of District Mardan And Charsadda, KP, Pakistan

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Ovarian cyst is female reproductive disease. It is a fluid-filled sac which develops inside in the ovaries or on the surface of single or both ovaries. It is caused by hormonal problems, TSH and HCG, endometriosis and pregnancy issues. Ovarian cyst may be malignant or benign. Mostly ovarian cyst do not require surgical removal (Laparoscopy and laparotomy) and are simply treated by medication and do not cause cancer. The objective of this study was to determine the prevalence of ovarian cyst in females of District Charsadda and District Mardan, KP, Pakistan. A total a 105 cases of ovarian cyst were collected from DHQ hospital of District Mardan and District Charsadda in which 62 (59.40%) cases were collected from DHQ hospital Mardan while 43 (40.95%)case were collected from DHQ hospital Charsadda. Occurrence of ovarian cyst is higher in District Mardan as compared to District Charsadda. The age range includes two groups >35 (32. 4%) and ≤35 (67.6%). In marital status of females 78.1% were married and 21.9% were unmarried. Common type of cyst is hemorrhagic (42.9%), dermoid (24.8%), corpus luteum (9.5%), polycystic (8.6%) and cystadenoma (3. 8%). Cysts are commonly present at right ovary (51.4), left ovary (26.7%) and uterus (21.9%). Cyst is commonly treated by surgery (78.1%)

and medication (21.9%). Common symptoms of ovarian cyst are abdominal pain (71.4%), pelvic pain (65.1), period pain, (40%), bloating (35.2%), irregular periods (32.4%) and vomiting (21.9%). The study concludes that the overall prevalence of ovarian cyst In District Mardan was 59.04% while in District Charsadda was 40.95%. According to our study, the highest rate of ovarian cyst was observed in age group ≤35 as compare to other age group.

Keywords: Ovarian cyst, prevalence, ultrasound diagnosis, hemorrhagic cyst, District Mardan &Charsadda.

FutureCON-2026-64: Nanotechnology and Molecular innovation; Revolutionizing the future

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Nanotechnology refers to the study and manipulation of matter on an extremely small scale. At this scale material have unique properties that enable innovations in medicine, energy and electronics. While that is a great accomplishment in molecular innovation as it designs and engineers specified functions into molecules such as targeted drug delivery or super strong materials. Nanotechnology involves designing and engineering materials at a nano-scale, manipulating and assembling tiny structures, characterizing and analyzing nanoscale properties. Nanotechnology can reduce production cost while improving yields. It enables eco-friendly solutions, reducing environmental impact, support sustainable development and reduce waste. Nanotechnology has a wide range of applications including water purification, removing contaminants and pollutants, improves packaging, nutrition and crop yields. It helps in creating stronger and lighter materials, enhancing chemical reactions and processes and also helps in diagnosing various diseases.

Keywords: Nanotechnology, nano -scale, designing, characterization, pollutants,

FutureCON-202665: Preliminary Phytochemical Screening of Two Species of Capsicum fruit

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The genus Capsicum comprises peppers, a diverse vegetable available in vibrant hues such as green, red, and yellow, celebrated for their culinary versatility and medicinal properties. Abundant in carotenoids and phenolic compounds, peppers exhibit potent antioxidant characteristics, rendering them efficacious in addressing an array of ailments spanning from cephalgia to cholera. Their bioactive phytochemical profile, encompassing flavonoids, carotenoids, and other antioxidant compounds, underscores their

antimicrobial and pharmacological potential, including anti-inflammatory and cardio-protective effects. Notably, polyphenols found in pepper extracts demonstrate significant antioxidant activity, crucial for mitigating oxidative stress-related disorders. Furthermore, in homoeopathy, Capsicum is indicated for symptoms such as homesickness, sleep disturbances, and suicidal tendencies, highlighting its multifaceted therapeutic applications. Beyond their culinary significance, peppers serve as a valuable resource in traditional medicine and pharmaceutical research, offering holistic solutions for health and well-being. It is imperative to explore the diverse chemical constituents within peppers and their biological activities to harness their full therapeutic potential. As such, peppers emerge as not only a flavorful addition to cuisines worldwide but also as a promising avenue for addressing various health concerns. Future research endeavors should continue to elucidate the intricate mechanisms underlying the medicinal properties of peppers, paving the way for their integration into preventive and therapeutic healthcare practices globally

Keywords: Capsicum, phytochemical screening, secondry metabolites, rich source of antioxidant

FutureCON-2026-66: Nanotechnology and Molecule Innovation

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This research is based on the "Synthesis and Characterization of Sulfur and Phosphorous Co-Doped Graphitic Nitride from Urea". Take 10 g urea in a crucible and covered with a lid placed in a muffle furnace at 350^0C for 3 h after cooling grind the melamine with the help of motor and pestle and placed in a muffle furnace at 580^0C for 2 h a brownish mini cake like compound will formed called graphitic carbon nitride. The same method will follow and formed 8 g melamine and then add1 g thiourea and 1 g diammonium hydrogen phosphate grind it properly and placed in a muffle furnace at 580^0C for 2 h that is 20% Sulfur and Phosphorus Co-Doped GCN. Then follow the same method and prepare melamine take 6 g melamine and add 2 g of thiourea and 2 g diammonium hydrogen phosphate grind it and placed in a muffle furnace at 580^0C for 2 h that will be 40% Sulfur and Phosphorus Co-Doped GCN similarly follow the same method and synthesize 4 g melamine add 3 g thiourea and 3 g diammonium hydrogen phosphate grind it properly and placed in a muffle furnace at 580^0C for 2 h that is 60% Sulfur and Phosphorus Co-Doped GCN will formed. Then analyze it with different characterization technique like,UV, FFTIR and similarly different activities like antibacterial activity and photo-catalysis.

Keywords: Graphitic Carbon Nitride (GCN), Sulfur and Phosphorous Co-Doped GCN, Thiourea, diammonium hydrogen phosphate

FutureCON-2026-67: Synthesis and characterization of Sulphur doped graphitic carbon nitride from Melamine

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Graphitic carbon nitride was successfully synthesized through thermal polymerization method using nitrogen rich precursor i.e. melamine while sulphur doped graphitic carbon nitride was synthesized through mentioned method using melamine and thiourea with varying composition of thiourea. Concentration of thiourea affect the surface area and crystallinity of the as-synthesized sulphur doped graphitic carbon nitride. The synthesized product was analyzed by X-rays diffraction(XRD), and scanning electron microscopy (SEM), these two techniques confirm the crystallinity and structural morphology of the synthesized sulphur doped graphitic carbon nitride, showed that surface area and crystallinity increase with increase in doping. Furthermore, the antibacterial activity of different S-g-C3N4 compound against the selected E.coli was carried out using Kirby-Bauer Disk Diffusion Susceptibility Test method, showed the most effective antibacterial activity in S-g-C3N4(100%) and S-g-C3N4(20%) i.e. 7±4.5mm and 6.7±2.3mm respectively in 5µg/ml while in 10µg/ml of solution the most effective was S-g-C3N4(10%) and S-g-C3N4(20%) i.e. 12±3.1mm and 13±1.2mm respectively. Our present study exposed that Sulphur doped graphitic carbon nitride samples exhibit good antibacterial activity whose antibacterial action increases with increase in concentration. Furthermore, the increase in surface area with increase in doping lead to high catalytic productivity which was the aim of our study.

Keywords: Sulphur doped graphitic carbon nitride, antibacterial activity. thermal condensation method, XRD,SEM

FutureCON-2026-68: Gender-Inclusive Leadership and the Use of Technology in Teacher Education in Pakistan

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Teacher's education in Pakistani society often faces systemic inequities, especially related to gender inclusivity and technology integration. Despite various policy reforms, the leadership roles in the teacher's training institutions mostly remain male-dominated, which limits the idea of inclusiveness and technology-enhanced pedagogical practices. The institutes responsible for Teacher's education in Pakistan plays a key role in transforming classrooms into inclusive learning spaces. However, gender inequality and limited use of technology still persist. Female leaders have shown potential to bridge these gaps through inclusive digital practices. Gender disparities in leadership positions limit women's influence over

technology-enhanced pedagogical reforms. This study highlights how gender-inclusive leadership can foster equity and innovation in teacher education. This study explores how women educational leaders foster inclusive and tech-integrated teacher training programs. Using a qualitative case study approach, data were gathered from three teacher education universities through semi-structured interviews with 20 women leaders and faculty members. Thematic analysis revealed three core findings: (1) women leaders advocate for equitable participation in digital pedagogical training, (2) institutional resistance and cultural norms constrain their influence, and (3) inclusive digital practices are more sustainable when leadership is participatory and gender sensitive. The research highlights the transformative potential of women leadership in bridging gender and technology gaps in teacher education. Policy recommendations include establishing mentorship networks for female leaders, integrating gender-responsive leadership modules in educational leadership curricula, and prioritizing funding for women-led digital education initiatives.

Keywords: Teacher education, gender-inclusive leadership, technology integration, digital pedagogy, Pakistan

FutureCON-2026-69: The Role of Social Entrepreneurship in Reducing Poverty in Pakistan: A Qualitative Analysis

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Poverty is understood as the deprivation of basic capabilities that provide a person with the freedom to choose the life he or she has reason to value. This paper will examine the role of social entrepreneurship in reducing poverty in Pakistan. The study will analyze how social enterprises support income generation, skill development, and community empowerment. It will also outline the theories of change that we will explore to understand how social entrepreneurs can overcome poverty in the country. The methodology will be qualitative, based on secondary data, including published research articles, reports from international organizations (UNDP, World Bank), government documents, and case studies of social enterprises in Pakistan. Using thematic analysis, the paper will identify key pathways through which social entrepreneurship can contribute to poverty reduction. The findings will help highlight, how social entrepreneurship can complement national poverty alleviation efforts and contribute to a more inclusive development model. The findings are expected to offer valuable insights for policymakers, development practitioners, and social innovators seeking to strengthen the ecosystem for social entrepreneurship in Pakistan. The findings will help highlight practical insights for policymakers and development practitioners.

Keywords: Social Entrepreneurship, Poverty Reduction, Pakistan, Qualitative Study, Secondary Data, Thematic Analysis.

FutureCON-2026-70: Strengthening Women's Empowerment through Social Innovation for a Resilient Society

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This study explores how social innovation can strengthen women's empowerment that can lead to a resilient Society 2050, focusing on the high-altitude and culturally distinct district of Upper Chitral in KPK, Pakistan. Although number of initiatives have been taken, but women in this area still confront sociocultural barriers, limited mobility, and limited economic prospects that prevent them from participating in digital engagement and decision-making. The study aims to assess the transformative potential of women-centered social innovation and there role in making a society resourceful and adaptive. To address this gap the study is guided by Social Innovation Theory and Empowerment Theory, the research highlights the paucity of literature regarding gender empowerment in remote mountainous areas and the lack of cohesive social innovation strategies in these contexts. Data was gathered through focus groups, semi-structured interviews, and examination of local development documents using a qualitative case study design. Theme analysis was conducted. The findings revealed that localized social innovations such as digital literacy hubs, feasible environment for entrepreneurship, adaptive skill-development programs, and women-led social networks significantly enhanced women's self-determination, economic independence, and community participation, especially when aligned with cultural norms and supported by local leadership. The study suggests practical measures like expanding collaborative spaces and programs that bring diverse people (communities, leaders, experts) together to create solution for societal challenges. Increasing digital access, strengthening women's leadership roles, and fostering collaborative public private partnerships will also substantially enhance women's empowerment and contribute to the formation of resilient society as it moves toward 2050.

Keywords: Social innovation, women empowerment, resilience, Society 2050, Upper Chitral, gender equality, Pakistan.

FutureCON-2026-71: Governance Structures and Policy Making in the District Mardan, Khyber Pakhtunkhwa, Under the Local Government Act 2013

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This abstract describes the Governance structures and legislative procedures in District Mardan, Khyber Pakhtunkhwa, Pakistan. Using the Local Government Act 2013, the goal is to evaluate how a decentralized approach affects efficient service delivery in Mardan. Under the Qualitative research

approach, semi-structured interviews with 10 key informants, District officials, and community stakeholders were used to collect data. These interviews were based on the budget system and meeting minutes from 2015 to 2018. The findings show a tax system assessed by the three branches of the administrative structure, consisting of the district council, Tehsil Councils, and Village Councils. The findings show low tax rates and weaknesses in Khyber Pakhtunkhwa Governance that led to the backwardness of district Mardan. It caused major issues in different sectors such as infrastructure, health, and education. These findings focused on improving the Governance structure and legislation at Mardan. Governance flaws in KP districts, Mardan, in different factors such as infrastructure health and education, should to improved according to the 2013 act.

Keywords: Governance structures, legislation, Decentralization, Service delivery, District Mardan, Khyber Pakhtunkhwa, Qualitative research

FutureCON-2026-72: Evaluating the Environmental Impacts of Digital pollution: A Comprehensive Analysis of E-waste and Carbon Footprint

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The rapid proliferation of digital technology, while driving global socio-economic development, has precipitated a dual environmental crisis: the tangible burden of electronic waste (e-waste) and the non-tangible carbon footprint, generated by the rapid obsolescence of electronic devices, leads to climate change, greenhouse gas emissions, global warming, soil and water contamination, and loss of biodiversity. This research provides a comprehensive analysis of these interconnected phenomena, collectively termed as "digital pollution." The internet and digital tech have a big carbon footprint, mainly due to data centres and manufacturing of digital devices. They are estimated to produce around 0.69 to 1.6 giga-tons of CO2 annually, which contributes to climate change. E-waste is a big problem, only a small part gets recycled and the rest contributes to pollution and environmental degradation, making it harder to fight climate change. A mixed-methods approach is employed, combining quantitative and qualitative analysis to calculate and evaluate the carbon emissions of data centers, networks, global e-waste generation, and recycling rates. The findings reveal that the Digital infrastructure generate a staggering amount of e-waste annually. In 2022, the world produced a record 62 million tonnes of e-waste, equivalent to the weight of 107,000 of the world's largest passenger aircraft. This number is expected to rise to 82 million tonnes by 2030, a 33% increase from 2022. The global e-waste recycling rate is quite low, with only 22.3% of e-waste being properly collected and recycled in 2022. The global e-waste recycling rate is expected to drop to 20% by 2030 due to the increasing gap between recycling efforts and e-waste generation. The study emphasizes on the

critical need for advanced and sustainable solutions to mitigate the environmental impacts of digital pollution like energy efficient data canters, e-waste recycling and circular economy, green coding practices, renewable energy powered devices, and AI powered sustainability. The research concludes that the environmental impact of digitalization is systemic and severely underestimated, but it's manageable with greater awareness and intentional actions.

Keywords:E- waste, Carbon footprint, Climate Change, Digital infrastructure, Data canters, Global warming, Sustainability.

FutureCON-2026-73: Profitability of Wheat Production, A Case Study of Tehsil Katlang, District Mardan Khyber Pakhtunkhwa

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Wheat is an important staple food in Pakistan, both in terms of food security and the economy. Pakistan is the eighth largest country in the world for wheat production. Wheat is a major crop, accounting for 2.2% of GDP and 10.3% of Pakistan's agrarian economy. This study aims to determine the cost and gross revenue of wheat in distract Mardan tehsil katlang. A total of 50 respondents were selected randomly for the personal interview method. Cost and gross revenue data from respondents were examined. To estimate costs, gross revenue, and profitability, the farm budgeting technique was used. After data analysis, the cost per acre came to Rs. 103170. Similarly, the average wheat yield was estimated at 35089.8 Rs. per acre. Thus, the gross revenue was Rs. 138259.8 Rs. per acre, while the net revenue from wheat production was Rs. 88886.56197.Thus; we conclude that the profit is directly affected by the price and quantity of wheat, while the profit is negatively influenced by the cost.

Keywords: wheat**,** cost**,** profitability**,** netrevenue**,** Pakistan

FutureCON-2026-74: AI-Driven Deepfake Detection Framework for Safe Digital Media Maintenance

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The development of deepfakes has advanced swiftly, facilitating the highly realistic alteration of faces, voices, and complete motion films through deep learning techniques. This technology possesses innovative possibilities in entertainment, virtual production, and accessibility applications. Nonetheless, its improper use has engendered significant concerns, including targeted defamation, breaches of privacy, political misinformation, financial fraud, and a deterioration of public confidence in digital evidence. With the increasing sophistication of deepfakes, the demand for dependable automated detection systems has become critical. The deepfake detection

framework presented in this project is based on artificial intelligence and can identify if visual content is faked or genuine. The technology makes use of cutting-edge pretrained models like XceptionNet and EfficientNet as well as sophisticated convolutional neural networks. These models pick up on tiny facial abnormalities, inconsistent textures, strange blinking patterns, and unusual lighting all of which are common in synthetic media. Large-scale actual and fake datasets are used for training in order to create a reliable model that can recognize fraudulent frames in photos and movies. The proposed solution shows strong potential for protecting digital platforms by improving forensic analysis and stopping the propagation of false information. Future additions might incorporate multimodal detection for social media pipelines, including source tracing, audio deepfake analysis, and real-time content verification. This effort helps to improve digital trust and create safer online spaces by developing responsible AI.

Keywords: - Deepfakes,Artificial intelligence detection**,** digital forensics**,** fake media detection**,** AI-powered verification

FutureCON-2026-75: Conservation of Natural Resources for the Survival of Humanity in the Light of Islamic Teachings

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This research has been conducted to highlight the importance of conserving natural resources for the survival of humanity in the light of Islamic teachings. The purpose of the study is to explore how Islam guides humankind in the proper and moderate use of the earth, water, forests, and other natural blessings. The study includes an analytical review of the Qur'an, the Sunnah, juristic principles, and the opinions of Islamic scholars. The findings reveal that Islam not only emphasizes the correct utilization of resources but also strictly forbids wastefulness, pollution, and the destruction of the earth. Moreover, the research clarifies that human beings, while staying within the limits of their needs, can use these resources appropriately and, at the same time, protect them to save the world from environmental pollution. As mentioned in Fatawa Shami, one of the major works of Islamic jurisprudence, the boundaries of human needs are clearly defined, and the use of resources within these limits is permitted. Consequently, it can be concluded that adherence to Islamic principles makes the conservation of natural resources possible, thereby maintaining the balance and continuity of human life.

Keywords: Islamic teachings, Quran and Sunnah guidance, environmental protection, sustainable use

FutureCON-2026-76: Determination of physicochemical parameter and heavy metal content in drinking water from different region of Mardan

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This research presents a thorough assessment of drinking water quality in various regions of Mardan, focusing on physiochemical parameters and heavy metal contents. Sample collection spanned multiple locations within Mardan, and an extensive analysis is conduct to measure crucial physiochemical attributes. Furthermore, the study explores the contents of heavy metals, to discern their prevalence in the water sources. Findings reveal notable variations in both physiochemical properties and heavy metal content among the regions. The presence of heavy metal contents at varying levels is identifying, underscoring the importance of these analyses for understanding water quality discrepancies. The outcomes highlight the necessity for tailor strategies to address the different qualities of drinking water in Mardan, ensuring the formulation of target interventions to improve public health and sustainable water resource management.

Keywords: Water samples, heavy metal, Perkin Elmer a analyst atomic absorption spectrometer

FutureCON-2026-77: Relation between stress and dietary consumption among adults

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Stress is a significant psychosocial factor that influences the health and daily functioning of adults, and its impact on dietary choices has become an important area of global research. This study explores how varying levels of stress shape eating behaviors among adults and the consequences that follow. Evidence shows that both acute and chronic stress alter the balance of appetite-regulating hormones such as cortisol and ghrelin. These hormonal shifts often push individuals toward high-calorie, sugary, fatty, and highly processed foods, which provide temporary emotional comfort but compromise long-term health. Many adults under stress also develop irregular eating patterns, including meal skipping, late-night eating, and increased reliance on convenience foods, all of which contribute to poor nutritional intake.The results indicate that the consequences of stress-influenced dietary choices are far-reaching. Individuals who frequently experience stress-related eating behaviors face an increased risk of obesity, hypertension, elevated blood glucose levels, gastrointestinal disturbances, weakened immune function, and chronic fatigue. The effects are not limited

to physical health; poor diet quality can intensify psychological problems, worsening symptoms of anxiety, low mood, and restlessness. This creates a harmful cycle in which stress leads to unhealthy dietary choices, and those choices further amplify stress, affecting overall well-being and productivity.Understanding this relationship is essential for developing effective interventions at both individual and community levels. Public health strategies that combine stress management training, nutritional guidance, and lifestyle modification can significantly reduce the health burden caused by stress-induced eating patterns. Encouraging mindful eating, improving access to nutritious foods, and promoting healthier coping mechanisms can help adults break the cycle and improve their quality of life. This study therefore highlights the urgent need for integrated approaches to address the interconnected challenges of stress and dietary choices among adults, ultimately contributing to better health outcomes across populations.

Keywords: Stress and eating behavior, dietary choices under stress, adult health impact, stress management

FutureCON-2026-78: Awareness of university students on food labelling and use of pack information for purchase of prepackaged food products

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The current study was about Food labelling is the information printed or attached to food packaging, providing consumers with essential details like ingredients, nutritional content (calories, fats, sugar, salt), allergens, expiry dates, and origin, mandated by law to ensure safety, prevent deception, and help people make informed food choices about what they eat. As in today's busy world, prepackaged foods are the most accessible and as they are ready to use, so the consumption of prepackaged food is rising among university students due to convenience and time constraints. The method used was cross sectional study based on a questionnaire of about 200 students at different universities in the KPK district, to check their food labelling habits. The sampling method used was a nonprobability sampling method. The results of my research indicate that most students were aware of food labels, but only a minority of students consistently utilized them during purchase. The most frequently used information was the expiry date, and price while specific nutrients' breakdown (fats, calories, sodium) was overlooked. It is hereby concluded that despite enough information about food labels, the functional usage of reading food labels remains low among university students. So, it will be better to make interventions which should focus on how to interpret complex nutrition labelling (serving size, saturated and unsaturated fats, allergen contents, low sodium content).

Keywords: Food labeling, allergens, intervention, accessible, purchase, convenience time constraints

FutureCON-2026-79: Awareness of cancer in undergraduate students in KP

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Cancer is the uncontrolled growth of cells. In United states, cancer is the leading cause of death. Cancer is a complex disease with varied causes and there are many ways to manage it. Most of the scientific studies emphasizes the primary prevention of cancer because a significant portion of cancers are preventable. Cancer prevention has conventionally focused on older adults (aged 40 and above), who tends to be eligible for most cancer screenings. A cross-sectional study was conducted among different universities in Khyber Pakhtunkhwa using a structured questionnaire. The 200 students were including from different academic departments selected through random sampling. The questionnaire assessed students' knowledge, awareness about cancer. The results show that most of the university students have moderate awareness regarding cancer. Generally, students were aware about blood cancer and breast cancer and also they were aware of most of their causes but they were less aware of other cancers like colon cancer, liver cancer etc. The study concludes that the students have basic knowledge about cancer but most of the students were not aware of the deep knowledge about it. Most of the students were fully aware about breast cancer and they regularly do self-examination as well. This study focuses on increasing knowledge and understanding of cancer risk factors, promoting healthy lifestyles, and encouraging timely screening and early detection practices. The enhancing of cancer awareness will help the young people to gain complete knowledge about several types of cancers. The cancer awareness at this stage of life will contribute a long-term positive effect.

Keywords: Cancer awareness, prevention, Health education, early detection, screening.

FutureCON-2026-80: From Books to Bots: Adoption of Artificial Intelligence in Academic Libraries and Its Impact on Learning Support Services: A Systematic Literature Review.

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Artificial Intelligence (AI) is rapidly transforming educational environments, including academic libraries that support learning and research. This study presents a systematic literature review (SLR) examining AI adoption in academic libraries and its role in enhancing learning support services. Following PRISMA guidelines, 50 peer-reviewed studies published between 2015 and 2024 were identified, screened, and analyzed from major academic databases. Findings show that AI applications, such as chatbots, virtual reference services, intelligent search tools, recommender systems, and

automated cataloging, significantly improve personalized learning, research assistance, information literacy, and user engagement. However, challenges persist, including limited infrastructure, staff expertise, implementation costs, ethical concerns, and resistance to organizational change. Notably, there is a lack of empirical research from developing countries. This review highlights the potential of AI to transform library services and emphasizes the need for strategic planning, capacity building, and context-specific research. The findings offer valuable guidance for librarians, educators, and policymakers aiming to integrate AI into academic libraries.

Keywords: Artificial Intelligence, Academic Libraries, Learning Support, AI Adoption, Systematic Literature Review, Educational Technology

FutureCON-2026-81: Recycling Old Items to Combat Climate Crisis

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In the face of pressing climate change reuse and recycling of discarded products provide a low-cost, scalable pathway toward economy-wide environmental impact mitigation. This study investigates novel up cycling approaches that convert residual materials, including plastics, textiles, wood, etc into functional products with increased longevity and lower carbon footprints. This aimed at minimizing environmental harm, promoting sustainability and also there is a savage of resources, and slows climate change. Results suggest that successful up cycling intervention have the potential to reduce CO2 equivalent emission by up to 45% per product unit. This work underline that waste-to-resource conversion not only mitigates emissions but also furthers sustainable development goals. Reuse and Recycling of old products greatly help in lessening climate change due to reduced greenhouse gas emissions, lower energy use, less extraction of raw materials and reduction of methane in landfills. Manufacturing products from recycled materials reduces the need for energy-intensive production processes. Manufacturing goods from recycled raw materials requires less energy compared to using fresh resources. For instance, recycling aluminum cans uses 95% less energy than making new ones. So, zero waste is a climate change solution.

Keywords: recycling, raw materials, Climate change, zero waste

Start-Up Idea Proposal Italiano ramen studio

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Italiano Ramen Studio is a modern, youth targeted convenience and quick service ramen concept designed to meet the rapidly growing demand for Asian flavors and fast, affordable meals in urban Mardan. With the rising

influence of Japanese, Korean, and fusion cuisine among young consumers, the market lacks a dedicated, trendy, and accessible ramen focused destination, we, Italiano Ramen Studio fills this gap. Strategically located in a high-footfall area near universities and commercial offices, the store offers a blended model: A specialty retail section featuring instant ramen, imported noodles, snacks, and beverages and A live ramen station serving freshly prepared, customizable ramen bowls that match youth tastes and modern food trends. Our goal is to build Pakistan's trendiest ramen hub, combining convenience with a unique dining experience. Beyond just food, Italiano Ramen Studio serves as a youth culture spot where students, professionals, and food enthusiasts can hang out, take aesthetic pictures, explore global flavors, join interactive challenges, and immerse themselves in a creative fusion of Italian, Japanese, Korean, and Pakistani street culture. By uniting food, entertainment, vibrant aesthetics, Italiano Ramen Studio aims to become the most popular ramen destination in Mardan and one of the coolest youth hangouts in KPK. With its strong market appeal, low operational complexity, and high repeat-purchase potential, the concept is designed for fast scalability and investor-friendly growth.

Comparative Study of Ph Tolerance on Alpha-Amylase Obtained from Different Bacterial Species

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Enzymes are biological catalysts which can speed up biochemical reactions in all living organisms. α-amylase is a starch degrading enzyme through hydrolysis, producing a mixture of glucose, maltose, maltoriose and dextrin. The industrial applications of α-amylase make it important in the market of enzymes. It can be obtained from various sources such as plants, animals and microorganisms. In the current research project total ten (10) bacterial strains were isolated on nutrient agar from soil sample of Women University Mardan, from raw milk and potato samples. Isolated strains were qualitatively analyzed on nutrient agar media with 2% starch supplemented for production of α-amylase. Among the isolated ten strains two strains P1 and M2 produced the clearance zone. The P1 strain produced the larger clear zone index of 3.7 mm while M2 produced the smaller clear zone index of 2.8mm. These strains were further morphologically and biochemically characterized including gram staining. On the basis of gram staining P1 strain is gram positive while M2 is gram negative. The Streptococcus P1 strain and *E. coli* M2 strain was quantitatively screened using nutrient broth supplemented with 2% starch and maximum α-amylase units were obtained after 24, 48 and 72 hrs incubation at 370C. After wards the effect of pH was evaluated on both strains (*Streptococcus, E. coli*) by optimizing the pH level at different range (pH 3, 4, 5, 7, 9 and 11) a maximum of 0.292 U/ml of P1 strain obtained at pH 9 after 72 hrs. of incubation at 370C and maximum of

0.204 U/ml of M2 strain obtained at pH 11 after 48 hrs. of incubation at 370C. In conclusion due to the starch degrading activity of α-amylase it constitutes a class of industrial enzymes having approximately many industries such as textile, biofuel, paper and pharmaceutical industries.

Keywords: α-amylase, Streptococcus, *E. coli*, DNS, Growth OD, Protein estimation, Clearance zone index

Reforms for poverty alleviation in Khyber Pakhtunkhwa

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Poverty alleviation in Khyber Pakhtunkhwa (KPK) has become a central policy priority due to persistent socioeconomic disparities, particularly in rural and newly merged districts. This study examines the effectiveness of recent reform initiatives implemented by the provincial government, including social protection reforms, governance improvements, service-delivery enhancement, and livelihood-support programmes. Using a review of policy documents and empirical studies, the research analyzes how interventions such as targeted cash transfers, expansion of health and education services, digital socio-economic registries, and rural infrastructure development contribute to reducing multidimensional poverty. Findings indicate that integrated social protection systems and improved public-finance management have strengthened welfare delivery and increased the province's capacity to support vulnerable households. However, challenges such as limited institutional capacity, geographic barriers, and gaps in programme coordination continue to hinder long-term poverty reduction. The study concludes that sustainable poverty alleviation in KPK requires a comprehensive reform framework that combines effective governance, inclusive service delivery, livelihood creation, and data-driven targeting. Recommendations include strengthening inter-departmental coordination, scaling up rural development initiatives, and improving monitoring systems to ensure transparency and impact.

Keywords: Poverty alleviation; Khyber Pakhtunkhwa (KPK); Social protection reforms; Governance; Public service delivery; Rural development; Livelihood programmes; Multidimensional poverty; Policy reforms; Sustainable development.

Climate Change and Agriculture in Pakistan: Emerging Risks and Resilience Strategie

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Agriculture is a backbone of Pakistan's economy, sustaining millions of livelihoods and playing a major role in ensuring national food security. Nevertheless, the sector is growingly vulnerable to the harmful impacts of

climate change, including rising temperatures, erratic rainfall, shifting growing seasons and extreme weather events. These stressors have led to reduced crop yields such as documented declines of up to 30% in maize, wheat, and rice along with soil degradation, water scarcity, and heightened risks of desertification and water-logging The objective of this study is to assess how these climate-induced challenges influence crop productivity, seasonal patterns, and the long-term sustainability of farming systems in Pakistan. Employing a mixed-methods approach, the research integrates quantitative data from meteorological records, agricultural statistics, and secondary reports with qualitative insights drawn from farmers' experiences and field observations. Statistical tools are used to analyse agricultural trends over the past decade and to establish correlations between climatic variations and crop performance. The significance of this study lies in its contribution to understanding Pakistan's growing vulnerability to climate-driven disruptions in the agricultural sector, offering evidence-based insights that can inform adaptation strategies such as efficient irrigation systems, heat-tolerant crop varieties, and improved water management practices. The findings aim to support policymakers, planners, and farming communities in developing climate-resilient agricultural frameworks that safeguard future food security and promote sustainable rural development.

Keywords: Agricultural sector, climate threats, extreme weather, food security, desertification, crop productivity, climate resilience.

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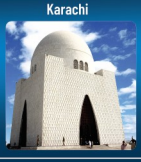

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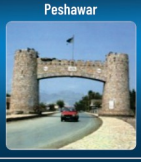

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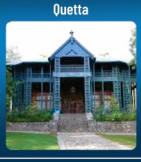

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