The University of Faisalabad

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STEAM EDUCATION
EMERGING TRENDS & APPLICATIONS

2nd INTERNATIONAL CONFERENCE ON ADVANCED

EDUCATION (ICASE-2024)

Theme: Emerging Trends & Applications

ABSTRACT BOOK

THE UNIVERSITY OF FAISALABAD

In the name of ALLAH, the Beneficent, the Merciful

2nd International Conference on Advanced STEAM Education: Emerging Trends and Applications, 2024 (ICASE-2024)

November 07-08, 2024

Abstract Book

Compiled by
Prof. Dr Tahira Iqbal (Convener, Scientific Committee)
Dr Rimsha Riaz (Member, Scientific Committee)

The University of Faisalabad
Pakistan

Pro-Rector's Message

Dear Esteemed Participants

On behalf of The University of Faisalabad, I am honored to welcome you to the 2nd International Conference on Advanced STEAM (Sciences, Technology, Engineering, Arts, and Mathematics) Education: Emerging Trends and Applications. This conference (ICASE-2024) is dedicated to exploring and discussing the latest advancements and applications in STEAM education. This gathering is a testament to our collective dedication to bridging minds globally through innovative technologies and groundbreaking innovations. The diverse fields of STEAM offer unique perspectives that, when integrated, pave the way for comprehensive solutions to the complex challenges of our time. The dialogues and exchange of ideas here are not just discussions but the seeds of future progress that will grow into substantial advancement and beyond.

International and national scientists from various Higher Education Institutions (HEI), Research Organizations, professionals working in Federal and Provincial Government Organizations, and Industry, are participating in the event as invited/keynote/Oral speakers/Session Chairs/Co-Chair. This event will boost the research culture at TUF and promote linkages and collaborations between counterparts in various public and private sector Universities and research organizations globally.

The program of 2nd ICASE-2024 promises to blend academic, professional, social and cultural experiences, inviting and hosting researchers and policymakers from around the World. Your knowledge, expertise, and experience in your respective field will be invaluable to our program. Especially for young researchers, this conference is an excellent opportunity to improve scientific learnings by communicating and sharing their knowledge in focused research themes. Active participation in discussions and sessions will significantly enhance the scope and impact of the conference. This major event of STEAM-2024 is expected to attract around 800 International and national delegates and participants including graduate students, young researchers and faculty members. The conference spans two full days of technical, oral, and poster sessions, providing numerous opportunities for networking and socializing with colleagues.

I extend my heartfelt gratitude to all the participants for their contributions and commitment to excellence. May this conference inspire us all to strive for a future where the fruits of our collaborative efforts benefit humanity at large.

Wishing you all an exciting and productive experience at this conference.

Best Regards

Prof Dr Aman Ullah Malik
Pro-Rector
The University of Faisalabad


THE GLOBAL GOALS
For Sustainable Development
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
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11 SUSTAINABLE CITIES AND COMMUNITIES
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16 PEACE, JUSTICE AND STRONG INSTITUTIONS
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2nd International Conference on Advanced STEAM Education: Emerging Trends and Applications, 2024 (ICASE-2024) NOVEMBER 07-08, 2024

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ORAL PRESENTATION

O.CS-1.1

Challenges and Issues in Predicting Human Behavior in Digital Twins

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The unpredictable nature of humans poses significant challenges in human-robot interaction and the integration of digital twin technology. For robots to safely mimic human behavior, they must rely on both historical and real-time data. This involves effective data sources and real-time feedback, yet ethical concerns, like privacy and bias, must be rigorously addressed. Human digital twins—digital clones reflecting individual behavior in smart systems—lack a standardized framework and remain an evolving research field. Accurate modeling of complex human nature demands robust data collection and algorithm restructuring. Personalizing smart systems with social media data to predict traits is ambiguous, requiring robust data integration and interdisciplinary collaboration. Understanding human intentions improves trust between humans and machines, aiding in natural interactions. Developing trustworthy systems necessitates responsible data use, privacy protection, and avoidance of biased predictions. Combining technological advancements with strong ethical foundations can unlock the potential of digital twins across various industries, from healthcare to smart cities. These advancements are essential in realizing the full promise of digital twin technology. Improved data collection methods, algorithmic restructuring, and ethical considerations form the backbone of future developments. Personalizing smart systems for individual needs—while ensuring data protection and unbiased predictions—is key. Fostering interdisciplinary collaboration will enhance our ability to create comprehensive models that accurately reflect human behavior and intentions. This, in turn, will foster greater trust and cooperation between humans and machines. Achieving this balance is crucial for the widespread adoption and success of digital twin technology, paving the way for innovative applications in various sectors.

Keywords: Digital Twin Technology, Connected and Automated Vehicles (CAV), Human Digital Twins (HDT), Healthcare Applications, Human-Robot Interaction.

O.CS-1.2

Comparative Analysis of ECG, CT, MRI, SPECT, and CTA in CAD Detection: Challenges in Medical Image Processing

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Coronary artery disease (CAD) globally remains a leading cause of mortality. emphasizing the critical need for accurate and timely diagnosis. In this context, Automated diagnosis through imaging modalities has gained significant importance. Various imaging modalities such as ECG, CT, MRI, SPECT, and CTA offer unique insights. Each modality has distinct features that contribute differently to CAD detection. Though, identifying the most relevant modality among these for deep learning applications is a key challenge in developing an efficient diagnostic model. This study explores the comparative advantages of these imaging techniques, focusing on their strengths and limitations in capturing the intricate features essential for CAD diagnosis. Moreover, the research highlights the complexities and challenges in medical image processing, which remain a significant barrier to the development of reliable deep learning-based diagnostic models. By addressing these challenges, this work aims to contribute towards more precise, automated detection of CAD using advanced imaging modalities and machine learning techniques.

Keywords: Medical Image Processing, Coronary Artery Disease (CAD), Computed Tomography, Machine Learning, Deep Learning.

O.CS-1.3

Optimizing Non-Functional Requirement Classification: Harnessing the Power of BERT and Transfer Learning

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Non-functional requirements (NFRs) define the essential qualities a software system must possess to meet business needs beyond its basic functionalities. These requirements impose constraints on attributes like performance, security, reliability, and usability, guiding the development process to ensure a high-quality system. Classifying NFRs is often challenging due to the complexity and variety of requirement documentation, leading to inefficiencies and inaccuracies. To address this, we propose NfBERT, a refined BERT-based model for automated classification of software requirements into functional (FR) and non-functional (NFR) categories. NfBERT leverages transfer learning and is fine-tuned using the Adam-W optimizer. It achieves high accuracy, with F1-scores up to 95% on the PROMISE NFR dataset. Additionally, we have augmented the dataset, expanding its scope with a new collection of sentences and a broader range of non-functional types. NfBERT also demonstrates strong performance in subclassifying NFRs, achieving an average F1-score of 89%. Our approach also proposes classifying functional requirements into three categories: function, data, and behavior, achieving an F1-score of 93%. NfBERT shows robust generalization across unseen projects, outperforming 17 previous methods in terms of Precision, Recall, and F1-score in preliminary cross-validation results.

Keywords: Functional Requirements, BERT, Classification, Deep Learning, PROMISE NFR

O.CS-1.4

Using Digital Resources to Improve Educational Opportunities for Girls in Marginalized Communities

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Today's fast-changing environment makes education crucial for men and women. It bridges the gap between cultural heritage and modern technological needs. Girls face educational inequities, especially in communities with cultural, economic, and social impediments to higher education. Technology can provide girls with alternate education options, giving all students equal chances and can help girls to improve talents that were previously unavailable. Given the possibility that not every female might have the opportunity to attend university, schools should offer an intermediate-level subject on digital tool use. We must explore personal capacity; educated male family members should learn about digital platforms and can then help their female relatives. If cultural hurdles hinder women from attending university, it helps women in such situations close the educational gap. I set up an online study schedule for my sister using several websites and digital books. She struggled with English, mathematics, and social sciences because her schooling was mostly Arabic and theology. She improved after six months of study and encouragement. This study explores integrating digital tools in education to bridge the educational gap and might offer excellent educational prospects for girls when combined with appropriate assistance.

Keywords: Educational Technology, Digital Tools, Girls' Education, Online Learning, Alternative Education Options.

O.CS-1.5

Transforming Heart Disease Detection with BERT: Novel Architectures and Fine-Tuning Techniques

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Prediction of heart disease is crucial for effective prevention and treatment. However, extracting clinical information such as CAD, smoking, hypertension, hyperlipidemia, obesity, and family history of CAD from unstructured electronic health records (EHRs) poses significant challenges for clinicians. This research introduces a novel approach that leverages an ensemble of transfer learning algorithms combined with a multiheaded attention mechanism to automatically extract heart disease risk factors from EHRs. Various deep learning models, including BERT, BioBERT, BioClinical BERT, RoBERTa, and XLNet, were initially trained on medical datasets and subsequently fine-tuned on the i2b2 clinical dataset. Individual models delivered strong results, with RoBERTa achieving the highest accuracy of 95. 27% and an F1 score of 94. 94%. BioBERT, BioClinical BERT, XLNet, and BERT also performed well, with precision ranging from 94. 73% to 95. 03%. However, the proposed ensemble model with multi-head attention outperformed all, achieving an accuracy of 96.35% and an F1-score of 95.76%. These findings highlight the superior ability of the ensemble model to capture complex interdependencies between heart disease risk factors, making it a robust tool for clinical prediction.

Keywords: Heart disease prediction, Electronic Health Records (EHRs), Transfer learning, Multi-head attention mechanism, Ensemble model.

O.CS-2.1

Development of an Artificial Intelligence-Based Recruitment System for Automated Resume Parsing and Candidate Ranking at University

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Many firms have labor-intensive, biased hiring processes that don't always match qualified applicants with open positions. The manual processing of resumes, unconscious prejudice, and low candidate participation in traditional hiring procedures cause poor hiring decisions. The goal of this research is to create an AI-based hiring system that will automate resume parsing, candidate ranking, diversity enhancement, unconscious bias reduction, and increased candidate interaction to address these issues. The principal aims of the system are to optimize the hiring procedure, provide impartial and equitable assessment of candidates, and sustain a high degree of involvement throughout the hiring process. The three stages of the suggested technique are AI-Driven Engagement, System Development, and Bias Reduction and Diversity Enhancement. Optical Character Recognition (OCR) and Natural Language Processing (NLP) techniques are used for resume parsing, resume collection and preprocessing, machine learning model creation, and candidate rating are the main tasks of the first phase. Using fairness-aware algorithms, the second phase tackles bias identification and diversity enhancement, guaranteeing equal opportunity for all candidates. To enhance the hiring process overall, the third phase incorporates AI-driven technologies for individualized communication and engagement along with ongoing feedback systems. Despite the possible advantages, the system would not be able to handle some non-standard resume forms, there might have been biases in the initial training set, and ongoing model upgrades would be necessary to maintain diversity and fairness over time.

Keywords: AI-Based Recruitment, Candidate Ranking, NLP, OCR, Fairness-Aware Algorithms, Automated Hiring Systems.

O.CS-2.2

Multilingual Review Classification on Daraz for Fake Review Detection

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E-commerce platforms like Daraz face challenges in maintaining the integrity of user reviews, which are often written in multiple languages, including Urdu, Roman Urdu, and English. This study addresses the problem of accurately classifying these multilingual reviews as fake or real using a novel hybrid machine learning model. We propose a hybrid approach combining multilingual Bidirectional Encoder Representations from Transformers (BERT) for feature extraction with a Support Vector Machine (SVM) classifier. This model effectively handles the complexities of diverse linguistic content and informal text variations. Our evaluation on the Daraz dataset demonstrates that the proposed model achieves superior accuracy in fake review detection compared to existing methods. This research contributes a robust solution for multilingual review classification, offering practical benefits for enhancing consumer trust and review reliability in e-commerce.

Keywords: Multilingual, SVM, BERT, Hybrid Machine Learning.

O.CS-2.3

Optimizing Text Features for Fake Reviews Detection Using Evolutionary Algorithm

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One of the major problems in business and consumer environments is the issue of fake reviews in e-commerce platforms. As it is already a great trend for people to purchase things online. Customers read reviews to know more about the product and to ascertain whether the product is original or fake. This study aims at developing an improved categorization model to categorize fake reviews. Authentic user-generated reviews are crucial in the age of internet commerce to maintain consumer trust and market perceptions, as fake evaluations can erode confidence and skew market dynamics. This study proposes a methodology that employs Self-Organizing Genetic Cooperative Optimization (SOGCO) algorithm with CNN to efficiently address this problem at hand and implemented the approach of ACO with CNN to compare with accuracy by implementing this approach. Through applying SOGCO algorithms with CNN model it helped to optimize the relevancy and efficiency of input features with an enriching and extensive dataset of e-commerce reviews. SOGCO's genetic algorithms and cooperative co-evolutionary techniques enhance the feature selection wave for the CNN model. CNN with SOGCO has an outstanding performance of 93% accuracy. In contrast, ACO approach initiates the feature selection process via the pheromone mechanism, achieving the 72% accuracy rate. The results demonstrate that the evolutionary feature selection and deep learning complement each other, and the result is extremely useful. Consequently, the purposed model offers greater accuracy and precision in detecting fake reviews for e-commerce dataset.

Keywords: Fake reviews, E-commerce platforms, Self-Organizing Genetic Cooperative Optimization (SOGCO), Convolutional Neural Network (CNN)

O.CS-2.4

Improving Law Enforcement Processes in Corruption Cases Through Blockchain-Enabled Data Security

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Corruption remains a significant threat to Social, Economic, And Political stability in many countries, posing serious challenges for law enforcement. Ensuring the security and integrity of evidence in corruption cases is critical to maintaining public trust and ensuring justice. This research explores how blockchain technology, specifically using advanced consensus algorithms like Proof of Stake (PoS) and Zero-Knowledge Proofs (ZKPs), can enhance data security and transparency in the law enforcement process of corruption cases. By employing a qualitative approach with normative-descriptive analysis, the study demonstrates that blockchain's decentralized and immutable ledger provides a robust solution for securing evidence. The adoption of PoS offers energy-efficient consensus mechanisms, while ZKPs ensure privacy and confidentiality of sensitive data, further reducing the risk of manipulation. These advancements make it increasingly difficult for unauthorized entities to alter or tamper with digital evidence, thus mitigating power abuse and hidden corruption within the legal system. The findings suggest that integrating blockchain technology into the law enforcement process can significantly improve the integrity of corruption-related evidence and strengthen public confidence in the legal system. By leveraging blockchain for recording and verifying digital evidence, such as financial transactions and legal documents, this research highlights the potential of blockchain to revolutionize corruption law enforcement, offering a transparent, secure, and verifiable method of evidence management.

Keywords: Blockchain, Law Enforcement, Corruption, Data Security, Consensus Algorithms, Zero-Knowledge Proofs, Proof of Stake.

O.CS-2.5

Optimized Multimodality based Authentication of Candidates in an Online Testing System with the help of Artificial Intelligence

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The growing dependence on online testing systems has rendered the preservation of examination integrity and fairness a paramount issue. In the digital era, online testing platforms have transformed educational evaluations yet have substantial difficulties in preserving security and integrity. This research proposes an optimized multimodal authentication system to mitigate risks of impersonation and the unreliability of single-mode verification under diverse conditions, thereby enhancing accuracy and ensuring fairness in online examinations through the application of Artificial Intelligence (AI). This method utilizes random authentication prompts during the examination, as opposed to continuous monitoring, hence diminishing the likelihood of fraudulent behavior while preserving user privacy and minimizing interruptions. The technology utilizes AI and machine learning approaches to improve the precision of biometric recognition, guaranteeing dependable authenticity during the testing process. The primary research aims are to integrate facial recognition with iris scanning to reinforce security, improve algorithms to better facial recognition accuracy across varying situations, and deploy random biometric verifications to deter cheating. The multimodal method guarantees that only valid applicants engage, enhancing the overall credibility and integrity of online evaluations.

Keywords: Facial recognition, Iris scanning, Artificial Intelligence, Machine learning, Random authentication, Online testing security.

O.CS-3.1

Enhancing Blood Donation Procedures through Blockchain and IoT Integration: An Advanced Method for Ensuring Secure and Efficient Healthcare Practices

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As the demand for blood continues to rise, implementing effective administration and tracking systems for blood donations is becoming increasingly crucial. This paper proposes an innovative system that leverages blockchain technology and the Internet of Things (IoT) to enhance the efficiency, transparency, and safety of the blood donation process. The integration of blockchain and IoT allows for real-time monitoring of storage conditions and immediate alerts for any deviations, thereby ensuring the integrity and safety of the blood supply. Storage limitations are addressed using the Interplanetary File System (IPFS), while the Ethereum blockchain provides decentralized, transparent, and traceable management of blood donation operations. Security evaluations and comparisons with existing solutions have confirmed the effectiveness of the proposed blockchain-based system. The system's adaptability to various industries is facilitated by its generalizability. Using smart contracts, blockchain technology ensures donor identity verification, supply chain management, consent management, traceability, and automation. IoT sensors enable real-time monitoring of environmental factors such as temperature and humidity, ensuring continuous quality control. The IPFS-based system enhances transparency, accessibility, and safety in blood donation processes. Further research is necessary to assess the feasibility of implementing these methods in practical settings. The proposed system has the potential to revolutionize blood donation management, transforming it into a decentralized, trackable, and secure network.

Keywords: Blockchain, Blood donation, Traceability, Smart Contract, Healthcare

O.CS-3.2

Development of a Robust Model to Detect and Mitigate Malicious Crypto-Jacking Attacks Using Machine Learning

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Crypto jacking is an advanced form of cybersecurity threat where the processing power of any device is secretly used for mining cryptocurrency without the user's consent. Advanced forms of cybersecurity threats in the context of crypto-mining environments include detection and mitigation challenges for crypto-jacking activities. The study presents a new model for detecting and mitigating crypto-jacking activities using machine learning within a crypto-mining environment. The system uses Machine Learning (ML) to detect real-time signals of crypto jacking by examining the performance and behavior of computer systems. The focus of the research is based on improving detection accuracy, reducing false positives, and optimizing overhead when considering resources provisioned within existing detection methods. Utilizing real-time capabilities and efficient use of computational resources, the model makes a significant advancement in securing digital infrastructures against crypto-jacking attacks while preserving the integrity and performance of affected systems.

Keywords: Cyber Security, Artificial Intelligence, Crypto-Jacking, Malware Detection, Anomaly Detection, IDS, IPS, Cyber Attack Prevention

O.CS-3.3

Development of an Artificial Intelligence-Based Realtime Admission System Dashboard for Undergraduate Prospective Students

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The creation of computer systems that are capable of learning, thinking, and solving problems tasks that usually require human intelligence is referred to as Artificial Intelligence (AI). AI can improve accuracy and efficiency in university admissions by automating and optimizing procedures including merit list creation, applicant evaluation, and status updates. The goal of this research is to create an AI-powered admissions system that will rectify the errors and inefficiencies seen in current undergraduate admissions practices. The existing systems are primarily manual with some automation, which causes delays, mistakes made by humans, and a lack of clarity for the students. The inability to offer real-time information on student admission status and forecast future trends using historical data only serves to worsen the issue. This study suggests an AI-based solution to address these problems. It integrates academic data, including Matric, FSC, and NTS scores, and generates merit lists automatically. Students may also access a real-time dashboard that tracks their admission status. The approach consists of feature engineering, building AI models, gathering and preparing data, and integrating it with an easy-to-use dashboard. To forecast current trends and enhance decision-making, the AI models are trained on historical admission data. The system's reliance on historical data, which might not be able to capture abrupt changes in admission trends, is one of its weaknesses, even though it greatly increases efficiency and accuracy. Despite these difficulties, it is anticipated that the suggested system can reduce the amount of work associated with administration, improve the quality of merit lists, and offer students and universities an open, data-driven admissions process.

Keywords: AI-Driven Admission System, Student Dashboard, Real-Time Updates, Admission Trends Prediction, Automated Admissions.

O.CS-3.4

A Transfer Learning Approach to Identify Road Pavement Distresses using Deep Convolutional Neural Network

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Road potholes and cracks are the types of road pavement distress, these factors jeopardize the safety of road and transportation efficiency. There are different types of road pavement distress like Fatigue Cracking, Block Cracking, Depression, Joint reflection cracking, Longitudinal cracking, Patching, Polished Aggregate, Potholes, Raveling, Rutting, Slippage cracking, Stripping and Transverse thermal cracking. To identify these types of distresses road assessment authorities, need specialized teams of inspectors and structural engineers who manually assess road infrastructures and provide detailed reports about the detected pavement distress type. Furthermore, these are some of the main factors which effects transportation efficiency and cause vehicle accidents. The objective of the proposed study is to develop a system for road safety and assessment, which will detect and identify road conditions in real-time. The proposed system will identify the major six pavement distress (Fatigue Cracking, Joint reflection cracking Potholes, Patching, Rutting, and Depression) using small IP camera mounted in front of vehicles and provide a helpful tool to road assessment authorities to assess the road pavement conditions in real time. The system will serve the vehicle drivers by notifying them about road conditions in real-time which will help them to avoid any damage and will be helpful for highway authorities to assess the different road distress types. The system will be trained on manually collected dataset of road distressed images using a deep convolutional neural network for real-time detection.

Keywords: Deep Learning, Transfer Learning, Pavement Distress, Potholes.

O.CS-3.5

Blockchain and IoT integration for Pharmaceutical Drug Traceability

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A robust healthcare system is essential for the well-being of society and the economy, making the pharmaceutical industry a critical player in ensuring the safety and security of medications. The problem with the safety and security of medications lies in the abundance of counterfeit and substandard medical products. Illicit medicines pose a substantial threat to public health and consumers worldwide. Counterfeiting medicines is so pervasive that it is an enormous challenge, invading public health and catalyzing the decline of trust in the health system. The counterfeit drug market generates illicit revenue of public interest annually, underscoring the urgent need for effective countermeasures. The pharmaceutical sector has, as such, a part to play in the safe and secure supply of medicines and the value of the quality maintenance of the health system. Technological advances, including blockchain and the Internet of Things (IoT), bring new opportunities to confront these challenges across industries such as pharmaceuticals. The paper presents a systematic literature review of various databases to evaluate blockchain and Internet of Things (IoT) applications in the pharmaceutical industry. Self-explanatory, the review consists of the analysis of existing frameworks and an exploration of how the integration of blockchain and IoT can mitigate drug counterfeiting and other issues associated with it. This study shows that a combination of blockchain and IoT has great potential to lessen the prevalence of counterfeit drugs that are in existence. The following research aims to provide an enhanced framework through the requital of the lacking aspects of the already available solutions for the pharmaceutical realm. The proposed framework, in combination with the benefits of blockchain and IoT, allows for a more comprehensive pathway to improving the landscape of medication safety and security, ultimately achieving a more trustworthy and effective healthcare system.

Keywords: Blockchain, Internet of Things (IoT), Counterfeit drugs, Pharmaceutical industry, Medication safety.

INFORMATION TECHNOLOGY (COMPUTER SCIENCES)

POSTERS/E-POSTERS PRESENTATION

P.CS-1

Enhanced Lungs Cancer Detection: A Multi-Model Deep Learning Model Integrating CT, MRI, and PET scans with Explainable AI

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Lung's cancer is one of the leading causes of death worldwide, so new, early detection methods are required to make patient conditions better. Although previous machine learning models in detecting lung nodules from CT scans have demonstrated high accuracy, further model development must be undertaken due to the multi-modal imaging data and with the aim of increasing generalizability across highly diverse patient populations. Here, we propose a novel approach to integrate CT, MRI, and PET scan data with the aid of advanced image registration and fusion techniques, together with a multicenter-validated deep learning model. We also introduce an explainability framework that showcases the most important features affecting model predictions in the quest for improving clinical trust and adoption. Preliminary results show that our integrated model outperforms traditional CT-only models on sensitivity and specificity, all the while yielding interpretable insights into the decision process for clinicians. The promise of our method in application to longitudinal studies is for the monitoring of time-dependent changes in tumor progression and treatment response. The findings suggest that a multi-modal, explainable, and generalizable model could significantly improve lung cancer diagnosis and management in diverse clinical settings.

Keywords: Lung Cancer Detection, Multi-modal imaging, Deep learning, Healthcare.

P.CS-2

A Smart Feature Extraction Framework for Dynamic Customer Churn Prediction

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Customer churn is a major concern and a primary obstacle for large businesses. Companies try to avoid customer churn by taking adequate steps to predict and handle it before it happens. Preventing churn thus provides companies with a significant source of revenue, contributing to the growth and improvement of their business capital. It is essential to carefully select the appropriate features to ensure a robust and accurate model. The selection of the right attributes directly affects the accuracy of the predictive model, and irrelevant or weak features will hinder its ability to predict customer churn effectively. The method of feature selection is an important part of machine learning. This process seeks to determine the most critical and influential characteristics to improve the model's accuracy, effectiveness, and efficiency. Utilizing Machine Learning and Deep Learning, this study suggests a framework for Churn Prediction with Smart Feature CPWSF. The framework involves an analysis of a complex and complicated dataset containing extensive consumer information, which undergoes preprocessing. The proposed framework adopts feature selection strategies, which include Principal Component Analysis and Extreme Gradient Boosting. These algorithms are utilized to design a framework that provides the most appropriate feature set for customer churn prediction. The study also employs various algorithms such as Support Vector Machine, Linear Regressions, Naïve Bays, and Long Short-Term Memory to build churn prediction models. The results demonstrate that the CPWSF outperforms the existing methods by yielding the maximum accuracy of 97.67% of churn prediction through XGB as a feature selection approach and LSTM as a prediction model.

Keywords: Artificial Intelligence, Customer Churn Prediction; Feature Reduction, Deep learning; Machine Learning.

P.CS-3

Integrating 3D CNNs and Transformer Models for Early Detection of Myocardial Infarction

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Myocardial infarction, commonly known as a heart attack, poses significant health risks and necessitates accurate and timely diagnosis for effective management. In this study, we propose a novel approach to identifying completely blocked arteries using advanced medical image processing techniques applied to 3D Computed Tomography Angiography (CTA) images. Our methodology integrates ensemble modeling with cutting-edge algorithms to enhance the detection and prediction of myocardial infarction. We employ a multi-step process starting with preprocessing of 3D CTA images to enhance feature extraction and reduce noise. This is followed by a robust segmentation pipeline that isolates arterial structures and identifies regions of potential blockage. To accurately predict the presence of completely blocked arteries, we leverage an ensemble approach combining the strengths of various deep learning models, including 3D Convolutional Neural Networks (CNNs) and Transformer-based architectures. This hybrid model enhances prediction accuracy by synthesizing information from multiple learning perspectives and reducing model biases. The proposed methodology is rigorously validated using a comprehensive dataset of CTA images, demonstrating its effectiveness in improving the detection of complete arterial occlusions. By integrating advanced algorithms and ensemble techniques, our approach aims to provide a reliable tool for clinicians, facilitating early intervention and better patient outcomes in the context of myocardial infarction.

Keywords: Myocardial infarction, Computed Tomography Angiography (CTA), Medical image processing, Coronary Artery Disease (CAT), 3D Convolutional Neural Networks (CNNs).

P.CS-4

Machine Learning on the Blockchain: Challenges and Opportunities in Data Analytics

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The integration of Machine Learning (ML) and blockchain technology represents a transformative development in the field of data analytics. This paper explores the synergistic potential of combining ML with blockchain to enhance data processing, security, and transparency in decentralized environments. Blockchain's inherent characteristics, such as immutability, decentralization, and transparency, provide a robust framework for storing and sharing ML datasets and models, thus ensuring data integrity and provenance. However, the convergence of these technologies also presents significant challenges, including scalability issues, high computational costs, and the need for secure, privacy-preserving data sharing mechanisms. This paper examines these challenges in detail and discusses potential solutions such as federated learning, which allows ML models to be trained across multiple decentralized devices without sharing raw data. It addresses the opportunities that blockchain offers for enhancing trust in ML models by enabling auditable and verifiable training processes. This integration is particularly beneficial in applications requiring high levels of data security and transparency, such as finance, healthcare, and IoT. The paper concludes by highlighting future research directions and the need for innovative approaches to overcome existing limitations, ensuring that the combination of ML and blockchain technology can be effectively utilized for advanced data analytics.

Keywords: Blockchain, Smart Contracts, Machine Learning, Big Data, Data Analytics.

P.CS-5

Revolutionizing Coronary Artery Disease Prediction with 3D Deep Learning Models Using CTA Images

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Coronary Artery Disease (CAD) remains a leading cause of morbidity and mortality worldwide, necessitating advancements in early diagnosis and treatment. Traditional diagnostic methods using 2D imaging often result in the loss of critical information due to limited perspectives on anatomical structures. In this study, we propose a novel approach utilizing an ensemble of 3D deep learning models to predict CAD from Computed Tomography Angiography (CTA) images. By leveraging the full 3D spatial information of CTA scans, our ensemble model combines the strengths of multiple architectures, including 3D Convolutional Neural Networks (3D-CNNs) and 3D U-Nets, to enhance the accuracy and robustness of CAD prediction. The ensemble approach aggregates predictions from these models, improving generalization and mitigating overfitting. Experimental results demonstrate a significant improvement in prediction performance, achieving high sensitivity and specificity compared to single-model counterparts. This innovative methodology underscores the potential of 3D deep learning in revolutionizing CAD prediction, paving the way for more accurate, non-invasive diagnostic tools in clinical practice.

Keywords: Coronary Artery Disease (CAD), 3D Deep Learning, Computed Tomography Angiography (CTA), 3D Convolutional Neural Networks (3D-CNNs), 3D U-Net.

P.CS-6

The Blockchain-IoT Nexus: Ensuring Data Integrity and Device Security

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As the Internet of Things (IoT) continues to expand across diverse sectors, the imperative to safeguard the security and integrity of IoT networks has never been greater. This paper delves into the integration of blockchain technology with IoT systems to tackle significant challenges related to data integrity and device security. Blockchain's decentralized ledger system provides a formidable solution by ensuring data accuracy and immutability through its transparent and tamper-resistant transaction recording process. The incorporation of smart contracts further enhances this framework, facilitating automated, trustless interactions among IoT devices and mitigating risks associated with unauthorized access and data manipulation. This study thoroughly examines various use cases where blockchain technology can fortify IoT security, including device authentication, data provenance, and secure data sharing. Additionally, we address critical technical and operational issues inherent in the deployment of blockchain within IoT environments, such as scalability, interoperability, and the impact on network overhead. By presenting a comprehensive review of current research, real-world applications, and emerging trends, this paper offers valuable insights into how the convergence of blockchain and IoT can revolutionize security protocols and promote reliable, secure data exchanges. The findings contribute to the ongoing discourse on enhancing IoT security frameworks and provide a strategic roadmap for future advancements in this dynamic field.

Keywords: Blockchain, Internet of Things (IoT), Data Integrity, Network Security, Decentralized Ledger, Data Provenance, Interoperability, Secure Data Exchange.

P.CS-7

NLP over Requirement Engineering Documents for Conceptual Modeling

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The conceptual model of requirement documents plays a central role in the development of business system structures. Due to its abstract nature and high-level conceptual data, Entity Relationship (ER) modeling is a massive task for system analysist. Researchers tried to use Artificial Intelligence (AI) to automatically generate ER diagrams from requirement document. The main challenge in broadening its use is developing a conceptual framework for a fresh implementation. This Framework focuses on a technology that combines syntax analysis and semantic heuristic analysis to extract the entity-relationship diagram. This research evaluates various previous work rules and effectively combining them into an effective NLP engine. Various tools and techniques proposed to reuse conceptual models for constructing a semi-automatic structure of ontology from natural language (NL) description. The text element converted into part-of-speech (POS) and converted into entities, attributes, and relationships based on the entity-relationship model (E-R). Furthered Requirements extraction, entities identification, attributes selection, and constraints relationships between entities performed. In result, automatically entity relationship diagrams (E-R) obtained which increase the efficiency and accuracy of software design.

Keywords: Entity Relationship (ER) Modeling, Artificial Intelligence (AI), Natural Language Processing (NLP), Conceptual Framework, Ontology Construction.

P.CS-8

Bio-Inspired Unmanned Arial Vehicle Design (UAV) for Deep Learning-Based Monitoring, Assessment and Inspection of Civil Infrastructure

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Crack damage in civil infrastructure poses significant risks to public safety and structural integrity. Effective maintenance and repair require timely and precise detection of such damage. Unmanned aerial vehicles (UAVs) provide high-resolution images that capture precise information, making them a viable technology for assessing large-scale buildings. It takes a lot of time and effort to analyze these images for crack detection manually. Due to their agility and accessibility, Unmanned Aerial Vehicles (UAVs) have emerged as a significant tool for infrastructure assessment. This paper aims to create and use a specialized UAV-based image dataset for training and evaluating deep learning models focused on crack detection in civil infrastructure. Data was collected using high-resolution multispectral images taken by UAVs. A Multi-spectral UAV DJI phantom was used for data collection from the civil infrastructure. This paper discusses a novel use of YOLOv7, an advanced deep-learning architecture, for detecting cracks in UAV-captured images to assess, monitor, and inspect civil infrastructure. This paper presents YOLOv7's potential as a reliable and efficient method for automated infrastructure inspection, essential for preserving critical civil infrastructure stability and maintenance. The combination of cutting-edge deep learning algorithms and UAV technology enables an approach to automated, effective, and accurate infrastructure inspection, which is essential for ensuring civil infrastructure safety and sustainability.

Keywords: Bio-inspired, Unmanned Arial vehicles (UAV), deep learning, YOLOv7, Cracks detection.

P.CS-9

Improving the Crack Detection Process of Civil Infrastructure Using Thermal Images based on YOLO V5 and V7

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Timely and effective detection of cracks in concrete is crucial to minimize further degradation and carry out suitable repairs. Recent years have seen approaches of several convolutional neural networks with varied degrees of accuracy and speed for object recognition but still there is an adequate need to improve the efficacy of these inspections. YOLO (You Only Look Once) is a widely recognized object detection algorithm, known for its speed and efficiency in real-time applications. In this work, we conduct a comparative study between YOLOv5 and YOLOv7, examining their performance across a variety of metrics, including accuracy, speed, and computational efficiency, with a special focus on crack detection. Both Models were implemented on 1000 high-quality thermal images using the FLIR E53 camera from various buildings for dataset Classification. The result indicates that both YOLOv5 and YOLOv7 are effective for real-time crack detection. Furthermore, YOLOv7 has shown better performance in detecting small or dense cracks and achieved mean average precision (mAP) of 0.86, recall of 0.597, accuracy of 0.669 compared to YOLOv5 mean average precision of 0.542, recall of 0.508, and accuracy of 0.404. It has been revealed that YOLOv7 improves safety by facilitating accurate identification and prompt maintenance. Additionally, it supports the goals of Industry 4.0 by automating manual inspections, lowering expenses, and promoting technological integration in public infrastructure management.

Keywords: YOLO (You Only Look Once), Crack detection, Civil Infrastructure, Cross-stage Feature Fusion.

P.CS-10

Development of Deep Learning Model for Detection andClassification of Stress Disorder by Physiological Signals

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The function of stress in the etiology of diabetes is difficult to identify and analyze through the verbal communication by experts, there is substantial evidence of its metabolic implications in people who already have chronic conditions like diabetes, presented a scientific method to determine their effects on people with diabetes. Stress hormones in the body can affect glucose levels in numerous ways, so the aim is to detect the level of stress and make the proper diabetic management for the patient. In this study, we developed an architecture that classifies stress in diabetic patients into categories such as, Stressed, and not stressed. Our model applied EEGLab and finite impulse response (FIR) bandpass filter with a passband extending from 4 to 45 Hz, to preprocess the signals and get distinct frequencies. Following the application of Fast Fourier Transform (FFT) & Short-Time Fourier Transform (STFT) for feature extraction and 1D signals were transformed into 2D spectral pictures (enhance feature representation, improved classification accuracy, and utilization of CNN advantages), CNN and LSTM were used for frequency binning and selection. Using a SoftMax classifier, stress classified into 2 classes stressed and not stressed, and 72% accuracy was achieved in the stress level classification.

Keywords: Stress in diabetes, Glucose levels, EEG signals, Feature extraction, Classification accuracy.

P.CS-11

Text to Image Using Stable Diffusion with Refinement of Prompt Engineering Using LLMs

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The audience has come to cherish generative text-to- image models because of their ability to generate top-notch images in response to natural language prompts. However, because the language spoken is complicated and unclear, creating effective cues for desired imagery can be difficult. Prompt Magician is the visual evaluation system that the research presented. It enables the user to explore the image outcomes and improve the input prompts. The approach we utilize is based on a prompt recommendation model that receives prompts from users, finds special (relevant and important) prompt keywords, and obtains related prompt-image pairs from Diffusion DB after that the system takes the category parameters from the user and automatically generates an image by the prompt that if more refined through the Large Language Model LLM model. The system enables users to choose from numerous criteria for customized investigation and displays a multi-level display containing the cross-modal embedding of the retrieved images and proposed keywords, allowing dynamic prompt refinement. The performance and effectiveness of the system we developed are done by two scenarios, user research, and interviews with experts. In the first case the user research feedback gross perfection is 92.6%. The second scenario interview the experts the shows the gross satisfaction 91.72%. The results obtained say that our approach enhances the generative text-to-image model's innovation assistance and allows rapid engineering.

Keywords: Text-to-Image, Stable Diffusion, Prompt Engineering, LLM, Large Language Model.

P.CS-12

Weed Detection Using Multispectral Imaging

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Precision farming uses technologies to improve plantation quality and productivity while minimizing environmental harm. Unmanned aerial vehicles (UAVs) are crucial for weed management as they can inspect large areas and deliver high-resolution multispectral images, including infrared and visible light. This helps assess productivity by estimating plant thickness, density, and coverage. Invasive plants compete with crops for resources, significantly reducing productivity. Herbicides, while effective, are costly and harmful to the environment and human health. This research aims to reduce herbicide use by developing a weed detection system. As the global population grows, agricultural production must double by 2050 to meet rising demand, making automated weed control crucial. Weeds can reduce crop yield by over 30%. Traditional herbicide use is environmentally damaging, and manual field inspection is labor-intensive. UAV imaging offers precise, site-specific weed control, saving up to 90% of herbicide usage. High-resolution cameras enable accurate weed detection and targeted herbicide application. A deep learning approach using the U-Net model was developed for weed detection. It utilized multispectral images of sunflowers, captured at various growth stages. The model was trained from cotyledon emergence to the final growth stage, where chemical treatments are applied. Organic methods, such as using natural insects or microorganisms, are also being researched to reduce chemical impacts. Overuse of herbicides can lead to weed resistance. This research addresses ethical concerns by ensuring data protection and avoiding biased predictions. Combining technological advancements with ethical considerations can unlock the potential of digital twins in various industries, enhancing trust and cooperation between humans and machines.

Keywords: Precision farming, UAV imaging, Weed management, Deep learning (U-Net model), Herbicide reduction.

P.CS-13

A Differential Structures Embedded Novel Model for Detection and Classification of Diabetic and Hypertensive Retinopathy to Sustenance Early Diagnostics

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Diabetic Retinopathy (DR) and Hypertensive Retinopathy (HR) are both eye diseases that influence the retinal area and then further at the last stage, cause permanent vision loss. Timely diagnosis of DR and HR is useful to enhance the screening process of patients to eliminate further harm. Retinal microaneurysms, exudates, hemorrhages, or cotton wool spots are some common lesions present in both DR and HR. Past systems detect both DR and HR based on these common lesions. The aim of this proposed work is to provide a model that can detect the differential structures of the retina to correctly classify between Diabetic and Hypertensive Retinopathy as well as detect common irregularities of both retinal disorders and classify them as Not Specified. This model can classify the retinal disease into three classes Diabetic Retinopathy, Hypertensive Retinopathy, and Not Specified. The Not-Specified class indicates the need for further diagnosis. To achieve this aim, we extracted the lesions of both diseases and then performed multi-classification. For this purpose, a hybrid model is proposed incorporating UNET and Convolution Neural Network. The model achieved an accuracy of 71% when tested on IDRID, REFUGE, and DIARAT-DB1 datasets of retinal fundus images.

Keywords: Diabetic Retinopathy (DR), Hypertensive Retinopathy (HR), Retinal lesions, Hybrid model (UNET and CNN), Multi-class classification**.**

P.CS-14

Challenges and Issues in Web Applications: Text Mining

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Text mining, the process of deriving meaningful insights from unstructured textual data, has emerged as a pivotal area of research and application in the age of big data. Leveraging techniques from natural language processing, machine learning, and data mining, text mining enables the extraction of patterns, trends, and sentiments from vast volumes of text across various domains, including social media, healthcare, finance, and academia. This paper explores the methodologies and tools employed in text mining, highlighting key processes such as text preprocessing, feature extraction, and modeling. We discuss the challenges inherent in dealing with linguistic variability, ambiguity, and context, and present case studies that illustrate the transformative impact of text mining on decision-making and knowledge discovery. Furthermore, we address ethical considerations and the future directions of text mining, emphasizing the need for robust frameworks that ensure privacy and fairness while harnessing the power of textual data. Ultimately, this work underscores the significance of text mining as an indispensable tool for unlocking the potential of unstructured data in a rapidly evolving digital landscape.

Keywords: Text mining**,** Natural language processing (NLP)**,** Big data**,** Feature extraction**,** Ethical considerations.

P.CS-15

Privacy Protection in Blockchain: Securing Personal Data in Blockchain Ecosystems: A Consortium Blockchain-Based Privacy Protection Scheme

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Blockchain technology provides a decentralized and secure framework but faces significant challenges in protecting personal data privacy, particularly due to its immutable nature. This paper introduces a privacy protection scheme designed specifically for consortium blockchains, which are governed by a selected group of entities. The proposed scheme integrates advanced cryptographic techniques, such as zero-knowledge proofs and homomorphic encryption, alongside data anonymization methods to ensure that personal information remains secure and private. To address regulatory challenges, particularly compliance with the General Data Protection Regulation (GDPR), the scheme incorporates robust access controls and dynamic consent management. This ensures that data subjects maintain control over their personal information, in line with principles of data minimization and purpose limitation. The proposed solution is subjected to rigorous simulations and security analyses, demonstrating its effectiveness in resisting various privacy attacks while maintaining the operational efficiency required for real-world applications. The findings indicate that this consortium blockchain-based privacy protection scheme offers a practical and secure approach for industries looking to adopt blockchain technology without compromising on data privacy. By balancing transparency and privacy, the proposed solution contributes to the broader adoption of decentralized systems in compliance with privacy regulations, paving the way for more secure and privacy-conscious blockchain applications.

Keywords: Blockchain, Privacy Protection, Consortium Blockchain, Zero-Knowledge Proofs, Homomorphic Encryption.

P.CS-16

Spam Detection from Urdu Reviews Using the Spammer Behavior

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Reviews have become the main source to Decide about offered products and services are good or bad. Hence, sellers are concerned about client evaluations by customer reviews, as they might directly impact the growth of their businesses. Unfortunately, there is a growing trend to write spam reviews to promote a specific item. This activity, commonly referred to as review spamming. This emerging topic "spam review detection (SRD)" has received considerable attention from researchers, previous studies on SRD have mostly focused on datasets consisting of English, Chinese, and other languages. Urdu is 10th among the most widely spoken languages globally. So, there is a dire need for a system or model that can accurately classify Spam Reviews from script written in Roman Urdu. This study aimed to detect spam in Urdu reviews by preprocessing the data, implementing feature extraction, training a classification model, and utilizing unique techniques for spam detection in Roman Urdu reviews. Following a thorough examination of prior research, the data is subjected to the use of machine learning and deep learning algorithms. The acquired findings were compared, and hybrid approaches were advised in this research, opening new possibilities for detecting spam or ham reviews. The results help in reducing spam and build confidence in customers regarding the service or product. CNN and LSTM are train on given roman Urdu review data set of Daraz. LSTM outperforms as compared to CNN accuracy. Using LSTM models, we achieved an accuracy score of 97%. In addition, we used a CNN model for comparison, which has not been done before. Our results indicate that the LSTM model outperforms the CNN model.

Keywords: Spam Review Detection (SRD), Roman Urdu reviews, Machine Learning, LSTM Model, Feature Extraction.

P.CS-17

Recovering of 3D Models from 2D Images Using Machine Learning Techniques

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In real world, everything is in 3D format; the human visual system has a great tendency to infer a 3D scene or object. Nowadays, taking pictures and videos of real-world scenes is very common due to the availability of cameras in our pockets as an essential part of the cell phone. However, the third dimension (depth) of the captured moments gets lost immediately. That is why a machine cannot infer the 3D model from an image. Due to an increase in the demand for closer to the real viewing experience and 3D printing, the conversion of a single 2D image into 3D has become a hot research area in the field of computer vision and geometric modeling. 3D modeling has a wide range of applications in robot vision, 3D printing, medical image processing, automated medical surgery, virtual reality, 3D movies, and many others. During the last few decades, with the induction of machine learning and improved computational power of computer systems, there have been several attempts to achieve a voxel-based 3D model directly from a 2D single image. The generation of the 3D model directly from a single planar digital image is not an easy task due to very little detail available in an image. Therefore, the literature shows several research gaps regarding resolution, accuracy, and efficiency to meet the required standards for many 3D practical applications. This research work aims to address the above-mentioned research gaps. The proposed research work is based on the autoencoder, a neural network-based technique for the conversion of a 2D single image into a voxel-based3D model. For the evaluation of the efficacy and quality of the proposed method, the experiments have been conducted using the ShapeNet dataset, which is a benchmark 3D repository. The results confirm that the proposed method gives reasonably better results than state-of-the-art methods in a smaller number of epochs, which shows its fast-learning capability.

Keywords: 3D modeling, Single image to 3D conversion, Autoencoder, Voxel-based 3D model, ShapeNet dataset.

P.CS-18

Development of the Urdu WordNet: An Overview

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Urdu is considered a morphologically rich and resource-poor language. WordNet is a lexical database, organized as a semantic network and it plays a vital role in respective natural language processing applications. This paper provides a comprehensive overview of the development of Urdu WordNet. This study delves into the historical context, challenges, and limitations researchers face in constructing this resource. The current state of Urdu WordNet is analyzed, including existing resources, their scope, and quality. We identify critical gaps and propose potential directions for future research to enhance the development and utility of Urdu WordNet. By understanding the past and present, we aim to outline a roadmap for building a robust and comprehensive Urdu WordNet that can serve as a cornerstone for various NLP tasks.

Keywords: WordNet, Lexical database, Semantic network, Natural Language Processing.

P.CS-19

Unmanned Aerial Vehicle and Machine Learning Based Enumeration for Large-Scale Unstructured Orchards

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In this research, our main goal was to create specialized tools for detecting and categorizing pineapples that are grown in Vietnam's agricultural lands. The objectives were to identify semi-ripe pineapples from unripe ones and assess fruit quality according to ripeness and condition. We used an approach to lower the computational expenses related to heavy training to accomplish our goals. Rather than employing the YOLOv5 detection model for both simultaneous detection and classification, our main goals were to increase the number of detectable items and speed up model training. Among the main components of our research plan are: Pre-trained Model: Using 40,960 images of ripe fruit from the dataset—four different fruits—we examined a pre-trained model. Transfer Learning: Our transfer model trained on new images using transfer learning techniques, effectively finishing the training process in a few hours. The decision-making process is based on the comprehensive model that was constructed using transfer learning. It achieves an astounding accuracy of over 96% and can easily adapt to new categorization tasks, such identifying rotting or diseased fruits. We further increased classification accuracy by applying picture enhancement algorithms and filters, which increased validation accuracy overall. But because there are restrictions in the datasets that are now accessible, there are still limitations in automated sorting, counting, recognizing decaying fruits, and grading across different fruits. Prospects for predicting pineapples' remaining shelf life include the creation of an improved deep learning system, which would help consumers, fruit vendors, and the economy by enabling timely purchases. Particularly in the field of smart agriculture, this research has significantly advanced autonomous fruit grading and quality prediction. We advise more research to improve R-CNN models and extend the system's functionality to accommodate a larger range of fruits. Deep learning approaches promise a fruitful future for the industry, marked by improved profitability, lower waste, and increased production through ongoing innovation and improvement.

Keywords: Pineapple detection and classification, Transfer learning, YOLOv5 model, Image enhancement, Smart agriculture.

EP.CS-1

Policy Evaluation of Free Electricity for Employees in Pakistan's Power Distribution Companies: Implications for Human Well-Being among Vulnerable Groups

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The study aims to explore the complex impacts of free electricity policies on vulnerable population in Pakistan. Despite the acknowledgement that access to low-cost and reliable energy is a fundamental human right and a crucial component of sustainable development, many low-income areas confront considerable obstacles in obtaining uninterrupted electricity. This article explores how free electricity provisions for utility employees disproportionately shift the economic burden onto marginalized groups through high electricity bills. In this study a mixed-method approach is used, incorporating literature review, qualitative and quantitative investigation of the relationship between electrical accessibility and fundamental rights such as education, healthcare, and economic possibilities. Furthermore, we assess the larger consequences of energy imbalance for poverty alleviation and social welfare in Pakistan. The findings will show that limited access to reliable electricity exacerbates existing inequities, hindering attempts to enhance the quality of life for the most vulnerable. At the end, the paper aims to provide the recommendations to policymakers for formulation/promulgation of effective policies/strategies to provide the uninterrupted electricity and fundamental rights to the citizens of Pakistan.

Keywords: Vulnerable Populations, Energy Accessibility, Human-Centric Security, Fundamental Rights, Policies & Governance.

EP.CS-2

Enhancing Energy Security through Resilient Power Transmission Networks: Analysis of Pakistan Transmission Infrastructure

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The energy security of the state is in fact the National Security of the state. The power transmission component of the national energy security of Pakistan is facing numerous issues with respect to its resilience and reliability. A problem never exists in isolation; it is surrounded by other problems in space and time. The more of the context of a problem that a scientist can comprehend, the greater are his chances of finding a truly adequate solution. This study focuses on interdisciplinary approach to see the energy security through a holistic lens for studying the energy systems as an entity rather than as a collection of parts under the umbrella of General System Theory. The impact of Physical Security under social sciences and Climatic impacts under natural / environmental sciences will be tested upon by triangulation approach duly verified by data triangulation to see the significant impact on transmission infrastructure of electric energy component an engineering discipline. The results will help policy makers develop methodologies to assess the vulnerability of power systems to various threats and devise mechanisms and processes for mitigating the disruptions in power systems for robust and more resilient system. This study will also help future scholars to explore the interdisciplinary aspects and its role while focusing on the core issues at hand.

Keywords: Energy Security, Climatic Impacts, National Security, Interdisciplinary Research, Sustainable Development.

EP.CS-3

Enhancing Cyber Security in Pakistan's Nuclear Infrastructure: Addressing Emerging Digital Threats

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As countries enhance their nuclear capabilities, it is crucial to prioritize the protection of key Infrastructure, especially considering the increasing cyber threats. This project aims to strengthen Pakistan’s nuclear future by addressing cybersecurity concerns in its nuclear infrastructure. An in-depth investigation is conducted to assess the present cybersecurity situation, pinpointing specific threats and weaknesses that are distinct to nuclear sites. The focus is on evaluating the regulatory framework to determine its effectiveness and suggesting improvements to strengthen cybersecurity safeguards. The study incorporates a risk assessment that considers technological and human variables, proposes techniques for efficient risk management. Investigating advanced technologies like artificial intelligence and machine learning as crucial aspect of the suggested security measures. The text examines how international cooperation, public awareness, and good communication may strengthen nuclear cybersecurity. The qualitative approach is adopted in order to conduct this research. This report provides valuable insights on protecting nuclear assets from new cyber risks, including practical suggestions for policymakers, regulatory agencies, and nuclear site operators.

Keywords: Nuclear infrastructure, Cyber Security, Nuclear Security, Nuclear future

ARTS & SOCIAL SCIENCES (ISLAMIC STUDIES, DESIGN AND INTERIOR, ENGLISH LANGUAGE AND LITERATURE)

KEYNOTE/INVITED LECTURERS

K.IS-1.1

Importance of Peace and Security in the Light of Sirat e Tayyibah

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If we think of any activity, like educational, business, economic, social or judicial, and see whether it is possible to conduct any of these activities in our society without the blessing of law and order. Of course, our answer will be negative. What importance has Allah given to peace and order? And what guiding principles did the Messenger of Allah, peace and blessings of Allah be upon him, tell us to establish peace and order in the society? The researcher will try to compare the situation of peace and order in the world before Islam and the situation after the spread of Islam in the world at that time and prove that the only way to establish peace and order in the society is through adopting the principles mentioned by the Messenger of Allah (peace be upon him). The topic is discussed through inductive inference. In the preparation of this research, the Qur'anic verses, Prophetic Ahadith and the Sirat e Tayyiba of our beloved Prophet (peace be upon him) have been studied deeply.

Key words: Peace – Islam - Sirat e Tayyiba - Guiding principles - The Time of Ignorance.

K.IS-1.2

Islamic Principles and the Pursuit of Sustainable Development

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This research paper delves into the intersection of Islamic principles and the global pursuit of sustainable development, examining how core Islamic teachings align with and support contemporary sustainability goals. Rooted in the Quran and Sunnah, Islamic ethics emphasize stewardship (*khalifah*), moderation (*wasatiyyah*), and justice (*adl*), all of which provide a robust framework for addressing environmental, social, and economic challenges. The paper explores how these principles can be applied to promote responsible resource management, social equity, and environmental conservation, contributing to a holistic approach to sustainability. By analyzing historical and modern interpretations of Islamic teachings on environmental stewardship, the paper highlights the relevance of these principles in shaping policies and practices that foster sustainability. Case studies from various Muslim-majority countries illustrate how Islamic values have been integrated into sustainable development initiatives, showcasing successful models and identifying areas for further improvement. The research also considers the potential role of Islamic finance in supporting sustainable development projects, emphasizing the ethical investment criteria that align with sustainability objectives. The findings suggest that the integration of Islamic principles into the broader sustainability discourse can provide valuable insights and practical strategies for achieving long-term global sustainability. This paper advocates for greater collaboration between religious and secular institutions in the pursuit of a sustainable future, underscoring the importance of faith-based approaches in addressing the pressing environmental and social issues of our time.

Keywords: Intersection, Sustainable Development, Stewardship, Moderation, Social Equity, Integrated, Discourse

K.IS-1.3

Human Rights, and Women's Dignity: Exploring Concepts of Equality and Justice in Seerah perspective and Addressing Violence Against Women

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The Seerah, which chronicles Prophet Muhammad's (PBUH) life and his practices, is such a crucial source concerning the principles of social justice and equality as expected from early Islam. At the core of this investigation is an examination of how these principles relate to gender equality and the protection of women's rights. While studying the Seerah from historical and moral viewpoints, this paper tries to demonstrate how Islam has been a torchbearer of human dignity in general and women's rights in particular. It also attempts to inject these core principles back into ongoing debates over violence against women, arguing how those combats of justice and equity matter for current quandaries. The research employs a multi-method approach for an exploration of intersections between the Seerah, human rights, and women's dignity as components inherent in Islamic teachings. The methodology adopted for this research comprises an exhaustive review of classical and contemporary Islamic literature, particularly highlighting Seerah and relevant jurisprudential sources to delineate the norms of equality & justice. This paper aims to map out the implementation of these principles by situating them in historical contexts and Islamic jurisprudence to consider their potential for addressing persistent issues relating to gender violence. It tells us that while Islamic doctrine generally aspires to equality and justice, it is subject to modern conditions in its age-old narrative. As such, it suggests that reform reflection is necessary in all contexts if violence against women is eradicated along with her full dignity and her lot in life is fair and equal.

Keywords: Social justice, SEERAH, Women's dignity, Violence against women, Gender equity, Human rights, Women's status in Islam, Islamic teaching.

K.IS-2.1

Prophet Muhammad's PBUH Ethical Teachings, Practice Guidance of Everyday Life

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According to the verse of the Holy Qur'ān, the Holy Prophet PBUH is the ever-best role model for humanity. His Seerah provides guidance for all the aspects of everyday life including sociology-cultural behaviors, family life, and socio-political affairs. The divine rulings of the Seerah of Holy Prophet PBUH encompass all the contemporary problems faced by humanity in daily life. Another very important contemporary issue is related to educational matters in society. According to the saying of Holy Prophet PBUH, He was sent to mankind as a teacher or mentor to guide humanity in the light of revealed knowledge. Capitalism has changed the priorities and preferences of a person's life today. Thus, over values and norms have been modified accordingly. In multicultural society especially in United Kingdom, we face problems in balancing our professional and domestic affairs. Time management is the major constraint in this regard. When we study the biography of the Holy Prophet PBUH, we come to know that He worked as the leader of state, chief of military staff and the manager of other administrative affairs. But we find a well-balanced life that manages all the affairs at the same time. Narrations reveal that at He provided proper time for dealing of day to day matters of his personal life and domestic affairs. Research has been premeditated to explore how we can get guidance from the Seerah of Holy Prophet PBUH to find solutions of different problems faced in daily life.

Key Words: Seerah Guidance, Contemporary problems, Domestic life, Education

K.IS-2.2

Social Aspects of the Study of Seerat-Al Nabi

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The emphasis on promoting knowledge in the life of Prophet Muhammad (PBUH) is closely tied to efforts aimed at elevating societal awareness. The qualities highlighted by Hazrat Khadija (RA) after the first revelation—wisdom, compassion, and integrity—are all fundamentally connected to the betterment of society. The titles "Sadiq" (the Truthful) and "Amin" (the Trustworthy) given to the Prophet Muhammad (PBUH) further reflect his profound social character and the trust he inspired. In the Seerat (biography) of Prophet Muhammad (PBUH), special attention is given to the protection and care of various social dimensions. His teachings emphasize the well-being of not only humans within society but also other creatures, the environment, and the Earth itself. Caring for all forms of life is a central part of the Prophet's message. The Quran's portrayal of paradise as a place of peace and beauty serves as a metaphorical guide, encouraging believers to create harmony on Earth through righteous deeds. By doing so, this earthly life becomes more meaningful and paves the way to eternal paradise. Acts of goodness encompass more than just helping the underprivileged; even greeting others with a smile is regarded as an act of charity. Such behaviors underscore the importance of the psychological aspects of community support, emphasizing that compassion and kindness should not be overlooked in our efforts to aid society.

Keywords: Society, Seerat-Al Nabi, Kindness, Goodness, Social Dimensions.

K.IS-2.3

Islamic Perspective on Education System in an Islamic State

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After the creation of man, Allah provided the basic things to fulfill man's physical requirements as well as arranged for his spiritual education and training. For this purpose, Allah has sent His chosen prophets and messengers. Allah Almighty crowned man with the crown of prophet hood and made him the first teacher so that people would be told the purpose of their creation, and they would not follow the path of error. The purpose of the Prophets of Allah was to strengthen the people religiously and to attract them to the supernatural force that brings all things into existence and governs them. That is why, Allah sent the first man in the world as a prophet to guide the people. This means that education and man are side by side. Education is the means of transferring the ideas, traditions, culture and customs of human society to the next generation and when society comes into existence, consciously and unconsciously, education starts to work in one way or the other. There was much importance given to education in the Islam. Hazrat Muhammad SAW arranged the masajid as the centers of education in all cities and tribes of the Arab. He appointed the learned and experienced sahaba for this purpose. He educated the people in a unique style with examples. There is much need to Islamize education and knowledge. There are many modern tools to get knowledge, but it is very necessary to get education with good intention and to serve humanity.

Keywords: Education, Society, Religion, Culture, Humanity

K.IS-3.1

Prophetic Traditions in Health and Wellness: Bridging Seerat-un-Nabi with Modern Medical Innovations

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The life of Prophet Muhammad (PBUH), as depicted in Seerat-un-Nabi, offers enduring lessons on health, wellness, and healing that are still applicable in today's healthcare systems. This paper examines how the Prophet's teachings, which emphasize compassion, preventive care, and holistic well-being, can complement modern medical innovations. These teachings align closely with contemporary approaches to healthcare, particularly in preventive medicine, rehabilitation sciences, and physical therapy. The Prophet's guidance on physical health—such as balanced diet, cleanliness, physical activity, and the use of natural remedies—mirrors the growing focus on lifestyle management in today's medical field. His approach to healing, which considers the physical, emotional, and spiritual needs of individuals, resonates with patient-centered care models that encourage treating the whole person rather than just the illness. In the context of physical therapy, the Prophetic emphasis on rehabilitation and care for the physically disabled highlights the importance of compassion and individualized care, concepts that are central to modern therapeutic practices. By connecting these timeless principles with current medical advances, this paper proposes a healthcare model that is ethical, culturally sensitive, and focused on patient well-being. This integration of traditional wisdom and modern innovations offers the potential to improve healthcare outcomes while maintaining a compassionate approach.

Keywords: Seerat-un-Nabi, holistic care, preventive health, physical therapy, compassionate medicine

ISLAMIC STUDIES

ORAL PRESENTATION

O.IS-1.1

Role of Seerah in Promoting Education and Personality Building for Peaceful Society

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The Seerah of Prophet Muhammad (PBUH) is a profound source of guidance that plays a vital part in promoting education and personality structure, which are pivotal for the development of a peaceful society. This study delves into how the Seerah serves as a comprehensive frame for both intellectual and moral education, offering a balanced approach that integrates knowledge with ethical behavior. The Prophet's (PBUH) life exemplifies a model of literacy, tone- discipline, and compassionate commerce, all of which contribute to individual and societal well- being. Education, as emphasized in the Seerah, is not limited to acquiring knowledge but also involves cultivating wisdom, critical thinking, and a strong moral compass. The Prophet (PBUH) encouraged education for all, irrespective of gender or social status, pressing its significance as a means of innovative educational system and societal advancement. His emphasis on character building and personality structuring and the pursuit of knowledge laid the foundation for a society and stable education system. Personality structure, in the Seerah, is nearly linked to the development of merits like tolerance, honesty, modesty, and empathy. These traits are essential for individuals who contribute appreciatively to society and foster peaceful concurrence. The Seerah encourages tone- reflection and tone- enhancement, guiding humanities to come more performances of themselves through adherence to Ethical Principles. By embodying these values, individuality can help make a community characterized by collective respect, justice, and compassion. In conclusion, the Seerah provides a holistic approach to education and personality structure, which are abecedarian to establishing a peaceful society. Integrating these training into contemporary educational systems can help address ultramodern challenges, promoting a culture of peace, forbearance, and understanding in a decreasingly complex world. The Seerah's dateless principles remain applicable and can serve as a design for nurturing both individual growth and societal harmony.

Keyword: Profound, Integrate, Compassionate, Commerce, Advancement, Tolerance, Ethical, Justice

O.IS-1.2

The status of women in Muslim societyin the light of Sunnah

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The paper will outline the role of Seerat Nabawi and Islamic law about women in Pakistani Society. Islamic faith states that in the eyes of God, men oud women Should be equal and are allowed to fulfill the same role. Therefor they are also required to complete all the duties of a Muslim worshiper, including the completion of religious traditions, Specifically the pilgrimage to Mecca. The Prophet Muhammad (Peace be upon him) was full of Praise for Virtuous and chaste woman. He Said: "the world and all things in the world are precious, but the most precious thing in the world is a virtuous woman". And Allah says in Surah An-Nisa (4:1) Where it emphasizes the equitable treatment of women stating “0-man Kind, fear your Lord, who created you from one soul and created from it its mate anddispersed from both of them many men and women". The textual Sources of Islam (The Quran and Sunnah) not only emphasize equality between males and females regarding their obligations, rights and duties, they also recommend being kind and gentle towards women, because their physical strength is less than men. There are two types of categories within the text; those that explain the honor of women and these that explain their Status. Texts that recommend that women are treated Kindly and with respect. These texts are more important because they place stress on the Kind and gentle treatment of women. Physically they are less strong, have Sensitive feelings. All above texts from the Quran and the Sunnah confirm and reveal the high Status of women in Islamic law. No obligations in the past or in the present hashonored, protected and guaranteed the rights of women as Islamic legislation has done. In this s Paper we will analyze the issue that today's Pakistani Society gives the Same Status to Women which Allah and His Messenger mentioned.

Keywords: Qur’an, Sunnah, Women, Seerat Nabawi, Pakistani Society, Islamic Law.

O.IS-1.3

Character Building: Plannings and Strategies (In Seerah Perspectives)

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Personal development is a lifelong journey aimed at improving oneself across various aspects of life, including skills, character, and relationships. The Prophet Muhammad (PBUH) serves as an exemplary model, offering timeless lessons that guide personal growth. His Seerah, or biography, is a treasure trove of insights that promote self-improvement and character building. By studying the Seerah, individuals can uncover principles that foster self-discipline, emotional intelligence, and effective communication. The Prophet (PBUH) exhibited numerous qualities essential for personal development, including leadership, humility, patience, and time management. His ability to balance spiritual duties with social responsibilities underscores the significance of leading a purposeful and balanced life. His interactions with companions, family, and even adversaries illustrate compassion, empathy, and a strong commitment to justice—qualities vital for achieving personal and social harmony. This exploration focuses on practical strategies derived from the Seerah that individuals can implement to enhance their emotional intelligence and leadership skills. By nurturing self-awareness, compassion, and humility, one can foster healthier relationships and achieve a deeper sense of fulfillment in all areas of life. Furthermore, the Seerah highlights the importance of continuous learning and personal refinement, which are crucial for growth. By emulating the example of the Prophet (PBUH), individuals can face challenges with resilience and integrity, develop a robust moral compass, and strive for excellence in their personal and professional lives. Ultimately, the lessons drawn from the Seerah provide a comprehensive framework for individuals seeking to enhance their personal development journey and make meaningful contributions to society.

Key words: Personal Development, Character, Relationship, Prophet Muhammad (PBUH), Model of excellence, Self-improvement, Strategies, Seerah, Success

O.IS-1.4

Role of Seerah in Promoting Education and Personality Development for a peaceful Society

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Humankind has been granted a special status due to its being vicegerent of Allah Almighty on the earth for he has been entrusted with responsibility to keep order in the world according to the directives of its creator. The last prophet of Allah Almighty promoted education for a peaceful Society. The Holy prophet told the purpose of knowledge is to eradicate evils that prevails in the society and to do strengthen the goal and build a sound moral character and personality development. This is a quite evident from the fact that after the battle of Badar Prophet Muhammad P.B.U.H asked the literate prisoners to teach ten Muslims and get themselves free. Thus, may Muslims have learned reading and writing. Education is source of personality development According to the teachings of Muhammad peace P.B.U.H everyone should concentrate on education and brought up to get mental and physical character what is required in Islam. Wisdom is lost property of Muslims. Knowledge is better than a person who is fasting day and night, does not sleep and does worship. Prophet Muhammad is an attractive personality in the history of human civilization. His chief achievement according to modern thinkers is the establishment of a peaceful Society. He was in fact Saviour of human beings.

Key words: Humankind, Education, Society, Eradicate and Muslims

O.IS-1.5

Role of Seerah in Promoting Ethical Values in Islamic Society

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"Husn" refers to goodness and beauty, "Akhlaq" is the plural of "Khalq" which means "attitude, behavior, habit". Habits are called good morals. Imam Ghazali, may God have mercy on him, says: "If the state of the self is such that it leads to good deeds that are rationally and religiously preferred, then it is called good morals, and if rational and If bad actions are performed which are not desirable according to Shariah, then it is defined as immorality. Allah Almighty says in the Holy Qur'an in Farqan Hameed: And you are for a great character. Hazrat Umm al-Mominin Aisha Siddiqa, may God be pleased with her, was asked, and she said that the creation of Syed Alam, may God bless him and grant him peace, is the Qur'an. In the hadith Sharif, Syed-e-Alam, may God bless him and grant him peace, said: “Allah has sent me to complete and perfect the good morals and good deeds. Hazrat Aisha (may Allah be pleased with her) says about helping the Prophet (peace and blessings of Allah be upon him) in his daily activities: When he (may God bless him and grant him peace) was at home, he was very gentle, forgiving and forgiving. He used to do housework and refrained from speaking evil and never took revenge on anyone, took care of his own clothes, milked the goat, stitched his clothes, mended his shoes, in the dol. He used to sew, bring the salaf from the market and if there was a servant, he would help him in the housework, then when it was time for prayer, he would go to the mosque for prayer.

Keywords: Akhlaq, Prophet Muhammad, Hazrat Aisha, Behavior, Habit, Companions.

O.IS-1.6

The Need and Importance of Ethical Teaching in Islam

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According to the Qur'an, the Holy Prophet (peace and blessings of Allah be upon him) is a universal and perpetual prophet and a mercy to the worlds, so the message, program and government, political, social, economic and social system he gave to the world is one of his main goals to eradicate oppression and oppression from all over the world. The end of justice, the respect and honor of humanity, the protection of the basic rights of man, the destruction of all causes of sedition and the establishment of peace and order at the global level through the suppression of crimes and the life and property of every human being and honor and reputation. There was also a need to provide safety and security equipment. The entire life of the Holy Prophet ﷺ and his behavior before and after the declaration of Prophet Hood and numerous actions are proof of his peace-loving nature, which we believe in the extent of far-sightedness, insight, inner insight, extreme wisdom, understanding of the matter and Attributes such as patience and tolerance can be attributed to Hamidah or the light of Prophet Hood. However, from the days of infancy and from childhood, it is evident from his character and certain habits that peace-loving and peace-making were part of his nature and instincts. The Prophet ﷺ was not a verbal claimant of peace and security like some of today's big powers and politicians, but he ﷺ showed it by becoming a high example of peace and security. Along with the teachings and instructions of peace and security and the destruction of all the causes and motivations of mischief, the Prophet ﷺ covered all the steps he took for peace, security and reconciliation throughout his life before and after the declaration of Prophet Hood. There is no room here. The patience of the Holy Prophet (peace and blessings of Allah be upon him) on the continuous harassment and mockery of the Quraysh of Makkah and his exhortation to the people of Islam to be patient with their persecution is also an argument for pacifism.

Keywords: Prophet Muhammad (PBUH) Ethical Teacher, Practical Guideline for Everyday life, Establishment of world peace, pacifism in nature, measures for peace and security, Patience on harassment.

O.IS-1.7

Society and our Responsibilities in the Light of Seerat-Un-Nabi (SAW)

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Islam is the religion of nature. He has observed the collective consciousness of man. Islam not only recognizes the collectivity arising from human interaction, but also supports the development of this collectivity and gives it such natural principles that strengthen the collectivity. He provides the best foundation for it and eradicates factors that distort it or make it limited and useless. Islam defines the individuality of the individual as the basis of the institutions and congregations that the individual creates for collective life, Islam encourages it, provides principles and laws for them, teaches the distinction between useful and useless congregations and correct congregations. Defines limits and restrictions. For example, Islam advocates the unity of humans. He does not consider any grouping as permanent which leads to mutual differentiation among human beings, such as color and race, language and country. In social life, groups and gatherings are generally formed on the same basis. Which are only useful for temporal and spatial expedients. They are harmful for human welfare. Islam considers these grounds of disagreement to be unnatural.

Keywords: Collective Consciousness, Human Unity, Social Welfare, Islamic Principles

O.IS-2.1

Ethical Leadership: What Modern Leaders Can Learn from Prophet Muhammad's Leadership Style

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Prophet Hazrat Muhammad's ﷺleadership provides a rich source of ethical guidance for contemporary leaders. His approach, grounded in principles of integrity, fairness, and empathy, offers valuable lessons for today's diverse and dynamic organizational environments. This article explores how Prophet Muhammad's leadership style can inform modern leadership practices, emphasizing key attributes that remain relevant in addressing current challenges. The Prophet Muhammad's commitment to justice and equality was evident in his interactions with people from various backgrounds. His leadership was characterized by a deep sense of fairness and respect for all individuals, setting a standard for ethical conduct in leadership. The Prophet's practice of Shura, or consultation, underscores the importance of involving team members in decision-making processes, fostering a culture of inclusivity and collaboration. Additionally, the Prophet's resilience in the face of adversity and his methods of conflict resolution offer practical insights for managing challenges in modern settings. His ability to maintain composure, seek amicable solutions, and build consensus can guide leaders in creating positive and productive work environments. By incorporating these principles into their leadership practices, contemporary leaders can enhance organizational culture, promote transparency, and build stronger, more cohesive teams. The Prophet Muhammad's emphasis on ethical behavior, empathy, and inclusiveness provides a valuable framework for leaders seeking to navigate the complexities of today's world while upholding high moral standards. This article aims to bridge historical and contemporary perspectives, offering actionable strategies derived from the Prophet's leadership that are applicable to current leadership challenges, and demonstrating how these timeless principles can foster ethical and effective leadership in today's context.

Keywords: Ethical leadership, Prophet Muhammad, Integrity, Fairness, Empathy, Inclusiveness, Shura, Conflict Resolution, Organizational Culture.

O.IS-2.2

Leadership and Governance - Lessons from the Prophet Muhammad's ﷺ Exemplary Leadership or Contemporary Challenges

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Explores the profound leadership qualities exemplified by the Prophet Muhammad and their relevance to modern governance. The Prophet's leadership, marked by integrity, empathy, and strategic acumen, offers a timeless model for addressing today's complex leadership challenges. His approach to governance was characterized by inclusivity, fairness, and accountability, which are increasingly vital in our diverse and rapidly evolving world. The Prophet Muhammad's ability to unite disparate groups and lead with a vision that prioritized justice and community welfare provides valuable insights for contemporary leaders. His methods for decision-making, conflict resolution, and fostering a cohesive community highlight principles that can be adapted to address issues such as polarization, ethical governance, and effective management. By examining key aspects of his leadership, such as his commitment to consultation (Shura), his role in establishing justice, and his exemplary personal conduct, these abstract aims to draw practical lessons for modern leadership. These lessons offer guidance for cultivating ethical leadership, promoting transparency, and building resilient organizations and societies. This exploration not only underscores the Prophet Muhammad's role as a pioneering leader but also emphasizes how his principles can serve as a beacon for contemporary leaders striving to navigate the complexities of today's global challenges. The Prophet's exemplary personal conduct, especially his humility and compassion, reinforced his leadership effectiveness, as people were drawn to him not just for his authority, but for his character.

Keywords: Leadership Qualities, Modern Governance, Integrity, Empathy, Accountability, Unity

O.IS-2.3

Personal Development Through the Seerah: Strategies for Self-Improvement

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The Seerah provides deep understandings and doable tactics for improving oneself. This study explores how Seerah provides a holistic approach to improving a person's behavior, character and general well-being. The Prophet's exemplary life is a blueprint for achieving balance, discipline and moral excellence in various aspects of life. This study illustrates methods for developing qualities like patience, humility, integrity and empathy by looking at significant incidents and lessons from the Seerah. The research also explores the Prophet's approaches to leadership, dispute resolution and time management—all of which are critical for both professional and personal development in the contemporary world. This study also highlights the value of spiritual growth achieved by consistent prayer, introspection and observance of moral standards. People can develop a strong sense of purpose, resilience and inner calm by incorporating these timeless lessons into contemporary life. The results imply that Seerah's method of personal growth is not only applicable but also essential for those who want to be able to make morally sound decisions and traverse the complexity of contemporary life. This paper concludes that the Seerah serves as a comprehensive guide for self-improvement, offering enduring wisdom that transcends time and cultural boundaries.

Keywords: Seerah, Personal Development, Self-Improvement, Prophet Muhammad (ﷺ), Character Building, Moral Excellence, Spiritual

O.IS-2.4

Implementation of Intellectual Training for the Training of a Sustainable Society in the Light of Seerat e Tayyaba

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Intellectual Guidance for the youth for Social Reforms in the light of the teachings of our Holy Prophet صلی اللہ علیہ وسلم. Man is the best creation of Allah in the Universe. Societies are comprised of families and families comprised of individuals. Islam addresses all mankind. In this discourse, the meaning and training of society have been analyzed. Furthermore, the meaning of training and its aims and objectives have been pointed out. The intellectual guidance of the youth in the light of the previous Prophets and the teachings of our Holy Prophet صلی اللہ علیہ وسلم has been pointed out. And it has been informed that we must adopt awareness and propagation for the acquisition of economical and human rights. We must raise awareness about the concept of the Day of Judgment.

Keywords: Intellectual Guidance, Social Reforms, Youth Development, Islamic Teachings

O.IS-2.5

Contemporary Education System and Islamic State

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The past of Muslim education demonstrates that there was no distinction between schooling that was primarily secular and that which was primarily religious. The Muslim world, however, has been split into numerous ideologies over the past two centuries, and as a result, there are now separate educational institutions for each philosophy. Religious and metaphysical studies are absent from secular and contemporary educational institutions, while religious seminaries place a strong emphasis on the study of pure religion. Two types of students who do not cohere in real life are graduating from our educational institutions under this condition. An all-encompassing educational system that appropriately integrates contemporary secular and religious subjects is urgently needed in the current Muslim world. When it comes to technology, the Islamic world is currently divided into two main groups. In this article, after describing the contemporary education system, an attempt will be made to describe the education system in the Islamic state in a detailed manner in the form of comparison.

Keywords: Contemporary Education system, Islamic State, Secular Educational Institutions.

O.IS-2.6

Children's Rights in the Light of Seerah ul Nabi ﷺ

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Children's rights hold a significant place in the teachings of Seerah of Prophet Muhammad ﷺ. The Prophet ﷺ demonstrated, through his words and actions, the importance of nurturing children with love, respect, and care. His treatment of children was revolutionary in an era where children, especially girls, were often undervalued. The Seerah provides numerous examples where the Prophet ﷺ emphasized the dignity of children, advocating for their rights to be protected, educated, and treated kindly. Prophet Muhammad ﷺ showed affection to children regardless of gender or social status. He encouraged parents to provide them with proper education, ensuring their intellectual, emotional, and spiritual growth. He condemned practices that led to the mistreatment of children, including the pre-Islamic tradition of burying female infants alive. His teachings on inheritance rights ensured that children, including daughters, received their fair share of wealth. Moreover, the Prophet ﷺ demonstrated the importance of spending quality time with children, engaging in playful interactions, and understanding their needs. His attitude towards orphans was particularly profound, calling for their protection and promising immense rewards for those who cared for them. These values are core to Islamic teachings on child welfare. Seerah ul Nabi ﷺ continues to be a timeless guide for ensuring children's rights in contemporary times, emphasizing that they are a precious trust and must be nurtured with care, compassion, and justice.

Keywords: Children's Rights, Justice, Care, Child Welfare, Dignity.

O.IS-3.1

The Need and Requirement of Practical Guidance for Construction of Personality (In Seerah Perspective)

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The Holy Prophet Muhammad (PBUH) imparted a comprehensive and timeless set of ethical teachings, guiding humanity toward moral excellence. As an exemplar of ethical conduct, Hazrat Muhammad (PBUH) emphasized values such as honesty, justice, forgiveness, compassion, respect, and equality. By embracing these teachings, individuals can cultivate moral character, foster social harmony, and contribute to a more peaceful world. This abstract presents a collection of the Prophet's ethical teachings, offering practical guidance for everyday life. To cultivate good character and make virtuous decisions, the wisdom of the Holy Prophet (PBUH) serves as a moral compass. His advice on navigating life's challenges with integrity and compassion particularly through forgiveness, honesty, kindness, and justice provides actionable insights. By applying these ethical principles, individuals can develop a strong moral foundation, leading to personal growth and the betterment of society. The ethical teachings of the Holy Prophet (PBUH) are not just limited to personal conduct; they offer a framework for building harmonious communities. His teachings emphasize the importance of justice and equality in ensuring social welfare and human dignity. Embracing these values not only benefits individuals on a personal level but also contributes to the development of a global community based on mutual respect and understanding. Moreover, the Prophet's teachings encourage proactive engagement in social issues, urging followers to advocate for the marginalized and uphold the rights of others. This commitment to social justice aligns with the universal principles of human rights, reinforcing the idea that ethical conduct transcends cultural and geographical boundaries. In conclusion, the ethical teachings of the Holy Prophet Muhammad (PBUH) offer timeless wisdom for those seeking to lead a life of virtue and integrity, promoting both personal and societal well-being. By embodying these values, individuals can become catalysts for positive change in their communities and the world at large.

Key Words: Ethical Teachings, Honesty, Forgiveness, Equality, Character, Personal Growth, Practical Guidance, Global Community.

O.IS-3.2

The Seerah and Human Rights, Exploring Concepts of Dignity, Equality and Justice

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Human rights have been widely discussed and debated across various cultures, religions, and legal contexts. Universal Declaration of Human Rights (UDHR) established a global standard, however, the principles behind these rights are deeply rooted in many legal traditions, including Islam. These concepts are not new they are intricately embedded in the teachings and life of Prophet Muhammad (PBUH), as documented in the Seerah. Seerah encompassing the life and teachings of the Prophet Muhammad (PBUH) offers a valuable perspective on dignity, equality, and justice, which are crucial for addressing contemporary global human rights challenges. Dignity is a fundamental human right related to the inherent worth of every individual. Numerous examples in the Seerah illustrate how the Prophet emphasized respect and honor for all people, regardless of their background. Equality is another key concept reflected in the Seerah. The teachings and actions of the Prophet Muhammad (PBUH) consistently highlighted the equality of all believers. A powerful example is found in his Farewell Sermon during his last pilgrimage, where he proclaimed that all people are equal, stating that there is no superiority of an Arab over a non-Arab, nor a non-Arab over an Arab, nor of a White over a Black, nor of a Black over a White. Justice is also a core principle evident in the Seerah. The Prophet Muhammad's governance and judicial decisions reflect his unwavering dedication to fairness and equality. His teachings emphasize the equality of all Muslims, irrespective of race, ethnicity, or social status. Thus, the Seerah not only informs our understanding of early Islamic culture but also provides a framework for addressing contemporary human rights issues. This is an insightful reflection on the connection between the Seerah of Prophet Muhammad (PBUH) and contemporary human rights.

Key words: Seerah, Prophet Muhammad, Universal Declaration of Human Rights (UDHR), Prophet Muhammad's (PBUH) farewell Sermon, Dignity, Equality, Social Justice

O.IS-3.3

Seerah's Approach to Globalization and Cultural Exchange

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The Seerah, the life of Prophet Muhammad (PBUH), serves as a timeless blueprint for understanding and navigating globalization and cultural exchange. Throughout his life, the Prophet encountered diverse communities, each with its unique customs, beliefs, and practices. His ability to engage with these cultures, while remaining steadfast in the teachings of Islam, offers a profound insight into balancing cultural preservation with the acceptance of positive external influences. This research explores how the Prophet Muhammad (PBUH) maintained a nuanced approach toward cultural exchange, ensuring that the Islamic identity was not diluted, yet also recognizing and incorporating the beneficial aspects of other traditions. Through an analysis of key events from the Seerah, such as treaties with non-Muslim tribes, interactions with foreign diplomats, and economic dealings with various communities, this study examines how the Prophet fostered mutual respect, understanding, and collaboration. He promoted peaceful coexistence by respecting the rights and traditions of others without compromising Islamic values. Moreover, the Prophet's emphasis on justice, compassion, and ethical conduct in dealings with different cultures provides critical lessons for contemporary global interactions. The methodology for this research is grounded in a comprehensive examination of historical records, including hadiths, biographies, and scholarly interpretations. By focusing on instances where the Prophet navigated complex cultural landscapes, the study identifies a model of cultural interaction that promotes openness without sacrificing core principles. The findings underscore the Prophet's visionary approach to cultural exchange, which not only strengthened the Muslim community but also facilitated harmonious relations with others. In today's globalized world, where cultures often clash or merge, the Seerah offers valuable lessons on maintaining cultural identity while embracing positive influences from other traditions, encouraging a more peaceful and collaborative global society.

Keywords: Globalization, Cultural exchange, Islamic principles, Prophet Muhammad (PBUH), Peaceful coexistence.

O.IS-3.4

The Prophet's ﷺ Teachings on Fairness, Equality and Human Rights

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Prophet Muhammad's ﷺ teachings on fairness, equality, and human rights form the bedrock of Islamic social justice and continue to offer a profound ethical framework for contemporary society. The Prophet ﷺ emphasized that justice is a universal obligation, transcending personal relationships and societal hierarchies. His advocacy for equality challenged the entrenched tribal and racial prejudices of his time, promoting the idea that all humans are equal in the eyes of God, regardless of race, ethnicity, or social status. Moreover, the Prophet ﷺ was a staunch defender of human rights, particularly for marginalized groups such as women, children, orphans, and the poor. His teachings advanced the rights and dignity of these groups, introducing reforms that protected them from exploitation and ensured their social and economic welfare. These principles of fairness, equality, and human rights remain integral to Islamic thought and continue to inspire movements for justice and human dignity across the world**.** Prophet Muhammad ﷺ was also a defender of human rights, particularly for marginalized groups such as women, children, orphans, and the poor. His reforms advanced the rights and dignity of these groups, protecting them from exploitation and ensuring their social and economic welfare. These principles of fairness, equality, and human rights continue to inspire movements for justice and human dignity in the contemporary world.

Keywords: Fairness**,** Equality**,** Human Rights**,** Justice**,** Social Justice**,** Dignity, Compassion.

O.IS-3.5

The Role of Prophet's (SAW) Uswa-e- Hasana in Promoting Islamic Environment

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This research explores the ethical teachings and practical guidance of Prophet Muhammad (PBUH), offering insights on how his principles can guide modern life. His teachings, as preserved in the Qur'an and Hadith, emphasize values like honesty, compassion, justice, humility, and patience, which are central to Islamic ethics and universally applicable. These virtues serve as a moral compass for individuals seeking a balanced, ethical, and meaningful life. One of the Prophet's key teachings is the importance of truthfulness, as reflected in his saying, "Truthfulness leads to righteousness, and righteousness leads to Paradise" (Sahih al-Bukhari). This principle underlines the role of honesty in fostering trust and social integrity. Similarly, compassion and mercy are pivotal to his message, with the Qur'an describing him as a "mercy to the worlds" (Qur'an 21:107). His teachings advocate kindness towards all, including family, neighbors, and animals, underscoring the significance of empathy in daily interactions. Justice is another cornerstone of his ethical framework, urging fairness in personal conduct and societal structures, while humility and patience are emphasized as essential for personal growth. The Prophet's life exemplified these qualities, with his simple lifestyle and perseverance in the face of adversity. Moreover, his practical guidance on matters like cleanliness, diet, and interpersonal relations promotes moderation and a balanced lifestyle. His teachings on community engagement stress the importance of social cohesion and mutual support. In conclusion, this research highlights how the ethical teachings of Prophet Muhammad (PBUH) remain relevant in addressing contemporary challenges, offering timeless guidance for cultivating a just, compassionate, and morally grounded society.

Keywords: Ethical Teachings, Compassion, Justice, Humility, Practical Guidance

ISLAMIC STUDIES

POSTER PRESENTATION

P.IS-1

Finding peace through patience: The teachings of Holy Prophet ﷺ

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Patience, a virtue highly emphasized in Islamic teachings, is deeply rooted in the life and example of the Holy Prophet Muhammad (PBUH). His teachings illuminate the path to inner peace through the practice of patience, especially during times of adversity. The Prophet's life was filled with challenges, yet he consistently exhibited unwavering patience and perseverance, embodying the Qur'anic principle of "Sabr" (patience). He taught that patience is not merely passive endurance but an active, positive force that strengthens one's faith and builds character. ThTough numerous hadiths, the Prophet highlighted that patience is essential for spiritual growth and attaining tranquility of the heart. One profound example is the Prophet's response to persecution in Mecca, where despite severe opposition, he remained patient, forgiving, and steadfast in his mission. This patience was not out of weakness but a reflection of his deep trust in Allah's plan. The Prophet also emphasized patience in daily life, encouraging believers to maintain calmness in the face of anger, to be patient with others' faults, and to endure life's trials with a hopeful heart. In essence, the teachings of the Holy Prophet offer a timeless guide for finding peace through patience. By cultivating patience, individuals can navigate life's difficulties with grace, transform their inner turmoil into peace, and achieve a harmonious state of being. These teachings are especially relevant in today's fast-paced world, where patience is often overlooked, yet remains a crucial element in the pursuit of true peace.

Keywords: Patience, Inner Peace, Islamic Teachings, Spiritual Growth, Forgiveness.

P.IS-2

Respect and Kindness to all in the Light of Seerah-Ul-Nabiﷺ

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This abstract explores the ethical teachings of Prophet Muhammad ﷺ., focusing on the core values of respect and kindness as essential principles for everyday life. Prophet Muhammad's guidance offers a timeless framework for ethical behavior that transcends cultural and temporal boundaries. His teachings emphasize the importance of treating all individuals with respect, regardless of their background, religion, or social status. Kindness, as advocated by the Prophet, extends beyond mere acts of charity to encompass a deep sense of empathy and compassion towards others, including animals and the environment. In a world increasingly marked by division and conflict, these teachings provide practical solutions for fostering peaceful and harmonious relationships. Prophet Muhammad's emphasis on kindness and respect serves as a reminder that ethical behavior is not just a matter of personal virtue but a societal necessity. By incorporating these principles into daily life, individuals can contribute to a more just and compassionate world. In an increasingly divided and conflict-ridden world, the teachings of respect and kindness offer practical solutions for fostering peaceful and harmonious relationships. The Prophet ﷺ emphasized reconciliation, forgiveness, and the peaceful resolution of conflicts, encouraging individuals and communities to transcend differences and work towards common good. His ethical guidance serves as a reminder that these values are not just personal virtues but societal imperatives that can transform communities and promote global harmony. By integrating these principles into daily life, individuals contribute to creating a more compassionate, just, and equitable world, underscoring the enduring relevance of the Prophet's teachings in today's complex social landscape.

Keywords: Ethical teachings, Respect, Kindness, Compassion.

P.IS-3

The Ethics of Social Justice in Islamic Teachings

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The ethics of social justice rooted in the *Seerah* the life and teachings of the Prophet Muhammad (PBUH) hold profound relevance for contemporary society. The study reveals how these foundational Islamic values can address modern inequality, discrimination, and social injustice challenges by examining key incidents and principles from the Seerah, such as the emphasis on human dignity, the rights of marginalized groups, and the pursuit of equity. The *Seerah* offers a framework for ethical leadership and community building that transcends religious boundaries, providing a universal model for fostering social justice in diverse societies. Integrating these teachings into contemporary discourse on social justice is crucial for inspiring more inclusive and equitable practices in today's world. The *Seerah* illustrates practical applications of justice, compassion, and ethical governance, offering timeless solutions to modern issues such as economic disparity, racial and gender inequality, and systemic discrimination. These principles advocate for a society where all individuals are treated with respect, and where the most vulnerable are given priority in social and legal protections. The study also highlights how the Prophet's (PBUH) emphasis on community building and moral leadership can inform contemporary efforts to create more inclusive and equitable societies-the study engages with contemporary debates on human rights, gender equality, and economic justice within the Islamic framework. It highlights how modern scholars and activists interpret and apply Islamic teachings to address current social challenges, advocating for reforms that align with the ethical principles of Islam while responding to the realities of modern life

Keywords: Seerah, Social justice, Marginalized, Contemporary, Diverse.

P.IS-4

Interfaith Dialogue in The Prophet's Era: A Blueprint for Contemporary Multicultural Societies

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The period of Prophet Muhammad (SAWW) has been a key model for the current age of interfaith dialogue and peaceful coexistence in a modern multicultural society. He (SAWW) put forward a very visionary and pluralistic approach to these things, including justice, mutual respect, and cooperation. A classic example of this is found in the Constitution of Medina (Mithaq-e-Medina). It was, therefore, a primitive document in governance that set down the principles of coexistence between different religious communities in one society. This constitution guaranteed the protection and equal treatment of every citizen, irrespective of their religion. Another instance of the Prophet's diplomatic wisdom is seen in the Treaty of Hudaybiyyah (Sulah Hudaybiyyah). Although he faced difficulties initially, he established peaceful relations with the Quraysh. The treaties with the Christians of Najran and other Arab tribes and the letters to the rulers of other lands show his constant dedication to promoting interfaith dialogue and understanding. These instances can surely serve as good models for contemporary multicultural societies. A cohesive society can be built using principles such as justice, equality, and peaceful coexistence. The methodologies used by the Prophet can be implemented at any time to foster interfaith, dialogue and social harmony. The contemporary world needs a lesson on this approach embraced by Prophet Muhammad (SAWW). This can be achieved by studying and using the principles offered by Prophet Muhammad (SAWW) in modern communities to create an environment where everyone can thrive irrespective of their religion.

Keywords: Constitution of Medina, Quraysh, Treaty of Hudaybiyyah, Contemporary era

P.IS-5

The Seerah and Personal Development, Strategies for Self–Improvement

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The Seerah, the life of the Prophet Muhammad (PBUH), offers profound insights into personal development and self-improvement. By studying his life, one can uncover timeless strategies for cultivating virtues like patience, humility, and resilience. The Prophet's emphasis on continuous learning, self-discipline, and community service provides a holistic framework for personal growth. His example illustrates how faith and character are intertwined, showing that true self-improvement is rooted in spiritual development and a strong moral compass. Incorporating the Seerah into daily life encourages introspection and mindfulness, guiding individuals to align their actions with higher ethical standards. By emulating the Prophet's approach to problem-solving, interpersonal relations, and leadership, one can develop a balanced, purpose-driven life. This transformative journey emphasizes consistency, accountability, and compassion, making the Seerah not just a historical study but a practical guide for modern self-improvement. The life of Prophet Muhammad (PBUH) teaches valuable lessons in personal development, focusing on virtues like patience, humility, and resilience. His example highlights the importance of continuous learning, self-discipline, and community service, showing that true self-improvement is deeply connected to spiritual growth. By applying the Seerah in daily life, one can align their actions with higher ethical values and cultivate a balanced, purposeful life. This journey emphasizes consistency, accountability, and compassion as essential elements of personal growth.

Keywords : Personal Development, Self-Improvement, Spiritual Growth, Ethical Standards, Mindfulness, Accountability, Character, Self-Discipline, Patience.

P.IS-6

Integrating Seerah-Based Ethics in Education for a Balanced and Peaceful Society

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One effective strategy to form a harmonious society is to integrate Seerah-based ethics into the educational system. Seerah is a rich source of moral and ethical guidelines. By inserting these principles into curriculum, educators can support students who excel academically while personifying values like justice, compassion, and tolerance. Education ration of Seerah-based ethics in education is not just for individual development. It is also essential for promoting empathy, understanding, and respect between various populations. These qualities are needed to unite people and promote social harmony in contemporary society where cultural and religious differences exist. Thus, educational institutions can raise a generation of learners who are ready to make valuable contributions to society. They will possess the moral compass required for effectively dealing with the complexity of today's environment. The transformational power of education itself can be seen further using Seerah-based ethics in the educational environment. It portrays educational institutions as vital contributors to the goal of achieving social cohesion and peace. This method gives students the tools they need to actively effect change in their communities by fostering a strong sense of moral responsibility and dedication to the common good. In the end, incorporating Seerah-based ethics into education has the power to change society in addition to transforming individuals. It promotes a cross-cultural and cross-religious culture of harmony, tolerance, and respect for one another.

Keywords: Education, Seerah, Justice, Compassion, Society, Culture, Harmony**.**

P.IS-7

The Role of Generosity and Charity in The Prophet's Life and its Societal Impacts

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The life of Prophet Muhammad ﷺ serves as a timeless example of generosity and charity, principles. These played a central role in shaping the social fabric of early Islamic society. His acts of kindness and giving were not only expressions of personal virtue. They are also key components of his teachings, encouraging a culture where wealth was shared, and the well-being of the less fortunate was prioritized. The Prophet's commitment to charity extended beyond mere financial assistance, it included acts of kindness, support, and the fostering of social ties, which together cultivated a strong sense of community and mutual responsibility. These practices had significant societal impacts. These help to alleviate poverty, reduce inequality, and create a more just and compassionate society. The emphasis on charity as a communal responsibility reinforced the idea that the welfare of the community was a shared concern. It leads to a system where resources were distributed more equitably. The societal structures that emerged from this emphasis on generosity and charity had long-lasting effects. In contemporary times, the principles of generosity and charity exemplified by the Prophet remain relevant, offering valuable lessons for addressing modern social issues. The study of these practices provides insight into how ethical and moral frameworks can be applied to foster social cohesion. This can also address challenges such as poverty, inequality, and social injustice. By understanding and applying the Prophet's teachings on generosity and charity, modern societies can work towards building more compassionate and equitable communities.

Keywords: Generosity, Charity, Islamic Society, Virtue, Social Injustice, Compassionate.

P.IS-8

Human Rights: Need for and Importance of Light of Seerah

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This paper explores the intersection of the Seerah (the life of the Prophet Muhammad, PBUH) with contemporary concepts of human rights, focusing on the principles of dignity, equality, and justice. By examining the Seerah, this study aims to uncover how early Islamic teachings and practices align with and contribute to modern human rights discourse. The Seerah provides a historical context for understanding the application of human rights principles in a pre-modern society. It reflects a vision of human dignity through the Prophet Muhammad's emphasis on compassion, respect, and honor for all individuals, irrespective of their social status. The principle of equality is manifested in various aspects of the Prophet's life, including his advocacy for the rights of women, slaves, and the poor, alongside his efforts to dismantle pre-Islamic social hierarchies. Justice, a central theme in the Seerah, is reflected in the establishment of a fair legal system and equitable social policies. This paper employs historical analysis and comparative methodology to highlight how these foundational principles from the Seerah resonate with and support contemporary human rights frameworks. By doing so, it demonstrates the relevance of Islamic teachings to modern discussions on human rights, emphasizing the timeless nature of the values of dignity, equality, and justice as articulated in the Seerah.The findings contribute to a deeper understanding of how historical Islamic principles can inform and enrich contemporary human rights practices and discussions. This exploration offers valuable insights into the universality and application of these core values in diverse cultural and historical contexts. In an increasingly interconnected world, a profound comprehension of the relationship between Islamic teachings and human rights is vital for fostering tolerance, compassion, and peace.

Keywords: Seerah (The life of Prophet Muhammad PBUH) and Human Rights, Dignity, Equality, Justice.

P.IS-9

The Holy Prophet (ﷺ) Character and Morality: A Model for Personal and Societal Transformation

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The character and morality of the Holy Prophet Muhammad (ﷺ) serve as a timeless model for both personal and societal transformation. His life exemplifies the highest standards of ethical conduct, which can inspire individuals and communities to achieve moral excellence and social justice. On a personal level, the Prophet's character—marked by qualities such as honesty, compassion, humility, and patience provide a blueprint for individual development. By emulating his virtues, individuals can cultivate integrity, empathy, and resilience, leading to a more fulfilled and purposeful life. His example encourages self-discipline and ethical behavior, fostering a sense of responsibility and accountability in personal actions. At the societal level, the Prophet's morality offers a foundation for building just and equitable communities. His leadership was characterized by fairness, inclusivity, and a commitment to the welfare of all members of society, regardless of their background. The principles he upheld such as justice, equality, and the protection of human rights are essential for creating a harmonious and sustainable society. Moreover, the Prophet's emphasis on community solidarity, social welfare, and the common good demonstrates how moral leadership can drive societal progress. By promoting values like compassion and mutual respect, his teachings encourage social cohesion and collective responsibility. In conclusion, the Holy Prophet Muhammad's (ﷺ) character and morality are a powerful source of guidance for personal growth and societal transformation. His example offers a path to achieving moral excellence, social justice, and sustainable development in both individual lives and broader communities.

Keywords: Morality, Compassion, Sustainable society, Harmonious, Collective responsibility.

PHARMACY

KEYNOTE/INVITED LECTURES

K.PH-1.1

Label-Free Detection of Breast Cancer Protein Biomarkers using A Newly Designed Electrochemical Nano-Immunosensing Platforms

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Early detection, effective therapy, and post-treatment monitoring are all critical to preventing the disease from progressing to late stages. As a result, there is a great need for efficient, less-invasive diagnostics, such as the identification of cancer biomarkers in plasma/serum samples. Breast cancer patients often exhibit positive expression of some tumor biomarkers which are commonly used in early tumor diagnosis and rapid detection. From this perspective, electrochemical biosensors are widely used for marker analysis due to their high sensitivity, specificity, ease of use, portability, cost-effectiveness, rapid response, and potential for miniaturization. Herein, novel impedimetric biosensing platforms were designed and constructed. To fabricate the sensing probe, the targeting antibodies were chemically conjugated on the nanocomposite surface using 4-aminothiophenol (4-ATP) as a cross-linking agent. Through assay optimization, screening of nanomaterials, determining the optimal ratio of the nanocomposite, adjusting the time of self-assembled monolayer (SAM) formation, and identifying the degree of cross-reactivity with non-target molecules, the sensor was thoroughly optimized to reach linear dynamic range of 1.0 fg/mL to 100 ng/mL with detection limit of 8.2 fg/mL. The immunosensor's reproducibility and stability were rigorously tested, showing minimal variation in charge transfer resistance (RSD = 1.33%, n = 5) and maintaining 82.5% functionality after four weeks of storage at 4°C. These results indicate the potential of these biosensors for clinical applications in early breast cancer detection and diagnosis.

Keywords: Impedimetric biosensors, Cancer diagnosis, Biomarkers

K.PH-1.2

In Vitro and Non-Invasive *In Vivo* Evaluation of Nanoparticles Grafted Multifunctional Hybrid Gel as A Cosmeceutical Tool for Skin Rejuvenation: A Step Towards Clinical Evidence

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The objective of the study was to fabricate an effective antioxidant formulation that can target multiple skin issues induced by reactive oxygen species. The novel formulation was fabricated by MCM-41/R and ZnO in Carbopol 940 gel. FTIR, XRD, BET, and FESEM confirmed the successful synthesis of MCM-41. Gel was optimized using Box-Behnken design and DPPH radical scavenging activity (%RSA). *Ex vivo* permeation, in vitro tyrosinase activity, and sun protection factor were estimated. Furthermore, pH, rheology, and spreading were analyzed for a period of 90 days. A non-invasive, randomized, split-faced study on 13 human volunteers was conducted to assess the impact of ZRM gel on various skin physiological parameters: melanin index, erythema index, moisture content, elasticity index, sebum index, and wrinkle index. In vitro characterization of nanoparticles proved the successful synthesis of MCM-41/R. *Ex vivo* experiments performed by means of vertical Franz diffusion cells and mouse skin membranes enlightened that, after twenty-four hours, 10.31± 2.95% of the drug was permeated from ZRM gel (flux = 0.086 mg/cm2/h and permeation coefficient = 0.009 cm/h). Quantification of anti-tyrosine activity and sun protection factor (SPF) suggested that ZRM showed 73.75±0.069% of tyrosinase inhibition activity and SPF values of 11.956%. The pH and spreading of ZRM gel were 6.8–7.01 and 3–3.8 cm, respectively. The flow index of ZRM gel was less than 1 at different storage temperatures. This showed that the gel behaved in a way that is not Newtonian. The patch test showed that neither the ZRM nor the placebo caused any type of irritation or allergy. Over a 90-day period, the gel showed significant effects on skin erythema index (-11.33%), skin melanin index (-23.07%), skin moisture content (53.71-18.31%), skin elasticity (10.83-10.64), and skin sebum level (-25.61%). ZRM gel had a significant effect on reducing the skin wrinkle index while increasing skin elasticity. Statistical analysis revealed significant differences in the skin physiological parameters between the active formulation and the placebo throughout the study duration.

Keywords: Nanoparticles, Cosmeceutical, Skin rejuvenation, Antioxidant formulation

K.PH-1.3

Advances in Formulation Design and Drug Delivery

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During recent years, advances in particle engineering e.g., electrohydrodynamic atomisation (EHDA) and centrifugal spinning have been considered instrumental to achieve improved aqueous solubility/bioavailability and rapid on-site drug delivery. EHDA produces particulates/fibres under the influence of an external electric field (10–25 kV). In centrifugal spinning, polymeric fibres are produced under the influence of centrifugal force produced by rotating a spinneret (containing polymeric solution/melt) at 20,000 rpm. This technique produces fibres at relatively low cost and a higher production rate as compared to EHDA. EHDA or centrifugal spinning processed particulates exhibit uniform size distribution and high surface area-to-volume ratio resulting in higher drug dissolution rates and permeability. Transdermal delivery of these submicron drug carriers has been augmented by microneedles (MN) or iontophoresis or MN coupled iontophoresis approach. These advances omit needle injury hazards. A MN patch, comprising of an array of micron sized needles, provides delivery of drugs/vaccines to deep skin layers for local or systemic effects in a minimally invasive manner. Iontophoresis involves application of an electric impulse of $\leq$0.5 mA /cm^2 to administer ionized and non-ionized drugs across skin layers by electromigration and electroosmosis, respectively. Application of electric current also generates reversible structural disruptions in the stratum corneum resulting in an enhanced skin permeability and increased drug flux. A combination of MN and iontophoresis augments the skin permeation of biopharmaceuticals in a minimally invasive manner.

Keywords: Particle engineering, Drug delivery, Microneedles, Bioavailability.

PHARMACY

ORAL PRESENTATION

O.PH-1.1

Impact of Micellar Solution for Solubilization of Antioxidant

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Background & Objective: The solubility of antioxidants can change the size, shape, density, viscosity of Poloxamers micelles by changing the Critical Micellar Concentration (CMC). Although, these micelles are thought to be the innovative and unique system for delivery of drugs for topical as well as for systemic drug administration. Even, these are supportive for the targeted drug delivery to cancerous cells. The structure of poloxamer micelles provides high capacity for drug loading and less susceptibility to phagocytic clearance.
Aims and objectives: The objective of this study will be preparation and characterization of polymeric/surfactant micelles encapsulating antioxidant agent and to determine the antioxidant activity of the formulations.
Methodology: The physical characteristics and the stability studies of the developed micellar formulations were the major criteria to determine the suitable formula for the application of skin. Poloxamers convert themselves into thermodynamically stable micelles in an aqueous media with the size range of about 5-100 nm. Some antioxidants face the problem of preparing uniformly dispersed formulations due to their hydrophobicity. Solubilization of these antioxidants into micelles may be a potential way to solve this problem. In this study, initially the extract of *Carica papaya* and *Cucumis sativus* was prepared and then formulation was developed by incorporating the extract. Then characterization was done through evaluating for them through pH, conductivity, morphology, rheological behavior, microscopy, stability, and antioxidant activity (DPPH method). HPLC analysis of poloxamers micelles was also carried out.
Results: The micelles not only provide controlled release but also improved solubility, considered to be best cleanser to provide easy way to wash / scrub the skin without water.
Conclusion: The combination of fruit extracts in micellar formulations showed good effects in stability during storage of study duration. The micellar formulations showed good effects in stability during storage of study duration.

Keywords: Poloxamer, DPPH method, CMC, HPLC, Micelles, Cleanser

O.PH-1.2

Encapsulation of Alpha Arbutin, A Depigmenting Agent, in Nanosized Ethosomes: *In Vitro* and *In Vivo* Human Studies

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Alpha arbutin is a skin-whitening agent in cosmetics. Structurally, it is 4-hydroxyphenyl-α-glucopyranoside. Ethosomes encourage the formation of lamellar-shaped vesicles with improved solubility and entrapment of whitening agents. The objective of this study was to fabricate an optimized nanostructured ethosomal gel loaded with alpha arbutin for the treatment of skin pigmentation. Different ethosomal suspensions of alpha arbutin were prepared by the cold method. Invitro evaluation included zeta potential, droplet size analysis, polydispersity index, entrapment efficiency (EE), scanning electron microscopy (SEM) and Fourier transform infrared (FTIR) spectroscopy. Stability studies of the optimized ethosomal and control gels were performed for three months under different temperature conditions. The optimized ethosomal gel loaded with alpha arbutin was further analyzed on human volunteers for skin benefits by measuring melanin level, moisture content and elasticity. It was concluded that the optimized formulation had a size, zeta potential, polydispersity index and entrapment efficiency of 196.87 nm, −45.140 mV, 0.217 and 93.458343%, respectively. Scanning electron microscopy (SEM) depicted spherical ethosomal vesicles. Stability data was obtained in terms of pH and conductivity. Rheological analysis revealed non-Newtonian flow. The cumulative drug permeated for ethosomal gel was 78.4%. Moreover, encapsulation of alpha arbutin causes significant improvement in skin melanin, moisture content and elasticity. The overall findings suggested that the arbutin-loaded ethosomal formulation was stable and could be a better approach than conventional formulation for cosmeceutical purposes such as for depigmentation and moisturizing effects.

Keywords: Alpha arbutin, Ethosomes, Melanin, Entrapment efficiency, Depigmenting agent.

O.PH-1.3

Mesoporous Bioactive Glass Nanoparticles for Bone-Tissue Regeneration and Drug Delivery to the U2OS Cancer Cell Line

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In this study copper mesoporous bioactive glass nanoparticles (Cu-MBG NPs) by employing cetyltrimethylammonium bromide (CTAB) as a soft internal template. These multifunctional NPs have the potential for antibacterial, osteogenic, and drug delivery applications. Hydroxycarbonate apatite formation was evaluated by immersing the as-synthesized sample in SBF and confirming it by FTIR and XRD analysis. Osteogenic ability was further confirmed by biomarkers such as alkaline phosphatase (ALP) activity and osteocalcin (OC) assay. Size, shape, morphology, and elemental analysis were determined by scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy-dispersive X-ray (EDX). Surface area and pore size were determined using the BET and BJH methods. Size, surface area, and pore size were determined to be 60 ± 5 nm, 313 m^2/g, and 10.74 nm. Cyclophosphamide (Cpa); an anti-cancer drug was loaded by taking different initial loading concentrations (2-10 mg/mL). For all these loading concentrations cumulative Cpa released in SBF was found to be in the range of 65-89% over two weeks. MTT assay indicated no significant cytotoxicity in normal human fibroblast (NHFB) cells. Cpa-loaded Cu-MBG NPs inhibited the viability of the U2OS cancer cell at all concentrations. Thus, a safe biomaterial was developed that is biocompatible, non-cytotoxic, anti-bacterial, and has the potential for drug delivery, bone repair, and regeneration.

Keywords: Bioactive Glass, Bone Regeneration, Sustained Release, Cyclophosphamide.

PHARMACY

POSTER PRESENTATION

P.PH-1

Nanoparticle-Based Targeted Drug Delivery for Cancer Treatment

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This review paper addresses the latest techniques for treating cancer as well as the numerous recent studies conducted on nanoparticles as delivery vehicles for anticancer medication. Numerous chemical and structural formulations of nanoparticles have been investigated for their ability to selectively bind to certain targets and to function as drug delivery vehicles. The size and surface properties of nanoparticles are important factors that influence the biodistribution of chemotherapy medications in the body as well as the efficiency of nano carriers. For targeting cancerous cells and transport anticarcinogenic drugs in a controlled way, numerous scientific studies have been conducted to investigate the usage of magnetic nanoparticles in the cure of oncogenic breast cancer cells and brain tumor cells. Other drug delivery systems that have been tested include liposomes, polymeric micelles, and colloid gold nanoparticles. The application of ceramic nanoparticles in photodynamic therapy for the cure of cancer is also covered in this article. Thus, the article provides a brief overview of the topic with suitable references to review articles and original research articles that describe previous and ongoing research findings related to different types of nanoparticles as drug delivery vehicles in cancer therapy.

Keywords: Cancer Treatment, Nanoparticle, Targeted drug discovery, Liposomes

P.PH-2

Preparation and *In Vitro* Evaluation of Drug Loaded Hydrogel Films for Inflammation

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Background: More than 300,000 people die annually due to different types of skin injuries, autoimmune diseases, wounds, cuts or burns according to the World Health Organization (WHO). The wound healing process is a complicated process with the main phase of inflammation. For treatment of wounds and inflammation several dressings are available such as bandages, cotton wool, gauzes but these dressings are dry in nature which does not maintains moisture at wound site and does not deal with inflammation thus lead to dehydration and worsening condition which promotes microbial growth & other side effects, so patient remains in pain due to inflammation.
Objectives: To develop the transdermal hydrogel films of anti-inflammatory drug to achieve controlled release to minimize adverse effects associated with oral administration.
Method: Hydrogel films encapsulated with different concentrations of polymer and drug were synthesized by solvent casting method by using crosslinking agent. A plasticizing agent to enhance the mechanical strength of hydrogel films is added. Physicochemical properties and anti-inflammatory study were carried out to assess formulated hydrogel films.
Results: Prepared hydrogel films were transparent, had high mechanical strength and displayed high swelling ratio. Cross-linked films showed a burst release of drug followed by prolonged release (95.5%) up to 24 hours through non- fickian mechanism. Results of FTIR and SEM showed high chemical and thermal stability of fabricated hydrogel films respectively. Animal study showed promising results to reduce inflammation upto 24 hrs.
Conclusion: Fabricated hydrogel films loaded with anti-inflammatory drug are promising candidates as effective inflamed wound dressings due to their great anti-inflammatory abilities.

Key words: Hydrogel films, Wound healing, Inflammation, NSAIDs, Calcium Chloride, Anti Inflammatory drugs.

P.PH-3

Exploring the Protective Potential of *Emblica officinalis* Juice Against Iron Deficiency Anemia

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Purpose: Anemia is a medical condition characterized by insufficient carrying capacity of oxygen associated with increased or decreased red blood cells. Anemia affects 24.8% of the global population, affecting approximately 1.62 billion people at a global level. Pakistani children are severely anemic, and more than half (53.7%) are anemic. *Emblica officinalis* contains numerous substances like gallic acid, luteolin, corilagin, quercetin, apigenin, chebulagic acid, isostrictiniin, ellagic acid, methyl gallate, and corilagin. Pedunculagin, emblicanin B, Phyllaemblicin B, punigluconin, and emblicanin A. Fruit pulp contains six hundred to seven hundred fifty milligrams of ascorbic acid. The present study aimed to investigate the protective potential of *Emblica officinalis* juice against iron deficiency anemia. **Methodology:** Fresh Amla fruits (*Emblica officinalis*) utterly ripe were sorted for constant size. The fruits underwent a thorough sanitization process using a solution containing 100 mg/L of sodium hypochlorite for 10 minutes. Afterward, they were dried by utilizing blowing air. To extract the juice, the fruits were pulped with the assistance of a household juicer and then filtered through a double-layered muslin cloth. A total of 60 male Sprague Dawley rats were utilized in six groups. T_1 contains basal diet plus 10 mg Asunra drug, T_2 contains basal diet plus 150 ml/kg/bodyweight Emblica officinalis juice, T_3 contains basal diet plus 200 ml/kg/bodyweight Emblica officinalis juice, T_4 contains basal diet plus 250 ml/kg/bodyweight Emblica officinalis juice, T_5 contains basal diet plus 510 mg/kg/bodyweight drug Ferumoxytol. **Results:** T_4 & T_5 treatments proved to be the best treatments in comparison to T_0, T_1, T_2, T_3. Likewise, administration of *Emblica officinalis* juice & drug ferumoxytol showed a significant increase ($P<0.05$) in biochemical parameters like hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin concentration, and ferritin level. **Conclusion:** Hence it proved that the drug ferumoxytol & *Emblica officinalis* juice are helpful in treating iron deficiency anemia.

Keywords: *Emblica officinalis*, Vitamin C, Ferumoxytol, Iron absorption, Iron deficiency anemia.

P.PH-4

Tevaluation of Anti-Arthritic Activity of Methanolic Extract of *Praecitrullus Fistulosus* in Albino Wistar Rats

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Rheumatoid arthritis (RA) is a systemic, inflammatory, progressive, and chronic autoimmune disease. The primary organs affected by RA are the synovial joints and the surrounding tissues. Most of the time, it is treated primarily with a variety of immunosuppressive, corticosteroid, NSAID, and DMARDs, all of which have numerous adverse reactions. It has been demonstrated that using natural plants to treat RA is less expensive and safer. The current study was designed to assess the effects of methanolic extract from *Praecitrullus fistulosus* fruit in rheumatoid arthritis rats. Phytochemical constituents such as polyphenols, tannins, flavonoids, glycosides and alkaloids were also identified in the methanolic extract of *Praecitrullus fistulosus*. Healthy young albino wistar rats (male) were used for this study weighing 120-150g and were randomly assigned into six groups. Single dose (0.2ml) of Freund Complete adjuvant was used subcutaneously for the induction of RA into the rats. The 1st group was normal control, 2nd was RA adjuvant induced control group, 3rd was treated group with indomethacin, 4th, 5th and 6th were treated groups which are treated with methanolic *Praecitrullus fistulosus* extract at different doses. Testing of various parameters were done at 1st, 3rd and 6th week of the experiment to assess therapeutic outcomes of methanolic extract of *Praecitrullus fistulosus* fruit in examination. Data was analyzed statistically by using ANOVA and DMR. Results showed that methanolic *Praecitrullus fistulosus* fruit extract has effective ($P<0.05$) anti-rheumatoid arthritis properties due to the existence of polyphenols, tannins, flavonoids, glycosides and alkaloids and free radical scavenging activity. Histopathological studies of joints showed no inflammation, pannus formation and cartilage damage under microscope which means that methanolic extract of *Praecitrullus fistulosus* has beneficial effects on rheumatoid arthritis. Thus *P. fistulosus* fruit extract possessed anti- rheumatoid arthritis and anti-inflammatory activities by reducing pain, inflammation, bone erosion and joint deformity.

Keywords: Rheumatoid arthritis, *Praecitrullus fistulosus*, anti-arthritis, anti-inflammatory, antioxidant, adjuvant induced arthritis.

P.PH-5

Evaluation of Anti-Arthritic Activity of *Actinidia Deliciosa* in Albino Wistar Rats

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An autoimmune condition, Rheumatoid Arthritis (RA) causes inflammation and impairment in the joints it affects. Many of the current RA treatments have serious adverse effects and primarily target the use of immune modulators to decrease synovial inflammation. Herbal remedies are seen to be significant substitutes for conventional methods of treating RA. The current research was the investigation of anti-arthritic effect of *Actinidia deliciosa (A. deliciosa)* in Complete Freund's Adjuvant (CFA) induced rat model of rheumatoid arthritis. The Soxhlet method was utilized to prepare a methanolic extract of *Actinidia deliciosa* fruit. The *Actinidia deliciosa* methanolic extract was also found to include phytochemical components such alkaloids, polyphenols, tannins, flavonoids, and glycosides. Male, healthy, young albino wistar rats weighing between 120 and 150 grams were utilized in this investigation. They were divided into six groups at random. Rats were given a single subcutaneous dose of adjuvant to induce rheumatoid arthritis. The 1^{st} group was a normal control; the 2^{nd} was a control group with rheumatoid arthritis produced by adjuvant; the 3rd group had indomethacin treatment; and the 4^{th}, 5^{th} & 6^{th} groups received varying doses of *Actinidia deliciosa* methanolic extract treatment. Evaluation of the therapeutic effects of *Actinidia deliciosa* fruit methanolic extract was conducted at the 1^{st}, 3^{rd}, and 6^{th} week of the study using a variety of parameters. Duncan's Multiple Range Test (DMR) and ANOVA (one way) were the statistical methods used to analyze the data. Results indicated that the presence of polyphenols, tannins, flavonoids, glycosides, alkaloids, and free radical scavenging activity in the methanolic extract of *Actinidia deliciosa* fruit produced significant ($P<0.05$) anti-rheumatoid arthritis effects. Based on histological testing of joints that showed no inflammation, pannus formation, or cartilage breakdown under a microscope, the methanolic extract of *A. deliciosa* has been proven to have favorable advantages on rheumatoid arthritis.

Keywords: Rheumatoid arthritis, *Actinidia deliciosa*, Anti-Inflammatory, Antioxidants, Adjuvant induced arthritis.

P.PH-6

The Key Events in Wound Healing: Sequential Steps Involved in Repairing of Wounds

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Wound repair is a highly complicated and complex biological event that allows the restoration of tissue continuity after an injury. The process has four well-coordinated stages: remodeling, proliferation, inflammation, and hemostasis. The first coagulation stage is termed 'hemostasis,' a rapid process of forming a platelet plug and vasoconstriction, bringing about a transient clot to support the subsequent stages. The following phase is inflammation, characterized by the movement of immune cells toward the site of the wound, for instance, macrophages and neutrophils. These cells also assist in cleaning the wound by flushing out debris and microorganisms and simultaneously releasing growth factors and cytokines that promote healing. It involves blood vessel formation, fibroblast proliferation, and epithelialization, which results in new tissue formation during the proliferation phase. To transport nutrients and oxygen to the hitherto ischemic tissue, endothelial cells form new blood vessels; fibroblasts produce the factors that enable epithelial cells to migrate, cover the wound surface, and create a protective barrier. This is important if tissue structure and function are to be re-established, hence this stage. Therefore, the newly created tissue matures in the remodeling phase and gains additional strength. The rearranged and cross-linked collagen strands improve the repaired tissue's tensile strength. The normal skin features are gradually replaced in the wound, and regenerated skin lacks the elasticity of the normal skin, although it is more prone to damage. Understanding the actual processes of wound healing develops new therapeutic approaches aimed at maximizing each act of healing. This includes cellular therapies, meant to treat the backbone of other injuries; growth hormone therapies, meant to improve the prognosis of chronic injuries; and improved dressings meant for treating acute injuries. The detailed cellular communication that is evidence in the wound healing process is still under investigation to develop specific strategies that would help in faster recovery and reduction in the effects of the disease.

Keywords: Wound healing, Hemostasis, Inflammation, Fibroblasts.

MATHEMATICS & ENGINEERING

KEYNOTE/INVITED LECTURES

K-ME-1.1

Concentrated Solar Power (CSP)

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Concentrated Solar Power (CSP) is an innovative and sustainable technology that harnesses the sun's energy to generate electricity. Unlike photovoltaic systems, which directly convert sunlight into electricity, CSP uses mirrors or lenses to concentrate sunlight onto a small area, typically a receiver, where it is converted into heat. This thermal energy is then used to produce steam that drives a turbine connected to a generator, producing electricity. CSP offers significant advantages in large-scale power generation, particularly its ability to incorporate thermal energy storage, allowing for electricity production even during cloudy periods or at night. Various configurations, such as parabolic troughs, solar towers, and linear Fresnel reflectors, have been developed to optimize energy capture and efficiency. The integration of CSP with hybrid systems, such as natural gas or biomass, enhances its reliability and scalability. As the world transitions to renewable energy sources, CSP stands out for its potential to provide a consistent, grid-stable power supply with low carbon emissions. However, its deployment is often limited by high initial costs, the need for direct sunlight, and land requirements. Ongoing research aims to reduce costs, improve efficiency, and expand its applicability, making CSP a vital component of the future sustainable energy landscape.

Keywords: Concentrated Solar Power (CSP), Thermal energy storage, Electricity generation, Renewable energy

K.ME-1.2

Application of AI Based Techniques in Fluid Mechanics

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The main idea of this investigation is to introduce an integrated intelligence approach that investigates the chemically reacting flow of non-Newtonian fluid with a backpropagation neural network (LMS-BPNN). The AI-based LMS-BPNN approach is utilized to obtain the optimal solution of an MHD flow of Eyring–Powell over a porous shrinking wedge with a heat source and nonlinear thermal radiation (*Rd*). The partial differential equations (PDEs) that define flow problems are transformed into a system of ordinary differential equations (ODEs) through efficient similarity variables. The reference solution is obtained with the bvp4c function by changing parameters as displayed in Scenarios 1–7. The label data are divided into three portions, i.e., 80% for training, 10% for testing, and 10% for validation. The label data are used to obtain the approximate solution using the activation function in LMS-BPNN within the MATLAB built-in command 'nftool'. The consistency and uniformity of LMS-BPNN are supported by fitness curves based on the MSE, correlation index (R), regression analysis, and function fit. The best validation performance of LMS-BPNN is obtained at 462, 369, 642, 542, 215, 209, and 286 epochs with MSE values of 8.67 × 10−10, 1.64 × 10−9, 1.03 × 10−9, 302 9.35 × 10−10, 8.56 × 10−10, 1.08 × 10−9, and 6.97 × 10−10, respectively.

Keywords: LMS-BPNN, Artificial Intelligence, Eyring-Powell, Activation function, MATLAB

MATHEMATICS & ENGINEERING

ORAL PRESENTATION

O.ME-1.1

Wireless, Voice Controlled, Automated 2 Wheel Drive Forklift for Industrial Warehouses

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One of the most exciting advances in the fast-expanding field of forklift automation is the incorporation of automation technologies into 2-wheel drive forklifts. Forklift automation technology has greatly enhanced material handling and warehouse operations, boosting output, security, and effectiveness. By lowering labor expenses, lowering the chance of accidents, and making the best use of available space, this technology has the potential to completely transform the industrial sector. By utilizing cutting-edge technologies like artificial intelligence, IOT, automation and robotics, 2-wheel drive forklifts can be automated so that they can run automatically. With the help of these technologies, forklifts can move and stack pallets, load, and unload freight, and move objects from one location to another. Forklifts that have automation technology integrated into them perform better overall, pay less for labor, and are safer. To create a user-friendly interface for operating the forklift, this work focuses on merging cutting-edge wireless communication technologies, mobile computing, and voice recognition algorithms. As the principal control interface, a specially developed mobile application enables users to operate the forklift by sending commands through their smart phones. To facilitate hands-free operation, voice recognition capabilities are also included. The initiative paves the path for upcoming advancements in the realm of voice- and mobile-controlled industrial automation systems.

Keywords: Forklift, Automation, Wireless Control, Voice Recognition, Innovation.

O.ME-1.2

Relaxation Analysis of Thermal Jump Conditions on MHD Flow of Gyrotactic Microorganisms through Porous Stretching Sheet Heated by Thermal Radiations

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This study presents a comprehensive analysis of the dynamic interaction between nanofluid movement and the transport of gyrotactic microbes within an absorbent medium. Nanofluids engineered colloidal suspensions with enhanced thermal conductivity, are examined in combination with the unique behavior of gyrotactic microorganisms, which show directed swimming in response to environmental cues. The porous medium introduces an additional layer of complication to the system, influencing both fluid flow and microorganism transport. The governing calculations for the joined nanofluid movement and microorganism transport in a porous medium are derived and solved numerically to investigate the involved interactions occurring at the micro-scale. Key parameters such as nanoparticle concentration, gyrotactic microorganism density, and porous medium permeability are methodically varied to separate their impact on the overall system behavior. The study reveals interesting phenomena, including the influence of nanofluid properties on the thermal characteristics of the porous medium and the modulation of gyrotactic microorganism distribution. Additionally, the interaction between nanofluid flow and microorganism transport displays developing behaviors that provide valuable insights into the collective dynamics of the system. Furthermore, the implications of these findings are discussed in the background of potential applications such as enhanced temperature transference in permeable media and the controlled transport of microorganisms for biomedical or environmental purposes. The method of SOR is used to address the coupled arrangement with nonlinear equations**.** The approximated explanation is then discovered by modifying an algorithm in the MATLAB program. The motile bacteria with bioconvection Peclet number raise the microorganism concentration. While the thermal radiation phenomena raise the temperature, according to numerical results.

Keywords: Gyrotactic microorganisms, Nanofluids, Slip condition, Darcy-Forchheimer flow

O.ME-1.3

A Literature Gap in Fuzzy Soft Graph

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The concepts of fuzzy soft graphs are more useful than fuzzy graphs and have wide applications in various research areas. Fuzzy soft graphs comprise two soft computing models: fuzzy sets and soft sets, which are more precise and compatible. Fuzzy soft graphs provide a parameterized point of view to deal with uncertainties and vagueness in graphs. According to this parameterized point of view, fuzzy soft graphs are applicable in decision-making problems and have many applications in neural networks and database theory. The literature review indicates that the membership value of each edge is always less than or equal to the minimum membership value of the corresponding vertices in the existing definition of fuzzy graphs. This restriction creates confusion when dealing with some practical problems in which edge membership value does not depend on the membership values of vertices. Therefore, there is a literature gap in fuzzy graphs. General fuzzy graphs fill the gap in existing research on fuzzy graph theory. The literature review also indicates that the work on weak fuzzy graphs has not been given importance. In this work, we discuss general fuzzy soft graphs and general weak fuzzy soft graphs with examples and investigate some properties of general weak fuzzy soft graphs.

Keywords: Fuzzy graph, Fuzzy soft graph, Numerical example.

O.ME-1.4

Significance of Magneto-Hydrodynamic Nanofluid Flow Over a Porous Surface with Thermal Radiation

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The current paper aims to explore the heat transfer performance of three-dimensional electrically conducting rotating hybrid nanofluid flow over a porous stretchable surface. The implication of thermal radiation is also taken into account. Here hybrid nanofluid contains nanometer-sized particles of two different materials base fluid. Similarity variables are employed to transform the fundamental equations of momentum, energy, concentration, and motile microorganisms into ordinary differential equations (ODEs). The resulting subsequent equations are solved by utilizing a three-stage Lobatto numerical scheme with MATLAB software. The influence of the most important physical parameters on velocity, temperature, concentration, and motile profiles is demonstrated through tables and graphs. Outcomes indicate that enhancing the magnetic parameter, rotational parameter, inertia coefficient parameter, porosity parameter, and mass flux/suction parameter decreases the basic nanofluid and hybrid nanofluid velocity along the x-axis, whereas the reverse tendency is observed along the y-axis. Moreover, temperature profile enhancing via rotational parameter also observed that values for the hybrid nanofluid case are more prominent as compared to nanofluid whereas the decreasing trend is noted for the concentration profile against Brownian motion. Our numerical results validate a good agreement as compared with the published data.

Keywords: MHD, Thermal Radiation, Hybrid Nanofluid

O.ME-1.5

Isolation Enhancement of Tightly Coupled Dual-band MIMO DRA Antennas Using Dual-band Metasurface for 5G Applications

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In this research work, a dual-band metasurface has been proposed to increase the isolation between two closely packed dual-band dielectric resonator antennas (DRAs). The metasurface has been placed only 0.08λ0 away from the antennas with the center frequency at a lower frequency band. The proposed dual band metasurface unit cell consists of two copper traces of different lengths printed on both sides of a printed circuit board (PCB). High isolation of more than 20 dB has been achieved for 3.4 and 4.9 GHz 5G bands. The proposed isolation technique can be useful for the applications where PCB of the antenna system is not allowed to be modified.

Keywords: Bipolar Fuzzy, Decision-making, Diagraph

MATHEMATICS & ENGINEERING

POSTER PRESENTATION

P.ME-1

Modeling and Control of a DC Microgrid Using a Nonlinear Lyapunov Controller for Integration of Renewable Energy Sources

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This paper presents dynamics analysis that accounts for intermittency issues and advances direct current (DC) Microgrid (MG) control. The integration of renewable energy sources within MG systems is significantly impacting the shift away from traditional methods of energy generation, heralding a new era in power production. This research focuses on employing a combination of solar photovoltaic and wind energy as hybrid renewable energy sources within a DC MG system, complemented by an energy storage system for storage and backup purposes. A novel approach in this study is the application of a nonlinear Lyapunov controller for the DC MG, which demonstrates exceptional performance in achieving stable output variable convergence. This controller facilitates global system modeling and maintains DC bus voltage stability amidst varying weather conditions and load demands. The performance of the Lyapunov controller is evaluated against that of a sliding mode controller (SMC) and a proportional integral derivative controller, showcasing its superior capabilities in system simulation and analysis conducted via MATLAB/Simulink. The Lyapunov controller's main benefit lies in its ability to adjust the overall dynamic behavior of the system and ensure reliable voltage output management. The study also addresses the issue of chattering observed in existing controllers by introducing a robust nonlinear controller designed to overcome such challenges, thereby enhancing the system's resistance to disturbances and noise.

Keywords: DC Microgrid, Nonlinear Lyapunov Controller, Sliding Mode Controller

P.ME-2

Deep Learning Based Method for Blood Sample Analysis using Microscopic Images

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This paper signifies a new programmed monitoring and detection method for microcytic hypochromic anemia using computer vision and deep learning. If Microcytic hypochromic anemia is not quickly identified and treated, major health difficulties could occur. Ensuring early detection and treatment of microcytic hypochromic anemia is vital for public health. Traditional detection approaches depend on manual exclusion. However, the data collection process for detection of microcytic hypochromic anemia can be labor-intensive and potentially risky for healthcare providers. It principally depends on the expertise of medical professionals, and various professionals may have differing conceptions of what constitutes the diagnostic criteria for microcytic hypochromic anemia. Therefore, this approach lacks some impartiality in numerical examination, and as the workload rises, the efficiency of manual detection would gradually decline. Deep learning networks have significantly improved the field of computer vision in recent years due to their robust feature extraction and machine learning capabilities. Hence, we propose deep learning to suggestively advance the accuracy and efficiency of the detection system for microcytic hypochromic anemia. The purpose of this work is to use a deep learning technique based on You Only Look Once (YOLOv5) to identify evidence linked to microcytic hypochromic anemia in medical images. This research thoroughly observes the YOLOv5 algorithm for object detection, with a focus on assessing the influence of detection heads on the accuracy of the YOLOv5 model. Additionally, our model effectively classifies microcytic hypochromic anemia across four different classes of cells abnormalities which are Lymphocytes, Microcytes, Monocytes and Macrocytes. We trained and tested YOLOv5 using a self-collected dataset of images. The outcomes establish that the proposed method is efficient, achieving 78.5% precision (P), 76.3% recall (R), and 79.2% mean average precision (mAP@.5). These results highlight the advantages of using deep learning for the automatic monitoring and detection of microcytic hypochromic anemia. This work covers the way for future research in the field of health monitoring.

Keywords: YOLOv5, Computer Vision, Deep Learning, Health Monitoring

P.ME-3

A Novel Approach of Linear Diophantine Fuzzy Aczel-Alsina Geometric Aggregation Operators with MADM and Their Applications

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This research aims to present a new method for making judgments on technology investments by using Linear Diophantine Fuzzy Aczel-Alsina Geometric Aggregation Operators in Multi-Attribute Decision Making (MADM) scenarios. Fuzzy set theory and geometric aggregation operators can be combined to analyze complicated decision-making situations in detail. This is especially useful when investing in technology when many factors need to be considered at the same time. Our study primarily focuses on creating and utilizing geometric aggregation operators in the MADM framework to manage the uncertainty and imprecision that are present in decision-making processes. We present a methodical approach to creating these operators, utilizing the idea of Linear Diophantine fuzzy Aczel-Alsina aggregation operators. This methodology allows us to depict real-world choice scenarios more accurately by modeling the decision criteria and their inter-dependencies in a fuzzy environment. We give a case study involving technology investment decisions to demonstrate the usefulness of our suggested methodology in real-world scenarios. We show how our geometric aggregation operators enable the integration of many criteria like cost, technological feasibility, market potential, and risk evaluation by utilizing Artificial Intelligence (AI) techniques for MADM. Decision-makers can obtain important insights into the best investment strategies that fit organizational goals and limits by thoroughly analyzing these criteria.

Keywords: Linear Diophantine Fuzzy Set, Aczel-Alsina Operational Laws, Multi-attribute, Decision Making.

P.ME-4

Generalizations of Certain Ostrowski Type Integral Inequalities for Convex Function *via* AB-Fractional Integral Operator

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We explore and establish a new lemma applicable to twice differentiable functions involving the fractional integral operator AB. By leveraging this novel lemma, we extend existing results and establish refined versions of Ostrowski-type inequalities for twice-differentiable convex mappings, broadening the scope of previous mathematical findings. The introduced inequalities provide sharper bounds and contribute to the theoretical understanding of fractional calculus in relation to convexity and inequalities. Moreover, the paper delves into special cases of the derived inequalities, offering deeper insights into specific instances where the general results hold. In addition to these theoretical advancements, practical applications are explored, particularly in the realm of mathematical inequalities. The study offers useful estimates involving special means of real numbers, such as arithmetic, geometric, and harmonic means, and applies these findings to Bessel functions, which play a significant role in various fields of applied mathematics and physics. The combination of fractional calculus and convex analysis, along with the applications to special functions, contributes to the broader development of mathematical inequalities, showcasing new possibilities for future research. The results of this study pave the way for further exploration into the applications of fractional operators in different mathematical settings, providing a valuable tool for researchers working with inequalities, special means, and function approximations in applied and theoretical contexts.

Keywords: Linear Diophantine Fuzzy Set, Aczel-Alsina Operational Laws, Multi-attribute, Decision Making.

P.ME-5

Development of Lightweight Permeable Concrete Pavers

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Urban areas have increasingly faced challenges with stormwater management, including flooding and excessive runoff. This study investigated the development of lightweight permeable concrete pavers by partially replacing coarse aggregate with pumice stone in varying proportions (5%, 7.5%, 10%, 12.5%, and 15%). The main objective was to determine the optimal balance between improving permeability and maintaining structural integrity. The methodology involved preparing concrete mixes with the specified pumice stone replacement levels, casting and curing the pavers, and conducting tests to assess density, permeability, porosity, and compressive strength. The results indicated that as the pumice stone content increased, the density and compressive strength of the concrete decreased. However, permeability and porosity improved significantly with higher pumice replacement. The results demonstrated that while pumice stone effectively enhanced the permeability and reduced the weight of the concrete pavers, it resulted in a trade-off with compressive strength. The optimal level of pumice replacement was found to balance mechanical strength with improved functional properties like permeability. This balance was essential to ensure the pavers could withstand structural demands while also managing stormwater efficiently. This study provided important insights into the development of sustainable infrastructure by demonstrating the viability of pumice stone as a material for producing lightweight, permeable concrete pavers. These pavers could contribute to better stormwater management in urban environments, helping to reduce runoff and mitigate flooding risks while promoting sustainability.

Keywords: Permeable Concrete, Urban Flooding, Sustainability, Permeable Concrete, Waste Materials

P.ME-6

Effect of Tertiary Cementitious Materials on the Mechanical Properties of Concrete

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This study investigated the influence of Tertiary Cementitious Materials (TCMs) such as fly ash, Corn Cob Ash (CCA), and Bagasse Ash (BA) on the mechanical properties of concrete. With growing concerns over the environmental and economic impacts of traditional Portland cement, there is an urgent need to explore sustainable alternatives that can maintain structural integrity while offering cost benefits. The primary objective of this research was to evaluate the fresh and hardened properties of concrete when partially substituting cement with TCMs and to identify the optimal mix design that balances strength, durability, and cost-effectiveness. The methodology involved replacing 50% of cement with fly ash, followed by incrementally substituting fly ash with 10%, 20%, 30%, 40%, and 50% of CCA and BA. This was initially tested by casting 2x2x2-inch mortar cubes to identify the optimal mix design. Based on the preliminary results, the most promising mixes were selected for further evaluation by casting 6x12-inch concrete cylinders, which were subjected to comprehensive mechanical property assessments, including compressive strength tests. The results indicated that while a reduction in cement content generally led to a decrease in concrete strength, significant cost savings were achievable. The optimal mix, consisting of 50% cement, 30% fly ash, and 10% each of CCA and BA, resulted in a 15.84% reduction in compressive strength compared to traditional concrete but reduced costs by approximately 30%. These findings contribute to the literature by demonstrating the feasibility of using TCMs to create sustainable and economically viable concrete mixes, offering valuable insights for future construction practices.

Keywords: Tertiary Cementitious Materials, Cement, Fly-Ash, Corn Cob Ash, Bagasse Ash Mechanical Properties

PHYSICS

KEYNOTE/INVITED LECTURES

K.PHY-1.1

Applications of Laser Induced Breakdown Spectroscopy in Science and Engineering

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Laser Induced Breakdown Spectroscopy (LIBS) is a powerful analytical technique that utilizes a laser to generate plasma from a material, allowing for the elemental analysis of samples. The Nd: YAG laser, with its ability to emit high-energy, short-duration pulses at 1064 nm, offers distinct advantages including deep penetration, minimal sample damage, and high spatial resolution. In scientific research, pulsed Nd:YAG lasers enhance the precision of LIBS, facilitating the detailed study of elemental compositions in complex materials such as meteorites, geological samples, and biological tissues. These lasers improve the detection limits and accuracy of trace element analysis, aiding in environmental monitoring and planetary science. In engineering applications, the robustness and versatility of Nd:YAG lasers enable their use in quality control and material characterization. They are instrumental in analyzing alloys, coatings, and composites, providing insights into material properties and integrity. The high energy and short pulse duration reduce the thermal effects on the sample, making it possible to assess delicate or small-scale components without significant alteration. lasers significantly enhance LIBS performance by offering high resolution and sensitivity while minimizing sample damage. Their application extends across diverse fields, from fundamental research to industrial quality control, showcasing their value in advancing both scientific knowledge and engineering practices. We have utilized LIBS for a variety of applications including materials science and biology.

Keywords: Laser-Induced Breakdown Spectroscopy (LIBS), Nd:YAG Laser, Elemental Analysis, Material Characterization.

K.PHY-1.2

Brain Tumor Characterization and Diagnosis with Laser-Induced Breakdown Spectroscopy

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The diagnosis and treatment of malignant tumors is one of the most challenging issues in healthcare systems worldwide, and brain tumors are a typical example of malignant tumors with high incidence, high recurrence rates, high mortality, and low total resection rates. Given the critical functions of brain tissue, precise identification and accurate diagnosis are the primary prerequisites for effective tumor treatment. As a fast, real-time feedback atomic spectroscopy detection technology, Laser-induced Breakdown Spectroscopy (LIBS) has been used in many industrial fields and research scenes, like coal quality analysis, space exploration, anti-terrorism and anti-riot detection, and biomedical sciences fields. In this work, we analyzed the key issues such as the mechanisms and identification techniques of LIBS in brain tumor diagnosis. We designed and built a LIBS brain tumor detection system and optimized the sample preparation methods. For different brain tumors and tumor boundaries, we studied the generation mechanisms of atomic and ionic discrete spectral lines, as well as molecular fragment bands, and preliminarily established a correspondence between spectral features and pathological diagnosis results. Various machine learning models were evaluated, and a decision fusion method was ultimately adopted to achieve a diagnostic accuracy of over 95%. Based on this, we proposed a method to supplement polarized information, further enhancing the characterization capability of LIBS for brain tumors.

Keywords: Machine Learning, Laser-Induced Breakdown Spectroscopy (LIBS), Brain tumor.

K.PHY-1.3

Full-Stokes Polarization Multispectral Imaging Database and Deep Learning Reconstruction

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Polarization multispectral imaging (PMI) has been applied widely with the ability of characterizing physicochemical properties of objects. However, traditional PMI relies on scanning each domain, which is time-consuming and occupies vast storage resources. Therefore, it is imperative to develop advanced PMI methods to facilitate real-time and cost-effective applications. In addition, PMI development is inseparable from preliminary simulations based on full-Stokes polarization multispectral images (FSPMI). Whereas FSPMI measurements are always necessary due to the lack of relevant databases, which is extremely complex and severely limits PMI development. In our works, we therefore publicize abundant FSPMI with 512×512 spatial pixels measured by an established system for 67 stereoscopic objects. Various analytical reconstruction methods and artificial intelligence image processing algorithms can be studied based on this database. Based on the database, our proposed method achieves full-Stokes single compression by introducing deep learning reconstruction. The four Stokes parameters are modulated by a quarter-wave plate (QWP) and a liquid crystal tunable filter (LCTF) and then compressed into a single light intensity detected by a complementary metal oxide semiconductor (CMOS). Data processing involves model training and polarization reconstruction. The reconstruction model is trained by feeding the known Stokes parameters and their single compressions into a deep learning framework. Unknown Stokes parameters can be reconstructed from a single compression using the trained model. Benefiting from the acquisition simplicity and reconstruction efficiency, this work well facilitates the development and application of polarized hyperspectral imaging.

Keywords: quarter-wave plate (QWP), liquid crystal tunable filter (LCTF), complementary metal oxide semiconductor (CMOS).

K.PHY-1.4

Optimized Sol-Gel Synthesis of Rare Earth Metal Doped Bismuth Phosphate Nanomaterials: Photocatalytic Degradation Study

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Photocatalysis is one of the most advanced and effective oxidation techniques to clean up the organic pollutants such as pesticides and textile dyes from industrial wastes and environmental system to clean up the water and air. Bismuth phosphate is considered one of the major photocatalytic compounds for its use in removal of organic dyes. In this respective, this research is designed to investigate the effect of doping of rare earth metal on bismuth phosphate for photocatalysis degradation of Bromo phenol organic dye. Pure and doped bismuth phosphate nanomaterials were synthesized through Sol-gel method and characterized through X-ray diffraction, scanning electron microscopy, Fourier transform infrared spectroscopy and UV-Visible spectroscopy to investigate their crystal structural properties, morphology and optical properties. XRD confirmed the formation of average crystallite size in the range of 50 nm with sharp diffraction peaks. SEM confirmed the formation of uniformly distributed spherical shaped nanoparticles. The Photocatalytic evaluation will be performed to check their effectiveness through Bromo phenol organic dye removal from industrial waste.

Keywords: Photocatalysis, Bismuth Phosphate, Organic Dye Degradation, Rare Earth Metal Doping.

PHYSICS

ORAL PRESENTATION

O.PHY-1.1

Investigation of structural optical and electrical properties of PVA-$BaTiO_3$ nanocomposite films

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The main aim of this study is to fabricate the nanocomposite film of PVA and $BaTiO_3$ and investigate their optical, electrical and thermal properties. PVA is widely used due to their low cost, simple preparation process, and electron losing ability. With the help of solution casting process, different concentration of PVA/$BaTiO_3$ composite films are fabricated. These fabricated films are investigated by different structural techniques such as XRD (x-rays spectroscopy), SEM (scanning electron spectroscopy), and FTIR (Fourier transform infrared). the results of these techniques show that the crystallinity of PVA is reduced by adding $BaTiO_3$ particles and these particles are uniformly distributed in PVA matrix. The optical properties such as band gap is decreased, and other parameters include refractive index; absorption edge; extinction coefficient and optical conductivity of PVA matrix improved by adding $BaTiO_3$ NPs. These factors make this composite film ideal for optical applications. The electrical properties such as dielectric constant, dielectric loss and ac conductivity are also improved of PVA due to $BaTiO_3$. DSC results shows that PVA-$BaTiO_3$ composite is thermally stable. The knowledge gained from this study contributes in the development strategies of polymer nanocomposite in diverse electrical optoelectrical applications.

Keywords: PVA-BaTiO3 Nanocomposites, Optical Properties, Electrical Properties, Polymer Nanocomposites

O.PHY-1.2

Synthesis and characterization of CuO/g-C_3N_4/$ZnFe_2O_4$ nanocomposite for photocatalysis application

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The discharge of various hazardous effluents from textile industry wastewater affects the ecosystem badly. Heterogeneous photocatalysis based on semiconductors is a sustainable method that effectively breaks down organic contaminants. The CuO/g-C_3N_4/$ZnFe_2O_4$ ternary composite has been synthesized through simple precipitation method. XRD, EDX, SEM, FTIR and UV-visible spectroscopy were used to characterize the prepared composites. X-ray diffraction revealed crystal structure of the synthesized samples clearly showing their cubic structure and average crystallite size between 20 nm-30 nm. EDX revealed that the elemental composition of the materials shows that the composite was properly prepared. The SEM micrograph revealed the grain size and morphology of the nanocomposite, showing Cubic Crystals and average grain sizes of 0.15nm for g-C_3N_4/$ZnFe_2O_4$, 0.18 nm for CuO/$ZnFe_2O_4$, and 0.27 nm for CuO/g-C_3N_4/$ZnFe_2O_4$ nanocomposites. FT-IR measurements in the range of 4000–400 cm^{-1} revealed the presence of Cu-O, C–N and C=N functional groups. UV–Vis spectral analysis reveals the optical properties, with the optical band gap value from 1.38 to 1.64eV determined using a Tauc plot. The CuO/g-C_3N_4/$ZnFe_2O_4$ composites have low bandgap, and lowered electron-hole recombination rate may be the cause of this encouraging behavior under visible light. To determine the ideal conditions for degradation, various experimental parameters were changed, including the irradiation time, the concentration of the dye solution, oxidant dose, the amount of catalyst, and the pH. The most effective conditions for degradation by photocatalysis were observed at a pH of 8, a photocatalyst dosage of 30 mg/100 mL, an H_2O_2 dosage of 8 mM, utilizing a ternary CGZ composite. Under these conditions, the degradation of RhB dye was achieved efficiently within 1 hour. Degradation efficacy of 97% was achieved under optimized conditions using the ternary CuO/g-C_3N_4/$ZnFe_2O_4$ composite. The nanocomposite's reusability was also evaluated over 5 cycles.

Keywords: Photocatalysis, Nanocomposite, Rhodamine B Degradation, Heterogeneous Photocatalytic Remediation

O.PHY-1.3

Rational designing of DCTBDP based novel derivatives for efficient organic and perovskite solar cells

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This research aims to design BODIPY based small molecules with exceptional electronic and photovoltaic properties for modern organic and perversities solar cell devices. In practice, five D-π-D-π-D type small molecule donors-DCTBDP-M1, DCTBDP-M2, DCTBDP-M3, DCTBDP-M4 and DCTBDP-M5 were designed using 3,5,8-trimethyl BODIPY dye as the core and 4-(diethylamino) phenyl, 4-diethylamino-2-methoxyphenyl and 4-(diphenylamino) phenyl at the 3, 5 and 8 positions, respectively. Detailed DFT computational analysis with MPW1PW91 functions and 6-31G basis set were performed for all designed molecules. Structural geometrical analysis along with density of states and transition density matrix analysis were performed. Furthermore, their electronic properties including HOMO and LUMO, electron affinity, ionization potential were also explored to elucidate the charge transfer characteristics. The lower values of reorganization in relation to reference molecules show that all designed molecules are better hole transporters for perovskite and organic solar cell devices. Absorbance for designed molecules was noted much higher than the reference. Efficient designing led to the substantial reduction in the band gaps (as low as 0.77 eV) for all the designed molecules in relation to the band gap (2.27 eV) of the reference molecule. Results of extensive DFT commutations revealed that the normalized V_{OC} for the designed derivatives M1–M5 were much higher than the reference molecule. FF for all the designed molecules were found comparable to the reference counterpart consequently displayed around 40% higher PCE. Thus, with improved hole transporting abilities, better electronic and photovoltaic characteristics, designed molecules have huge potential as substitute HTMs for advanced organic and perovskite solar cells.

Keywords: BODIPY Derivatives, Organic Solar Cells, Perovskite Solar Cells, Density Functional Theory (DFT)

O.PHY-1.4

Comparison of Whole Blood and Serum Samples of Breast Cancer Based on Laser-Induced Breakdown Spectroscopy with Machine Learning

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To identify cancer from non-cancer is one of the most challenging issues nowadays in the early diagnosis of cancer. The primary issue of early detection is to choose a suitable type of sample collection to diagnose cancer. A comparison of whole blood and serum samples of breast cancer was studied using laser-induced breakdown spectroscopy (LIBS) with machine learning methods. For LIBS spectra measurement, blood samples were dropped on a substrate of boric acid. For the discrimination of breast cancer and non-cancer samples, eight machine learning models were applied to LIBS spectral data, including decision tree, discrimination analysis, logistic regression, naïve byes, support vector machine, k-nearest neighbor, ensemble and neural networks classifiers. Discrimination between whole blood samples showed that narrow neural networks and trilayer neural networks both provided 91.7% highest prediction accuracy and serum samples showed that all the decision tree models provided 89.7% highest prediction accuracy. However, using whole blood as sample achieved the strong emission lines of spectra, better discrimination results of PCA and maximum prediction accuracy of machine learning models as compared to using serum samples. These merits concluded that whole blood samples could be a good option for the rapid detection of breast cancer. This preliminary research may provide the complementary method for early detection of breast cancer.

Keywords: Laser-Induced Breakdown Spectroscopy, Breast Cancer, Serum, Machine Learning.

PHYSICS

POSTER PRESENTATION

P.PHY-1

Early Diagnosis of Polycystic Ovary Syndrome Using Laser Induced Breakdown Spectroscopy

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Polycystic Ovary Syndrome is a serious hormonal disorder affecting many women particularly in the current generation and it can lead to complications such as infertility. Early detection of polycystic ovary syndrome is essential to reduce its complexity and minimize complications. The technology Laser-Induced Breakdown Spectroscopy has emerged as a power full tool for analyzing biological samples. Laser-Induced Breakdown Spectroscopy work by using a laser pulse to create plasma form the sample surface allowing for the detection of various elements in the sample based on the emitted light. This technique is highly sensitive and can be used for rapid detection and analysis making it a potential option for polycystic ovary syndrome screening. Combining Laser-Induced Breakdown Spectroscopy with other diagnostic techniques allows for a comprehensive approach to understanding the biochemical changes associated with polycystic ovary syndrome. Laser-Induced Breakdown Spectroscopy can be used to analyze the elemental composition of ovarian tissue in patients with polycystic ovary syndrome. Ultrasound studies showed that teens with polycystic ovary syndrome had larger ovaries with an average size of 9.29 +/- 4.62 milliliters compared to 4.77 +/- 2.30 milliliters in the control group ($p < 0.001$). This precursory research has no previous work.

Keywords: Polycystic Ovary Syndrome; Hormonal Disorder; Laser-Induced Breakdown Spectroscopy; Early diagnosis, Elemental composition.

P.PHY-2

Early detection of cardiovascular disease using laser induced breakdown spectroscopy combined with machine learning

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Cardiovascular disease (CVD) is a term used for disorders affecting the heart. It is the most common causes of death worldwide. Early detection is essential for effective cure and inhibition. Laser Induced Breakdown Spectroscopy (LIBS) discovers a non-invasive, quick and highly subtle analytical tool for early detection of cardiovascular disease. LIBS pointing to a high energetic laser pulse on the top of blood samples which produces plasma, emitting light which is the elemental configuration of the sample. By examining the deviations in biochemical indicators such as Calcium, magnesium, sodium and potassium that relate to cardiac disease detection. LIBS combined with machine learning algorithms Like Support Vector Machine (SVM), Principal Component Analysis (PCA) and Neural Networks (NNs) accurate the analysis by classifying configurations in spectral data that specify probable cardiac disease. This research yields the average accuracy rate of 75 % of Neural Networks, 80% of SVM and 85% of PCA and the prospective of LIBS as precise, fast and economical process for early detection of cardiac disease. This innovative work provides the enhancement in efficiency over other analytical techniques in future.

Keywords: Cardiovascular Disease Detection, Laser-Induced Breakdown Spectroscopy (LIBS), Machine Learning Algorithms, Biochemical Markers

P.PHY-3

Investigation of Prostate Cancer Using Laser-Induced Breakdown Spectroscopy Assisted Machine Learning

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Prostate cancer is one of the most widespread malignancies affecting men all over the world at a high rate, necessitating the development of more accurate and rapid diagnostic techniques. In recent years, laser-induced breakdown spectroscopy (LIBS) has emerged as a promising analytical method due to its ability to rapidly analyze the elemental composition of serum and blood samples. In practice, diagnosis can be affected by multiple factors such as observer variability, visibility, and complexity of the lesions. In this regard, LIBS-assisted machine learning has been designed to help surgeons in their clinical practice discriminate between healthy and cancerous blood and serum samples. Emissions of Ca, Na, Mg, K, C, O, H, and N were selected for malignancy diagnosis and cancer staging. Average LIBS spectra of serum samples of patients were shown to have greater peaks of Na. Classifiers like k-nearest neighbor (KNN), support vector machine (SVM), partial-least discrimination analysis (PLS-DA) and principal component analysis (PCA) achieved comparable performances with a percentage accuracy of about 70-80% for diagnosis and staging cancer. The preliminary research on LIBS-assisted machine learning proved to be an innovative concept and a rapid, accurate, and reliable method for the early detection of prostate cancer.

Keywords: Prostate cancer; Support Vector Machine; Partial-Least Discrimination Analysis; K-Nearest Neighbor; LIBS

BIOLOGICAL SCIENCES
(BIOCHEMISTRY, MICROBIOLOGY)

KEYNOTE/INVITED LECTURES

K.BIOCH-1.1

Reimagining Education: Equipping Students for the 21st Century

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As the world rapidly evolves, so too must our educational systems. The demands of the 21st century require a paradigm shift in how we teach and learn. We need to explore the critical importance of reimagining education to equip students with the skills necessary to thrive in a complex and interconnected world. The key 21st century skills include critical thinking, problem-solving, creativity, communication, collaboration, digital literacy, and global citizenship. These skills are essential for students to navigate the challenges and opportunities of the modern era. There are certain shortcomings of traditional education systems that should be replaced with innovative approaches that are better suited to the needs of 21st century learners. New approaches, such as project-based learning, personalized learning, and the use of technology to enhance learning experiences are central to successful educational initiatives. The role of educators in fostering the development of 21st century skills is pivotal. They are responsible for implementing the strategies for creating a supportive and engaging learning environment that encourages creativity, critical thinking, and collaboration. In conclusion, reimagining education is essential to equip students with the skills they need to succeed in the 21st century. By fostering creativity, critical thinking, problem-solving, and collaboration, we can empower students to become innovative, adaptable, and responsible citizens.

Keywords: 21st century skills, Critical Thinking, Digital literacy, Project-based Learning

K.BIOCH-1.2

Genome Editing for Crop Improvement and Alternate Methods for CRISPR-Cas Delivery in Plants

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CRISPR/Cas system has emerged as the most effective tool for genome editing in the current era. This technology has acquired the attention of scientists in a very short span of time due to its remarkable efficiency and target specificity. The CRISPR-Cas technology is unique in that it is robust, reasonably specific, and simple to use. This allows for the precise genetic alteration of crops, the production of favorable germplasm, and the establishment of cutting-edge, highly effective agricultural systems. As a novel genome-editing tool, the CRISPR-Cas9 system has gained popularity and has been widely used in numerous taxa, including plants. Using the CRISPR-Cas9 system, it is now possible to enhance a variety of plant traits. CRISPR-Cas9 technology is a flexible strategy that can be used in crop improvement. The clustered regularly interspaced palindromic repeats (CRISPR) technique describes fully the qualities of crops that have been targeted during the past ten years, acting as a link between field-based crop breeding and lab-based molecular biology. Therefore, by altering the genomes of crops to increase their yield, resistance to pests and many other characteristics. Due to the genome sequence availability of many crops, the application of CRISPR-Cas9 in crops is increasing exponentially. I will discuss our lab's work on the application of CRISPR-Cas technology in crop plants for various agronomic traits. Moreover, non-traditional ways for the delivery of CRISPR-Cas systems will also be discussed.

Keywords: CRISPR-Cas9, Genome Editing, Crop Improvement, Non-Traditional Delivery Methods

K.BIOCH-1.3

Revolutionising Research: The Power of AI-Assisted Writing

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The academic research landscape is changing with the help of artificial intelligence (AI). There are many ways that AI is modernizing and changing research writing, from initial idea to final publication. The most extraordinary effect of AI is the acceleration of a literature review. For instance, with the assistance of AI-powered tools, it is possible to quickly scan enormous databases full of research papers and pick out relevant results or extract summary findings. This frees up researchers' time to focus on synthesizing information and developing original arguments. Moreover, AI can assist in the early stages of writing by generating initial ideas and outlines. By analyzing existing research, AI algorithms can identify potential research gaps and suggest promising avenues for exploration. This can help researchers develop innovative and impactful research questions. Once the initial draft is complete, AI can be used to refine the writing style and improve language clarity. Natural language processing (NLP) techniques can help identify grammatical errors, inconsistencies, and awkward phrasing. Additionally, AI-powered writing assistants can suggest alternative word choices and sentence structures to enhance the overall readability of the text. However, it is important to acknowledge that AI is not a substitute for human judgment and creativity. While AI tools can be invaluable aids, researchers must still exercise critical thinking and ensure that the output generated by AI aligns with their own research goals and standards. By understanding the potential benefits and limitations of AI-assisted writing, researchers can harness these technologies to enhance their productivity, efficiency, and the overall quality of their work. The focus is new insights into the current state of AI in research writing and the future implications for the academic community.

Keywords: Artificial intelligence, Machine learning, AI in research writing, Natural Language Processing (NLP) techniques

BIOLOGICAL SCIENCES (BIOCHEMISTRY, MICROBIOLOGY)

ORAL PRESENTATION

O.BIOCH-1.1

Structural Characterization and *in-vitro* Bioactivities of Herbal Extract and Nanoparticles of *Caralluma Tuberculata*

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Caralluma tuberculata have great importance due to their antidiabetic, antimicrobial, anti-inflammatory, antioxidant and anti-hemolytic activities. In this study methanol, *n*-hexane and aqueous extracts of *C. tuberculata* were prepared. The chitosan-based nanoparticles of methanolic extract of *C. tuberculata* were prepared by ionic gelation method. The methanolic extract had highest total phenolic content (TPC) than nano particles (124.5±0.73 mg GAE/mL and 21.02±0.10 mg GAE/mL) respectively. n-hexane showed maximum total flavonoid content (TFC) as compared to nano particles (128.5±0.15 µg CE/mL and 16.5 ±0.60 µg CE/mL). Maximum percentage of DPPH (2,2-diphenyl-1-picrylhydrazyl) inhibition were shown by methanolic extract (48.7±0.13%) as compared to nano particles (1.83±0.229%). Anti-inflammatory activity of *n*-hexane extract (91.41±42.16%) showed highest percentage inhibition. Aqueous extract had the highest percentage (11.44±1.38%) of alpha amylase inhibition compared to other extracts and nano particles (9.10±1.33%). Nano particles showed highest hemolytic activity than methanolic extract (25.9±3.70% and 5.23%) respectively. In case of anti-bacterial activity only the aqueous extract showed inhibition zone of 9mm while all other extracts showed no inhibition zone against *Staphylococcus aureus*. Similarly, in case of *E.coli* only the *n*-hexane extract of *Caralluma tuberculata* showed the inhibition zone of 15mm while other extracts showed no inhibition zone. Structural characterization and functional group identification were done by Fourier transformed infrared spectroscopy (FTIR) which showed the presence of compounds like aldehyde, sulfones, sulfonyl chlorides, sulfates, sulfonamides, nitro(R-NO2), aromatic, primary and secondary amines, amides, amino substituted alkyl group, carboxylic acid, ether and ester. The high-performance liquid chromatography (HPLC) analysis confirmed the presence of kaempferol, p-coumaric acid, salicylic acid and chlorogenic acid. The zeta-sizer and zeta-potential of these nanoparticles were 332.2nm and 29.5mV, respectively with positive charge on it. One-way ANOVA was used for analysis of data.

Keywords: *Caralluma tuberculata,* nano particles, Bioactivities, HPLC, FTIR

O.BIOCH-1.2

Structural Characterization and Pharmacological Potential of *Leptadenia Pyrotechnica* Extract and its Nanoparticles

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Leptadenia pyrotechnica, used in traditional medicine due to its pharmacological characteristics including antidiabetic, antimicrobial, anti-inflammatory, hemolytic and antioxidant. Biopolymer-based nanoparticles were excellent due to their ability to administer medication at specific points and biocompatibility. *L. pyrotechnica* whole plant had been processed to synthesize methanolic, *n*-hexane and aqueous extracts (yields were 2.004%, 4.52% and 7.45%). The Ionic gelation method has been utilized to generate chitosan-based aqueous nanoparticles. Zeta potential and zeta sizer done for structural characterization results showed that nanoparticles were strongly cationic 36.8mV (positively charged) and size was 114.9 nm. Antibacterial activity showed good results with methanolic extract (17mm with *E. coli* and 15.2mm with *S. aureus*) as compared to extracts of *n*-hexane and aqueous. Methanolic extract showed the maximum total phenolic content (569 ±1.6 mg GAE/mL) and total flavonoid content (163.5±7.8 µg CE/mL) than nanoparticles (34.95±1.9 mg GAE/mL) and (37.1±2.9 µg CE/mL) respectively. Maximum percentage of DPPH inhibition were shown by nanoparticles (63.54%) as compared to plant extracts. *n*-hexane extract showed the maximum mean percentage inhibition in hemolytic test as compared to nanoparticles (61.85% and 6.52%) respectively. Maximum mean percentage of anti-inflammatory activity shown by nanoparticles (5.15%) as compared to extracts. The mean percentage inhibition in alpha amylase test were maximum shown by aqueous extract (24.77%) than nanoparticles (24.3%). Fourier transformed infrared spectroscopy (FTIR) showed different compounds like alcohol, chloride, phenols**,** carboxylic acid, sulfates, sulfone, sulfonyl, sulfonamides, primary and secondary amines, flavonoid and aromatic compounds. Chlorogenic acid, p-coumaric acid, HB acid, caffeic acid, kaempferol, ferulic acid and coumarin detected by high performance liquid chromatography (HPLC) in *L. pyrotechnica* extract. Results were expressed as mean ± S.D. One-way ANOVA is used to evaluate the data.

Keywords: Plant extract, Bioactivities, Nanoparticles, Zeta size, Zeta potential, HPLC, FTIR

O.BIOCH-1.3

Microwave Assist Extraction and Nanoparticles Formation Approach to Explore Chemical Profile and Bioactivities of *Aloe Barbadensis Miller*

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Medicinal plants have been used to serve miserable humanity for a very long time. *Aloe barbadensis Miller* has a wide range of therapeutic advantages. In this research, the *Aloe vera* leaf extracts were prepared using different solvents aqueous, methanol and *n*-hexane. The chitosan-based methanolic nanoparticles of *Aloe vera* were synthesized by ionic gelation method. The bioactivities of extracts and nanoparticles were identified and compared. The *n*-hexane extract showed highest total phenolic contents (TPC) than methanolic nanoparticles (433.5 ± 1.43 mg GAE/mL and 386.2 ± 1.5 mg GAE/mL) respectively. The total flavonoid contents (TFC) of *n*-hexane extract and nanoparticles were 1071.1 ± 3.24 µg CE/mL and 106.2 ± 0.294 µg CE/mL, respectively. The % DPPH inhibition of *n*-hexane extract was greater (44.1 ± 0.459%) than other extracts and nanoparticles (27.05 ± 0.479%). The largest inhibition zone against *Staphylococcus aureus* and *Escherichia coli* was shown by methanol extract and nanoparticles 19mm and 16mm, respectively. The hemolysis by *n*-hexane extract and nanoparticles was 23.9 ± 1.51% and 22.2 ± 3.704%, respectively. The alpha-amylase inhibition of methanol extract and methanolic nanoparticles were 54.7 ± 1.33% and 58.7 ± 1.33% respectively. The inflammation % inhibition of nanoparticles and methanol extract was 26.1 ± 2.42% and 8.22 ± 1.35%, respectively. The Fourier transform infrared spectroscopy (FTIR) confirmed the presence of phenols, carboxylic acid, esters and aromatics. The high-performance liquid chromatography (HPLC) analysis indicated chlorogenic acid, vanilic acid and coumarin. Zeta potential and zeta size done for structural characterization results showed that nanoparticles were strongly cationic 23.7mV (positively charged) and size was 271.9 nm. Results of all activities were expressed as mean ± S.D and one way ANOVA was applied. Further research in this regard is warranted involving bioassay guide assessment.

Keywords: *Aloe barbadensis Miller*, Medicinal Plant, Chitosan Nanoparticles, Bioactivities, HPLC, FTIR, Zeta Size, Zeta Potential.

O.BIOCH-1.4

Exploration of Antioxidant, Antidiabetic, Antimicrobial Potential and Structural Characterization of Seed Extract of *Silybum Marianum*

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Many of today's synthetic pharmaceuticals are based on plant-derived molecules. Numerous phytoconstituents have been identified through phytochemical investigation in medicinal plants. *Silybum marianum*, belonging to the Asteraceae family has a long history of use as a folk remedy for a wide variety of human and animal health problems. Due to its potential therapeutic value, this study comprises the investigation of its biochemical activities. In this study, seed-extracts were prepared by using different solvents like methanol, hydro-ethanol, water, and n-hexane. Their antioxidant, antidiabetic, antibacterial, and cytotoxic activities were determined and compared. Fourier transform infrared spectroscopy (FTIR) was used to identify functional groups and to characterize the structure, respectively. The high-performance liquid chromatography (HPLC) was used to determine antioxidant components. Mean and standard deviation (SD) were calculated by using MS Excel. The antioxidant profile comprises Total Phenolic Contents (TPC), Total Flavonoid contents (TFC) and DPPH radical scavenging assay. TPC and TFC were high in hydro-ethanol and n-hexane extract, and DPPH radical scavenging activity was not found in hydro-ethanol and aqueous extract. The antidiabetic activity was assessed by alpha amylase inhibition assay and was highest in methanol extract. The agar gel diffusion method was used to assess antibacterial activity using *E. coli* and *S. aureus* bacteria. Weak antibacterial activity was observed in all extracts. Cytotoxicity was assessed by hemolysis assay. Weak cytotoxicity was observed in all extracts. Alcohol (O-H), alkenes (C-H) groups were observed in all extracts by FTIR analysis. The HPLC analysis showed high phenolic and flavonoid content in methanol, hydro-ethanol, water, and n-hexane extracts of seeds of *Silybum marianum.*

Keywords: *Silybum marianum,* Biochemical Activities, HPLC, FTIR.

O.BIOCH-1.5

Evaluation of Antioxidant, Antidiabetic and Antimicrobial Potential of Flowers of *Althaea officinalis*

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Traditional medicine has relied on a range of herbs to cure a variety of disorders and preserve health since the dawn of time. *Althaea officinalis* (marshmallow), a perennial plant of the Malvaceae family is indigenous to Asia, America, and Europe, is one widely used medicinal herb. It is an evergreen herb. Flowers are multicolor like dark pink, white, rose pink and purple. Antioxidant, antidiabetic, antimicrobial, anti-inflammatory, antifungal, antihypertensive, antiplatelet, anti-tubercular and cardiovascular properties of *Althaea officinal* flowers make them extremely valuable in medicine. Three different extracts (aqueous, methanolic and hydro-ethanolic) were used to check its antioxidant, antidiabetic, and antimicrobial therapeutic values. The antioxidant activity was measured as total phenolic contents (TPC), total flavonoid contents (TFC) and DDPH radical scavenging assay. The agar well diffusion method was used to measure the antimicrobial potential. The antidiabetic activity was measured by alpha-amylase inhibition assay. The average ± SD data of TPC of flower extracts (aqueous, methanolic and hydro-ethanolic) was 104.2 ± 5.3, 91.8 ± 4.367 and 65.6 ± 4.3, respectively. The TPC was taken as the equivalent of mg GAE/100g. The average ± SD data of the total flavonoid contents of flower extracts was 3150 ± 380.8, 2266 ± 423.26 and 1844 ± 62.5, respectively. The TFC was taken as mg catechin equivalent /100g. The percentage of DPPH inhibition of methanolic and hydro-ethanolic extract of flowers was 35.13 %, and 31.65 % whereas water extract showed no activity. The structural characterization of seeds and flowers was done by FTIR and HPLC. This research indicated that *Althaea officinalis* flowers have some pharmacological properties and therapeutic potential.

Keywords: *Althaea officinalis*, Antimicrobial, Antioxidant, Antidiabetic, Total Phenolic contents.

BIOLOGICAL SCIENCES (BIOCHEMISTRY, MICROBIOLOGY AND UMDC)

POSTER/ E-POSTER PRESENTATION

P.BIOCH-1

Exploration of Antioxidant, Antidiabetic, Antimicrobial Potential of Fruit of *Carissa Carandas*

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Antioxidant, anti-diabetic, anti-microbial, anti-bacterial, anti-inflammatory, antihypertensive, anti-hyperlipidemic, antiviral, anticancer and hepatoprotective properties of *Carissa carandas* make the medicinal plant extremely valuable in medicine. Extracts of methanol, hydro-ethanol, and water from the fruits of *Carissa carandas* were prepared and used for various activities. The methanolic, hydro-ethanolic, and water extracts of fruits of *Carissa carandas* were used to determine antioxidant, anti-diabetic and anti-microbial activity. Antioxidant activity was measured as total phenolic content (TPC), total flavonoids content (TFC) and 2,2-dipheny1-1-picrylhydrazy1 (DPPH) scavenging assay. The antimicrobial activity was measured by agar well diffusion method by using *E. coil* and *Bacillus subtilis* and antidiabetic profile was assessed as α-amylase inhibition assay. The data was calculated as average ±SD (standard deviation). The methanolic, hydro-ethanolic, and water extracts of fruit of *Carissa carandas* showed Total phenolic contents as 89.4±3.6mg GAE/100g, 132.6±5.9mg GAE/100g and 129.7±6.02 mg GAE/100g, respectively. Total flavonoid contents were 1103±157.7 mg CE/100g, 1968±107.8 mg CE/100g and 1193±165.2 mg CE/100g, respectively. DPPH inhibition in *Carissa carandas* was 5.18 ± 0.03, 0 and 24.5±9.9. The antidiabetic activity as alpha amylase inhibition was 157 ± 17.7, 76 ± 1.2 and 450 ± 71.5, respectively. The anti-microbial activity of all extracts showed either very small or no activity. The result of this investigation demonstrated that extracts of *Carissa carandas* had some pharmacological properties and yet further studies are required to fully evaluate the properties and therapeutic potentials of these plants.

Keywords: *Carissa carandas*, Medicinal plants, Antidiabetic, Antioxidant, Antimicrobial.

P.BIOCH-2

Assessment of Phytochemical Potential, their Characterization and Antimicrobial Activities of *Euphorbia tirucalli*

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The Euphorbia *tirucalli* is incredibly helpful in medicine because of its antimicrobial, antioxidant, anti-inflammatory, anti-diabetic and hepatoprotective qualities. In this study, aqueous, methanolic and hydro ethanolic extracts of *Euphorbia tirucalli* were used to study various activities. Total phenolic contents (TPC), total flavonoid contents (TFC), antioxidant, antimicrobial and antidiabetic activities of *Euphorbia tirucalli* were measured. The Structural characterization was carried out by FTIR and HPLC. The average and SD were calculated by using MS EXCEL. The mean ± SD of total phenolic contents in methanol, hydro-ethanol and aqueous extracts of *Euphorbia tirucalli* was 93.4 ± 4.58, 125.8 ± 3.54 and 13.8 ± 1.94 as mg GAE/100g, respectively. The mean ± SD of Total flavonoids contents in methanol, hydro-ethanol and aqueous extracts of *Euphorbia tirucalli* was 958 ±140.6, 1248 ± 144.9 and 146 ± 30.2 mg CE/100g, respectively. The mean ± SD of DPPH % inhibition in methanol, hydro-ethanol and aqueous extracts of *E. tirucalli* was 78.04 ± 14.795, 19.23 ± 58.643 and 29.13 ±55.417, respectively. The antibacterial assay of various extracts of *Euphorbia tirucalli* was determined by using *E. coli* and *Staphylococcus aureus.* The results of antimicrobial activity showed small activity against these microorganisms. The antidiabetic activity of *E. tirucalli* was determined by α-amylase inhibition assay. In this study, α-amylase inhibition of methanol extract was 219±27, hydro-ethanol 435±45 and water extract 941±20 %. FTIR spectrum obtained confirmed the presence of O-H, C-H, C=O, C=C, C-N, C-CI stretching and CH_2 bending. HPLC analysis showed six compounds in *Euphorbia tirucalli* including Chlorogenic Acid, Gallic Acid, HB acid, Coffeic Acid, Kaemphero and quercetin. This study demonstrated that plant extracts had good Pharmacological properties and potential.

Keywords: *Euphorbia tirucalli*, Antioxidant activity, *E.coli*, Antidiabetic activity , α-amylase Inhibition

P.BIOCH-3

Antioxidant, Antidiabetic and Antimicrobial Activities of Extract of Leaves of *Terminalia mantaly*

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The bioactive chemical compounds found in medicinal plants are active against external invaders like pathogenic bacteria. Advances in medicine have made it possible to better control the evolution of many diseases that were once fatal. Among plants, *Terminalia mantaly* (Combretaceae family) is being used as a medicinal plant. Due to its abundance in many locations and settlements and its great activities against various microbes, this plant is preferred by traditional healers for creating medications against skin illnesses. The major goal of this study was to determine the potential of phytochemicals peculiar to *Terminalia mantaly* leaf extract as anti-microbial, antioxidant, and anti-diabetic activities. Methanol, hydro-ethanol, and water leaf extracts were used to determine Total phenolic contents (TPC), Total flavonoid contents (TFC), antioxidant activity as DPPH radical scavenging assay, antidiabetic activity as α-amylase inhibition assay and antimicrobial activities by using an agar well diffusion method. TPC and TFC were determined as gallic acid and catechin equivalents, respectively. The obtained data was used to calculate average and standard deviation (SD) by using MS Excel. The methanolic leaf extract of *Terminalia mantaly* showed high contents of total phenols (155.9 ± 9.584 mg gallic acid equivalents/100g) and high flavonoid contents in distilled water extract (4398 ± 666 mg catechin equivalents/100g extract of plant). According to the DPPH radical scavenging experiment results, hydroethanolic extract showed high ability to scavenge free DPPH radicals (48.9 ± 17.9% inhibition). The *a*-amylase inhibition activity in distilled water extract was greater (358±76.2% inhibition). The antimicrobial activity of various extracts of leaf of *Terminalia mantaly* was checked against *E. coli* and *B. subtilis.* The methanol, hydro ethanol and water extracts of leaf showed small activities against *E. coli* and *B. subtilis* in leaf extract.

Keywords: Antidiabetic, Antioxidant, *Terminalia mantaly*, Medicinal plant, Bioactive compounds

P.MICRO-4

Prevalence of *bla$_{NDM}$* Harboring Uropathogenic *Pseudomonas aeruginosa*

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Pseudomonas aeruginosa a pathogenic microorganism producing Metallo-beta-lactamase, is a significant public health concern due to its resistance to multiple drugs, particularly carbapenem antibiotics. It causes various medical issues leading to significant illness and death. *P. aeruginosa* is the primary cause of hospital-acquired infections affecting individuals with weakened immune systems. The *bla$_{NDM}$* gene, which encodes the New Delhi metallo-β-lactamase enzyme provides resistance to carbapenems and other antibiotics in *P. aeruginosa*. The present study aimed to evaluate the occurrence of UTIs caused by uropathogenic *P. aeruginosa* harboring the *bla$_{NDM}$* gene in clinical samples obtained from different tertiary care hospital in Faisalabad, Pakistan. A total of 100 urine samples were collected and the isolated strains of *P. aeruginosa* were identified through standard microbiological approaches and confirmed by biochemical assays. Molecular characterization of *P. aeruginosa* was done via PCR. After confirmation antibiotic susceptibility testing revealed alarming resistance rates with 100% of isolates exhibiting resistance to ceftazidime, aztreonam, imipenem, and meropenem while 87% were resistant to cefepime. Furthermore 54% of isolates were resistant to piperacillin-tazobactam and ciprofloxacin with mild resistance observed against amikacin. Gentamicin demonstrated the highest sensitivity with 84% of isolates remaining susceptible. Phenotypic detection of MBL production was initially performed using the modified carbapenem inactivation method which revealed that 100% of the isolates were MBL producers. Subsequent molecular characterization through polymerase chain reaction detected the *bla$_{NDM}$* gene in 15.38% of positive isolates confirming the presence of the New Delhi metallo-β-lactamase enzyme and its associated resistance to carbapenems. The study highlights the high prevalence of uropathogenic P. aeruginosa carrying the *bla$_{NDM}$* gene, emphasizing the need for efficient diagnostic techniques, responsible antimicrobial use, and new treatment approaches to address infections resistant to multiple drugs in various clinical settings.

Keywords: *Pseudomonas aeruginosa,* Uropathogenic, *bla$_{NDM}$* gene, β-lactamase enzyme

P.BIOCH-5

Evaluation of Antioxidant Potential and Characterization of Biofunctional Components of *Terminilia Chebula*

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Fruits of *Terminalia chebula* have usually been used as a common traditional medicine for homeostasis, laxative, diuretic and cardiotonic cures *T. chebula* fruit contains bio functional ingredients like phenols and flavonoids, which are accountable for antimicrobial and antioxidant and antidiabetic features. Methanolic, hydro-ethanolic, and aqueous extracts of fruits of *Terminalia chebula* were used for this study. After the preparation of extracts, the antioxidant as DPPH radical scavenging assay, total flavonoid contents (TFC), total phenolic contents (TPC), antidiabetic, and antimicrobial activities of *T. chebula* fruit were assessed. High-performance liquid chromatography (HPLC) and Fourier transform infrared spectroscopy (FTIR) were used for the structural characterization of the samples. The obtained data was analyzed using MS EXCEL. The TPC of methanolic, hydro-ethanol and water were 139.1 ± 4.11, 150.4 ± 4.81 and 138.2 ± 7.59, respectively. The total flavonoid contents (TFC) of methanolic, hydro ethanol and water was 1575 ± 284.2, 3313 ± 478.3 and 1752 ± 303.9, respectively. The DPPH % inhibition of methanolic, hydro ethanol and water extract was 90.0 ±1.02, 75.8 ± 11.0 and 83.0 ± 3.3, respectively. Various extract of fruit of *T. chebula* showed the low antimicrobial activity against *E. coli* and *S. aureus*. The antidiabetic activity measured as α-amylase inhibition of methanolic, hydro ethanol and water extracts of *T. chebula* fruit showed as percentage of 55%, 36% and 97%, respectively. The FTIR shows a strong peak at 1025.0 cm^{-1} was obtained which indicated different functional groups such as alcohol, ether, ester, carboxylic acid and anhydride groups are present in a sample. HPLC analysis gave five major compounds, namely gallic acid, vanalic acid, chlorogenic acid, and kaemphenol. The *T. chebula* fruit exhibited some pharmacological potential, indicating the need for further comprehensive studies to explore its therapeutic potential.

Keywords: *Terminalia chebula*, Antimicrobial, Antioxidant, Antidiabetic, Total phenolic contents

P.UMDC-6

Exploring Quality of Patient Care: Contrasting Private and Public Health Sector of Faisalabad District

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Quality of patient care plays a very crucial role in determining the effectiveness of the healthcare system. The patient's perception of satisfaction depends upon many factors like accessibility, affordability, the attitude of the doctor and paramedic staff towards them, outcome of their treatment and many more. The satisfactory experience of the patient will significantly increase the level of trust for the doctor. The patient will tend to stick more towards their treatment resulting in better outcomes. This research focuses on Faisalabad, Pakistan, where the differential in patient care quality between private and state hospitals is obvious and sets out to investigate these differences. This study dives into the different environment of patient care quality, using insights from empirical evidence, such as comparisons of service quality between private and public hospitals in Pakistan. A mixed approach was adopted to elicit responses from 164 patients of 6 hospitals using a questionnaire formulated on a Likert scale. The study adopted SERVQUAL instrument to measure the five dimensions of service quality. Cross evaluation on basis of independent t-test indicated that there are better care facilities in private hospitals but at much higher rates than the public hospitals. By identifying the important factors impacting patient satisfaction and investigating discrepancies in treatment quality, this study hopes to make practical recommendations for improving healthcare services in Faisalabad. These findings can help influence policy choices and motivate initiatives to provide more fair, efficient, and patient-centered treatment in both public and private institutions, resulting in improved health outcomes and a stronger healthcare system in the region.

Keywords: Health care, hospital, public, private, quality care, Faisalabad

P.UMDC-7

Analyzing Health Literacy in General Population of Faisalabad

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Introduction: In Pakistan, where educational attainment remains low, health literacy's impact is particularly profound. Many individuals struggle with understanding complex health information, which can lead to diminished health knowledge and poorer outcomes. Health literacy extends beyond basic comprehension to encompass the ability to navigate and utilize health information comprehensively. **Objectives**: 1. To assess the health literacy in the general population of Faisalabad. 2. To determine the role of health literacy in improving quality of life. **Methodology**: Study Setting: The study was done among the general population of Faisalabad. Study Design: Our study design was descriptive cross sectional. Duration: The time of our study was from April 2024 to October 2024.Sample Size: The sample size was 154 people of Faisalabad. Sample technique: We used a simple random method. Inclusion Criterion: Our study included men and women of age group 15- 49 years. Exclusion Criterion: Our study excluded children and older age people. Data Collection: We collected the data from a validated and well-structured questionnaire. Data Analysis: We analyzed data by using software SPSS version 21 and applying Chi square test and using frequency tables. Ethical Approval: We got ethical approval from the institution review board of The University of Faisalabad. **Results:** The research study of 154 participants indicated generally high levels of health literacy; however, 32.5% reported substantial challenges in accessing necessary assistance and communicating effectively with healthcare professionals, while 13.6% demonstrated a marked reliance on provider guidance and exhibited skepticism regarding the credibility of health information .Pearson Chi square test is performed to compare qualification of people with their understanding of health literacy. We obtained p-value 0.009 which is quite significant indicating there is meaningful association between the variables. **Conclusion**: The study illustrates significant progress but also reveals critical areas for improvement, particularly in enhancing patient education and ensuring access to reliable health information.

Keywords: Health Literacy. Skepticism. Variable.

P.UMDC-8

Does Occupation Play A Role? Exploring Occupational Risk Factors for Osteoarthritis in Pakistani Workers

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Background: Osteoarthritis (OA) has emerged as a significant public health concern in Pakistan with increased prevalence in older adults. This led to the discovery of occupational risk factors that may trigger osteoarthritis in people.
Aims: To determine various occupation associated risk factors in Pakistani workers that increases the risk of developing OA.
Methods: A cross-sectional survey involving a random sample of eighty-one people aged 18 years and above from hospitals and working community in various cities of Pakistan. Prevalence rates for individuals with physically demanding jobs in sectors like agriculture, construction, stitching, and manufacturing were determined by inquiring about repetitive stress, prolonged standing, awkward postures, and heavy lifting. Statistical analyses were performed using SPSS (Statistical Package for Social Sciences) to identify factors associated with OA.
Results: This study revealed a positive correlation between age and prevalence of OA with 72% of the individuals aged 50 years and older. Occupationally, prevalence was observed most in homemakers engaged in strenuous household chores (44.44%), followed by teachers (14.82%) and farmers (11.11%). Other occupations demonstrated low prevalence rates. The chi-square analysis revealed a significant association between prolonged occupational duration and OA. These findings suggested that individuals with more than 20 years of physically demanding jobs that included repetitive hand movements and prolonged standing were more prone to OA. Knee joint was the most affected joint.
Conclusion: This study has provided valuable insights into the prevalence and determinants of OA among Pakistani workers. By identifying certain occupational risk factors, such as prolonged standing, lifting weights and repetitive movements, we can develop targeted interventions to prevent this disease and improve worker well-being.

Keywords: Occupational risk factors; Osteoarthritis; Pakistan; Prevalence.

EP.BIOCH-1

Extraction and Evaluation of Bioactive Compounds of Bark of *Terminalia mantaly*

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Terminalia mantaly belongs to Combretaceae family and is used in traditional medicines worldwide. The bark of the tree is rich in tannins. The current study aims to assess the antioxidant, antimicrobial, and anti-diabetic activities of *Terminalia mantaly* bark extracts in methanol, hydroethanol, and aqueous extract. Total phenolic and flavonoid contents were determined as equivalents of gallic acid and catechin, respectively. By using DPPH radical scavenging assay antioxidant activity was determined. The antidiabetic activity was determined by α-amylase inhibition assay and antibacterial activity as well diffusion agar method by using *E. coli* and *B. subtills*. The structural characterization of compounds found in plant extract was carried out by using FTIR and HPLC. High phenolic content in methanol extract (156.8 ± 2.03 mg gallic acid equivalents/100g) and high flavonoid content in hydroethanolic extract (2567 ± 543.4 mg catechin equivalents/100g extract of plant) were found in bark *Terminalia mantaly*. The hydro ethanol extract of bark of *Terminalia mantaly* showed strong capacity to scavenge free DPPH radicals (44.1 ± 3.99% inhibition). The α-amylase activity in hydro ethanol extract (415 ± 75.8% inhibition) was higher than aqueous extract (147 ±_11.9% inhibition), and least (58 ± 2% inhibition) in methanol extract, respectively. Furthermore, the antimicrobial activity of the three extracts (methanol, hydro ethanol, and aqueous) were used against microorganisms (*Escherichia coli* and *Bacillus subtills*) and methanol, hydro ethanol and water extracts showed least activities against *E. coli* and *B. subtills*. A prominent peak at 1032.5cm^{-1} was obtained showing the presence of functional groups such as alcohol, ester, carboxylic acid, and anhydrides in a sample. More research is required to identify the bioactive compounds essential for the pharmaceutical impacts.

Keywords: *Terminalia mantaly*, DPPH Radical Scavenging, Nanosuspension, FTIR

EP.BIOCH-2

Phytochemical Evaluation and Bio-Functional Activities of *Rauvolfia Serpentina* Root Extract

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Traditional medicine uses a wide variety of herbs to treat various illnesses. Roots of *Rauvolfia serpentina* possess antioxidant, antidiabetic, anti-microbial and anti-proliferative activities. Extracts of methanol, hydro-ethanol, and aqueous from the roots of *Rauvolfia serpentina* were used to determine antioxidant, antimicrobial and antidiabetic activity. Antioxidant activity was carried out as total phenolic content (TPC), total flavonoids content (TFC), and 2,2-dipheny1-1-picrylhydrazy1 (DPPH) scavenging assay. The antimicrobial activity was measured by agar well diffusion method and antidiabetic assay were carried out as α-amylase % inhibition. The data was calculated using MS Excel as average and standard deviation (SD). The average ± SD of TPC of methanol, hydro ethanol, and aqueous extract of roots of *Rauvolfia serpentina* was 69.4 ± 3.8, 59.7 ± 4.2, and 53.7 ±4.0 mg GAE/100g, respectively. The average ± SD of TFC of methanol, hydro ethanol and aqueous extract of roots of *Rauvolfia serpentina* was 448 ± 58.5, 784 ± 218 and 357 ±71.6 mg CE/100g, respectively whereas DPPH scavenging assay as % inhibition was70.6 ± 4.7, 205 ±35.8 and 130 ±6.3, respectively. The antibacterial activity was performed by the agar well diffusion method by using two bacterial strains *E. coli* and *B. subtilis*. The methanol, hydro ethanol, and aqueous extract of roots of *Rauvolfia serpentina* showed no activity against *E. coli* and *B. subtilis* except very small activity against *B. subtilis* shown by the aqueous extract. The result of this investigation demonstrated that extract of roots of *Rauvolfia serpentina* with various solvents like methanol, hydro ethanol and aqueous have high antioxidant contents whereas no antibacterial activity against two bacterial strains. The average ± SD of α-amylase % inhibition of methanol, hydro ethanol and aqueous extract of roots of *Rauvolfia serpentina* was 70.6 ± 4.7, 205 ± 35.8 and 130± 6.3, respectively.

Keywords: *Rauvolfia serpentina*, antioxidant activity, total phenolic contents, total flavonoid contents, DPPH assay.

EP.BIOCH-3

Therapeutic activities of phytochemicals of leaf extract of *Putranjiva roxburghii*

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Since ancient times, many plants have been utilized as natural medicines to promote health and treat a wide range of illnesses. *Putranjiva roxburghii* is a botanical remedy that dates back to ancient times.The plant's bark, leaves, seeds, and roots have distinct traditional therapeutic uses. The leaves are used to cure illnesses and are very effective in reducing stiffness. In the current study, methanol, hydro-ethanol, and water leaf extracts of *Putrajaya roxburghii* were used to determine the antioxidant, antibacterial and anti-diabetic potential. The Total phenolic contents (TPC) as gallic acid equivalent, Total flavonoid contents (TFC) as catechin equivalent and antioxidant activity as DPPH radical scavenging assay of leaf extracts of *Putrajaya roxburghii* were determined. The antidiabetic activity of various extracts was determined as α-amylase inhibition assay and antimicrobial activities by using an agar well diffusion method against *E. coli* and *B. subtilis.* MS Excel was used to calculate the mean, and standard deviation (SD) and to make graphs. The mean ± SD of TPC of methanolic, hydroethanolic and water extracts of leaves of *Putrajaya roxburghii* was 124±5.29, 134 ± 7.51, 130 ±4.04 and of TFC was 2118 ±261, 2909 ± 377 and 4179 ±360, respectively. The mean ± SD of DPPH % inhibition of methanolic extract leaves of *Putrajaya roxburghii* was 52.3 ± 5.71 whereas hydroethanolic and water extracts showed no activity. The methanolic and hydro ethanol leaf extract showed small activity against *E. coli*, and *B. Subtills*, respectively whereas water extract showed small activity against both microorganisms. The mean ± SD of % inhibition of α-amylase by methanolic, hydroethanolic, and water extracts of leaves of *Putrajaya roxburghii* was 195 ± 26.6, 94 ±2.08 and 328 ± 27.4, respectively.

Keywords: *Putranjiva roxburghii*, Therapeutic Potential, Antioxidant Activity, Antidiabetic, Medicinal Plant

EP.BIOCH-4

Assessment of Antioxidant, Antimicrobial, Antifungal Activities and Structural Characterization of Extracts of *Crataegus oxyacantha*

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There are many species of Crataegus, which are important members of the Rosaceae family. These members are popular for their extensive histories of utilization in the treatment and management of illnesses of the endocrine and metabolic systems that are detrimental to the health of humans. Crataegus extracts have been shown to have diverse pharmacological outcomes on the cardiovascular system, according to findings of several different studies. These effects include antioxidant, anti-inflammatory, anti-cardiac remodeling, inotropic, hypercholesterolemia, anti-ischemia, hypolipidemia and antibacterial effects. Evaluation and estimation of antioxidant, antimicrobial and antidiabetic (antiglycation and enzyme inhibition assays) activities was conducted by prescribed methods and the data was statistically analyzed. Structural characterization was done by FTIR and HPLC. Total phenolic contents found in methanol, hydro-ethanol and aqueous extracts of *Crataegus oxyacantha* were 20.8 ± 2.8, 29.5 ±4.7 and 24.8 ± 2.8 measured as mg GAE/100g, respectively. Total flavonoids content in methanol, hydro-ethanol and aqueous extracts of *Crataegus oxyacantha* were 217 ±34.4, 292 ± 53.1 and 42 ±7.32 as mg CE/100g, respectively. The percentage of DPPH inhibition in methanol, hydro-ethanol and aqueous extracts of *C.oxyacantha* was 87.55 ± 2.15, 84.86 ± 0.571 and 84.91 ± 2.81, respectively. There was no antibacterial and antifungal activity of methanol, hydro-ethanol and aqueous extracts of *C. oxyacantha against E. coli* & *S.a ureus* and *A. niger.* The antidiabetic activity of *C. oxyacantha* was studied by α-amylase inhibition assay. In this study methanol extract of this plant has 258 ± 50, hydroethanol possesses 297 ± 30 and water extract has 634 ± 76% amylase inhibition. FTIR spectrum obtained confirmed the presence of O-H, C-H, C=C, C=O stretching and CH_2 bending. In current studies five compounds were identified in *C. oxyacantha* by HPLC including chlorgenic acid, gallic acid, HB acid, vinallic acid and P-coumeric acid. This study demonstrated that plant extract had some pharmacological properties.

Keywords: Antioxidant, Antidiabetic, *Crataegus Oxyacantha*, Medicinal plant, Antimicrobial

EP.UMDC-5

Prevalence And Contributing Factors of Burnout Among House Officers
Physicians of Faisalabad

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Introduction: Physician burnout is a rising concern worldwide, impacting both physicians and patients. Despite the global significance, there is limited research done on burnout among house officer physicians of Faisalabad.
Objectives: The aim is to study the prevalence of burnout and their contributing factors in house officer physicians in Faisalabad.
Methodology: Data was collected from House officers of private and public hospitals in Faisalabad. It was a descriptive cross-sectional study. Study duration was from April 2024-October 2024. The research was comprised of 65–100 individuals. A simple random sampling technique was employed. It included House officers currently working in Faisalabad. It didn't include medical students, nurses, and paramedical staff. Data was collected in the form of a questionnaire. We had used the Maslach Burnout Inventory. It was given to 65 individuals who fell in the inclusion criteria. We analyzed data by using software SPSS version 21. We took ethical approval from institution review board of The University of Faisalabad.
Results: Among 65 house officer physicians (25 males, 40 females), 46 (70.77%) were unmarried and 19 (29.24%) were married, with a mean age of 25.54±1.75 years. On the MBI scale, 36.9% showed high emotional exhaustion, 76.6% high depersonalization, and 38.5% low personal achievement. Overall, 35.4% were at risk of burnout, and 38.5% were already affected. Mean scores were 17.50±11.16 for emotional exhaustion, 13.16±9.75 for depersonalization, and 34.61±11.04 for personal achievement. No significant gender association with burnout was found in the chi-square test ($p = 0.264$).
Conclusion: The study shows a high prevalence of burnout among house officer physicians with no gender association. It emphasizes the need for mental health support, improved work conditions, and sufficient resources to create a more supportive work environment.

Keywords: Physician burnout, House Officers, Global Significance

BIOLOGICAL SCIENCES (BIOTECHNOLOGY)

KEYNOTE/INVITED LECTURES

K.BIOT-1.1

Progress and Challenges of Agriculture Biotechnology in Pakistan

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Modern biotechnology was initiated in Pakistan in early 1980's though conventional biotechnology was carried out since 1960s.The Centre of Excellence in Molecular Biology (CEMB) in Punjab University, Lahore was the pioneer institute where research on genetic engineering and M.Phil. degree in Molecular Biology were launched in 1987. There was a boom in establishing modern biotechnology centers during decade 1997-2008 and recent survey indicated that there are over 50 Biotechnology centers in the country, mostly in public sector. The government of Pakistan spent over 20 billion rupees in establishing these modern biotechnology centers. At present more than 500 experts (PhDs) are available in various disciplines of Biotechnology. The ecosystem of adaptation of modern biotechnology is tightly linked to IPR of WTO and Biosafety regulations under UN- sponsored Cartagena Biosafety Protocol (CPB) regimes. Pakistan is not only signatory but ratified the CBP and promulgated Pakistan Biosafety rules-2005 and Pakistan Intellectual Property Rights Organization (IPOP). These developments set the stage for production and release of biotech products. In terms of delivery of products, except GM cotton no other GM crop has been commercially released. The GM (Bt cotton) cotton was officially approved in 2010 which covered almost >95% area under cotton. Pakistan is at number 8 in terms of area under global GM crops ranking. However, significant progress resulted in establishing a robust service sector in molecular diagnostics especially in hepatitis and Covid-19 epidemics. Additionally, in the forensic sector, DNA tests for purity in plants/animals and ownership issues, molecular analysis based on PCR became common and network is present all over Pakistan. The modern biotechnology at present in Pakistan facing multiple challenges and top among that is absence of efficient and rapid approval system of GM crops approval. The system is unable to process imported GM soybean even for Food, Feed and Processing (FFP). The policy for production and release of GM products is available but there are serious governance and capacity issues. The national biotechnologists are in the blind alley and despite specific expertise now forced to shift to other sub-sectors of biotechnology where such regulations are not much needed. The present challenges along with the progress will be elaborated during the presentation.

Keywords: Agriculture Biotechnology, GM crops, Bt Cotton.

K.BIOT-1.2

Algae-Based Decarbonization, Resource Recovery, Recycling and Bioproducts

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Cultivating microalgae and cyanobacteria using city wastewater as low-cost growth media offers a *three-in-one* set of advantages including pollutant removal, mitigation of atmospheric carbon, and subsequent utilization of the biomass to produce biofuels and other high-value bioproducts. The present study was focused on employing microalgae/cyanobacteria for multiproduct algal biorefinery using city wastewater as low-cost growth media. Several algal/cyanobacterial strains including *Pseudoscillatoria coralii* BERC01, *Grasiela emersonii* BERC27, *Bracteacoccus pseudominor* BERC09, *Plectonema terebrans* BERC10, and *Spirulina platensis* BERC15 were characterized for their potential for wastewater cultivation, atmospheric carbon mitigation, and production of biofuels and high-value industrial products. All strains exhibited excellent wastewater cultivation and pollutant removal potential and respectively produced 1.9 g L^{-1}-2.23 gL^{-1} with 3.54-4.2 gL^{-1} of CO_2 fixation ability, along with 100% removal of suspended solids, 50-100% removal of total nitrogen and phosphorus. Moreover, wastewater cultivation improved biomass and lipid production without having any negative impact on the biodiesel composition. Furthermore, 62.9-300 mgg^{-1} of phycobilins were produced by these strains. Biomass has been valorized into multiple products including soil amenders, industrial enzymes, biopolymers, and animal feed (cultured in treated water) while keeping the process carbon-neutral to ensure the low-carbon emission. Besides, each step starting from cultivation, harvesting to biomass processing was studied to improve cost-effectiveness via establishing a cascading biorefinery in a circular biorefinery paradigm. The data demonstrated suitability of urban wastewater for enhanced biomass production while keeping the energy-water-environment nexus sustainable.

Keywords: Low-Cost Cultivation, Multiproduct Cascading Biorefinery, Circular Bioeconomy, Ecological Preservation.

K.BIOT-1.3

Sustainable Industrial Development through Nanotechnology: Challenges and Opportunities

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Nanotechnology, the manipulation of matter at the atomic scale, aligns closely with the United Nations' Sustainable Development Goals (SDGs)**,** offering transformative solutions for sustainable industrial development. Its applications in clean energy (SDG 7) by mimicking photosynthesis for renewable energy production and improving energy storage can significantly reduce carbon footprints. In healthcare (SDG 3), nanotechnology enhances targeted drug delivery and diagnostics, improving health outcomes with fewer side effects. Furthermore, innovations like self-cleaning surfaces and stronger, lightweight materials contribute to sustainable industrialization and responsible consumption (SDG 9 and SDG 12), reducing waste and environmental impact. Thus, nanotechnology provides pivotal contributions to multiple SDGs, fostering sustainable practices across various sectors.

Keywords: Nanotechnology, Sustainable Development Goals (SDGs), Sustainable Industrialization, Clean Energy.

BIOLOGICAL SCIENCES (BIOTECHNOLOGY)

ORAL PRESENTATION

O.BIOT-1.1

Making the Hop: Voyage from Lab to Field

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Currently, strict rules regarding social and environmental concerns are focusing on the elevation of organic compounds, biological inputs, biofertilizers, biopesticides for crop/soil protection and sustainable agriculture. Biofertilizers and biopesticides serve as an eco-friendly substitute to toxic chemicals and form an important component of integrated nutrient management system. Efficiency of both biopesticides and biofertilizers can be increased by molecular approaches. This talk will highlight the role of biofertilizers and biopesticides in crop improvement and hence achievement of sustainable agriculture. Avirulent opportunistic plant symbiotic fungi, especially *Trichoderma* spp. is, widely used as plant growth enhancers as well as antagonistic fungal agents against several pests and diseases. The plant-*Trichoderma* symbiotic association leads to the acquisition of plant resistance to pathogens, improves developmental processes, yield, absorption of nutrient and fertilizer use efficiency. *Trichoderma* spp. have widely been used in agriculture and industry to produce many important commercial enzymes. This presentation will sum up the research work carried out for the utilization of *Trichoderma* spp., as biocontrol and growth promoting agent, and the development of a feasible process to produce ecologically safe *Trichoderma* based bioformulation for field application. The foremost inducement of soil salinization in arable lands is climate change and other related factors including technological, industrial, and agricultural advancements and anthropogenic activities. A substantial decrease in crop production is caused by soil salinity, as it contributes significantly to the reduction of plant growth and yield. NIBGE has developed a sustainable Bio-inoculant specific for saline soils which is comprised of halotolerant plant growth-promoting rhizobacteria and fungi.

Keywords: Biofertilizers and biopesticides, Sustainable Agriculture, *Trichoderma* spp., Saline soils.

O.BIOT-1.2

Fibrinolytic Protein 'Lumbrokinase' has Potential Use in Cardiovascular Disease Treatment or Prevention

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Cardiovascular diseases (CVDs) have become the leading cause of disease-based deaths around the globe. Among different available medications, fibrinolytics are the most frequently used ones, especially in acute Myocardial Infarction (MI) and Stroke. Potent fibrinolytic agents like streptokinase, tissue Plasminogen activator, reteplase, urokinase and nattokinase are being administered; however, certain drawbacks have been reported with their use. Alternately, a unique fibrinolytic protein from the gut of earthworms may be exploited as a potent as well as safe therapy. Tissue specificity of lumbrokinase renders its application safe in term of reduced risk of internal bleeding which is a risk in case of therapies. Similarly, it absorption through oral cavity, makes it suitable for oral administration. Its stability at a wide range of temperatures and pH makes it suitable for industrial level production and wide transport without the need of cold chain. Hence, its production, isolation, characterization and biosafety studies are needed to develop it at industrial scale.

Keywords: Fibrinolysis, Internal Bleeding, Oral Administration, Thermostability, Blood Clots, Heterologous Protein Expression.

O.BIOT-1.3

Stevia rebaudiana: A Natural Sweetener to Maintain Metabolic Health and Prevent Chronic Disorders

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Nowadays, metabolic disorders like obesity and diabetes are the leading causes of an extensive range of human health challenges like hypertension, renal problems, and heart diseases because of the regular consumption of high-calorie sweetened foods and beverages. That's why the demand for zero-calorie sweeteners increased. Some artificial sugar-free sweeteners available on the market, such as sucralose, neotame, aspartame, and canderel, are harmful to health and can cause cancer and phenylketonuria. *Stevia rebaudiana* recently gained prominence among health-conscious people as a natural sweetener without any side effects. Stevia is a calorie-free and highly effective alternative to artificial sweeteners. Leaves of the stevia plant are used as sweeteners in various foods and beverages over all the world. In 1995, the FDA approved that stevia leaf extracts could be used as dietary supplements because it is non-toxic, non-mutagenic, or non-carcinogenic. The health benefits and sweetening capability of stevia leaves are because of the presence of phytochemicals, specifically isosteviol, stevioside, and rebaudioside, including rebaudioside A, B, C, D, E, and F. These compounds are 250–300 times sweeter than sucrose. stevia leaves also contain tannins, vitamins, phytosterols, flavonoids, essential oils, alkaloids, hydroxycinnamic acid, and other miscellaneous compounds with antioxidant and antimicrobial properties. This plant is an excellent source of minerals such as magnesium, calcium, iron, sodium, zinc, phosphorus, and potassium, as well as a valuable source of vital amino acids that are necessary for enhancing the body's defensive system and regulating numerous metabolic functions.

Keywords: *Stevia rebaudiana*, Supplement, Phytochemicals.

O.BIOT-1.4

In-silico Identification of Drought Responsive, Late Embryogenesis Abundant group 4-5 (*LEA4-5*) Gene in Brassica

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Brassica species are widely used for edible oil production, animal feed, and traditional medicine. However, drought stress significantly impacts their yield and quality, particularly in rapeseed, affecting seed development, shoot growth, photosynthesis, and germination. This study explored the drought response in six Brassica species: B. carinata, B. juncea, B. oleracea, B. napus, B. nigra, and B. rapa, focusing on the genome-wide identification of 21 drought-responsive LEA4-5 genes. The identified LEA4-5 genes were grouped into four categories based on evolutionary relationships. Gene structure analysis showed a consistent exon-intron organization, and the predicted LEA4-5 proteins had molecular weights ranging from 13,372.67 kDa to 16,779.43 kDa. A collinearity study indicated segmental duplications of LEA4-5 gene families during evolution. Stress-related cis-acting elements in the promoter regions suggest these genes play a role in drought tolerance. Artificial drought was induced using 5%, 10%, and 15% Polyethylene glycol 6000 (PEG 6000) treatments to assess drought tolerance in the germination and seedling stages. Results showed reduced germination, root and shoot length, fresh and dry weight, and water content with increasing PEG concentrations, demonstrating a clear impact of drought stress. This study highlights the protective role of LEA4-5 genes in drought conditions and provides a basis for identifying Brassica species with enhanced drought resilience. These findings can guide breeding and agricultural practices aimed at improving drought tolerance in Brassica crops.

Keywords: Drought, Late Embryogenesis Abundant Group 4-5, genome-wide, and Polyethylene Glycol 6000.

O.BIOT-1.5

Manipulating the Mitochondrial Genetic System: Current Progress and Future Directions

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Mitochondria are not only key players in cellular metabolism and energy production but also with their own genetic system, they play an important role in cell. The mitochondrial genome encodes for only a few genes, but its expression is complex and essential for survival. Organelle DNA mutations or rearrangements can cause drastic problems in many organisms such as incurable neurodegenerative diseases in humans and cytoplasmic male sterility in plants. Due to this importance, manipulating mitochondrial genetics is thus of relevance. Conventional transformation of these organelles was only achieved in a couple of unicellular organisms, the complex genetic system of animals and higher plant mitochondria could not be studied by transgenic approaches because conventional methods do not permit genetic transformation of these organelles. The importance of the issue stimulated the development of a wealth of alternative strategies for mitochondrial genetic transformation. These include a variety of approaches aiming to transfer DNA into mitochondria and maintain the transfected genetic information, although the problem of selection markers for mitochondrial transformants remains open in most organisms. Conversely, nuclear expression and mitochondrial trafficking of proteins or RNAs through different targeting and shuttling systems have been widely developed to circumvent the need for regular transformation. A number of these methodologies were reported to be successful, for instance to rescue pathogenic mutations in the mitochondrial genome, others are promising. The challenge in the field is currently to define consensus biotechnological tools.

Keywords: Nuclear Expression, Mitochondria, Mitochondrial Genetic Transformation.

O.BIOT-1.6

Biosynthesis of Epoxy Resins using Wood Shavings as Agriculture Waste

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The awareness of environmental implications, and importance of sustainable development have raised interest in exploring renewable feed stocks for the synthesis of bio-based materials including polymers. To develop bio-based polymers such as epoxy resins, the main raw material lignin can be extracted from agricultural waste that is wood shavings. Lignin is a non-renewable complex organic polymer that belongs to the cell wall of plants, and is available frequently in wastepaper and pulp etc. In the present study, wood shavings were used to synthesize epoxy resin using green method (digestion through microorganism) and chemical method (degradation into monomers through Kraft lignin process). The woods shavings were treated with sodium hydroxide (NaOH) and sodium sulfide (Na_2S) to degrade lignin and cellulose hemicellulose complex into simple monomers. *Bacillus subtilis*, a well-studied bacterium for its lignin degradation ability, was used. The resultant lignin monomers are then harvested and characterized by FTIR and NMR spectroscopy. Further, these lignin-derived monomers were processed in a two-stage manner to produce epoxy resin. In the first step, the monomers were dissolved in Tetrahydrofuran (THF) and epichlorohydrin (ECH) at 60°C for 24 hrs in the presence of NaOH. The findings of the study showed that the properties of the bio-based epoxy resin synthesized in this work were equal or somewhat better than the petroleum-based epoxy resin. This biotechnological approach is efficient to produce resins following economic and environmentally friendly techniques.

Keywords: Polymer, Green Synthesis, Epoxy Resins, Biotechnology.

O.BIOT-1.7

Nanomaterials for Plant Disease Diagnosis and Control

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Plant diseases are causing huge damage to agricultural crops around the globe and the loss in yield reaches 75% occasionally. Thus, reliable strategies to control the destruction caused by phytopathogens in agricultural farms are imperative. Several conventional diagnostic procedures to detect phytopathogens are used including serological, immunological and nucleic acid-based detection techniques. Many of these procedures have limitations such as requirement of prior knowledge about pathogens, low sensitivity and lack of detection of several plant pathogens simultaneously. The use of nanomaterials to sustainably control and timely diagnose plant diseases is largely neglected. Various nanomaterials have been extensively used in almost all fields of life; however, there is very limited knowledge and application of these nanomaterials for early diagnosis and control of plant diseases. Nano-sensors coupled with biomarkers could serve as efficient tools in plant disease diagnosis. Such sensors not only detect disease at early stage but also provide quantification of pathogens leading to devise effective control strategies. We developed functionalized CNTs that leverage both their magnetic properties and antibody conjugation capabilities to improve polymerase chain reaction (PCR) diagnostics of *X. fastidiosa,* a phytopathogen of pecan. The results indicate that CNTs significantly enhance efficiency for target capturing of *X. fastidiosa*, thereby increasing the sensitivity and reliability of pathogen detection compared to conventional DNA extraction methods and Dynabeads, a commercial immunomagnetic material. Moreover, we also synthesized green nanoparticles to effectively control various phytopathogens.

Keywords: Nanomaterials, Phytopathogens, Detection, Xyllela, Antimicrobials.

BIOLOGICAL SCIENCES (BIOTECHNOLOGY)

POSTER PRESENTATION

P.BIOT-1

Bacillus subtilis Mediated Synthesis of Zinc Oxide Nanoparticles for Treatment of Wastewater

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In the present study, ZnO nanoparticles have been biosynthesized and characterized using the biologically clean method with the help of Bacillus subtilis. Their efficiency in treating wastewater and assessing the environmental effects was also studied. Different analytical techniques were employed in the course of the study like; X-Ray diffraction used in the determination of average particle size, transmission electron microscopy and Fourier-transform infra-red spectroscopy, to analyze and identify the shape, size and chemical nature of the nanoparticles synthesized. The wastewater treatment process involves incorporating ZnO nanoparticles produced by Bacillus subtilis to the samples of wastewater and then observing the modifications in the critical water quality indexes. The efficiency of the treatment process is determined by the capacities to which specific substances, including heavy metals such as chromium, lead and mercery; organic compounds, and pathogens are eliminated. Further, it looks into the sustainability aspect by exploring and analyzing the future stabilities and recyclability of the nanoparticles. Disposal assessment is the assessment of any nanoparticles existing in treated water and the testing of the effects of the treated water on the environment. These methods include biochemical testing of microorganisms and the determination of the gene source of microbial pollution to determine the load of the microorganisms in the purified water. From the preliminary data, it can be stated that ZnO nanoparticles synthesized by Bacillus subtilis can have rather perspective efficacy in treating wastewater, removing considerable amounts of pollutants. Furthermore, the environmental impact assessment indicates a low level of harm to the ecosystem and offers valuable information about the behavior of nanoparticles in the water after treatment. This research enhances the developing field of wastewater treatment by offering a thorough comprehension of the possible advantages and difficulties linked to the utilization of nanoparticles. The main purpose of this research is to provide information that can be used for wastewater treatment technologies that are both sustainable and effective. These technologies will have implications for protecting the environment and promoting public health.

Keywords: Wastewater, Nanoparticles, Heavy Metals, Zinc Oxide, *Bacillus subtilis*.

P.BIOT-2

Removal of Complex Organic Dye(s) in Industrial Wastewater Using Photolytic Degradation Exploiting Nanostructure-Material(S)

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The textile industry holds considerable global significance, it simultaneously emerges as a primary source of wastewater production, contributing to water scarcity and ecological toxicity. Metal nanoparticles decorated with manganese are rapidly developing material for removal of dye from wastewater. In this regard, Iron nanoparticles doped with manganese (Fe-Mn) were synthesized using co-precipitation and hydrothermal method. The physicochemical properties, photocatalytic and adsorbent capacity of the synthesized materials were investigated. The synthesized nanomaterials were characterized through SEM, FTIR, AFM and Zeta sizer. SEM images show the crystalline morphology of FeO while spherical and elongated shape of Fe-Mn nanocomposites. SEM and AFM analysis confirms high surface area of nanocomposites, having slightly negative zeta potential of (-2.71mV). The as-synthesized nanocomposites showed enhanced adsorption of methylene blue dye in dark in comparison to iron nanoparticles alone. The optimum concentration of Fe-Mn was found to be 0.3 mg/L for adsorption of 300-600 mg/L dye in 30 minutes. The removal percentage revealed that the adsorption of methylene blue dye was adsorbent dose-dependent and exhibited the best fit with experimental data. The removal efficiency of nano composites was 85% in normal pH and it was increased to > 90 % in lower pH. The efficiency of simple iron oxide was increased from 50 % to 70 % while the pH scale went to upper level. The adsorption equilibrium for these nanoparticles was achieved in 15 min of adsorption. Therefore, the synthesized Fe-Mn nanocomposite shows great potential for sustainable wastewater management and various biomedical applications such as sensors, and catalysis in the future.

Keywords: Nanostructure, Industrial Wastewater, Photolytic Degradation.

P.BIOT-3

Optimization and Characterization of Layered Double Hydroxide (LDH) Nanoparticles for DNA Binding

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The enhancement and characterization of Mg-Al Layered Double Hydroxide (LDH) nanoparticles for DNA binding have shown promise in gene therapy and nanomedicine. These nanoparticles exhibit unique anion-exchange characteristics, biocompatibility, and potential as efficient gene-delivery carriers. This study aims to optimize synthesis conditions, focusing on the Mg-Al molar ratio, pH, and aging time during a controlled co-precipitation process. $MgCl_2$ and AlCl3 were dissolved in water, mixed with sodium hydroxide, and stirred vigorously. The resulting precipitate was centrifuged, washed, and autoclaved to form LDH crystals. Fourier-transform infrared spectroscopy (FTIR) confirmed effective DNA intercalation, while transmission electron microscopy (TEM) and scanning electron microscopy (SEM) revealed uniform nanoscale particle size critical for cellular uptake. Zeta potential measurements indicated strong electrostatic interactions between the positively charged nanoparticles and negatively charged DNA.UV-Vis spectroscopy and gel electrophoresis confirmed high DNA binding efficiency. The release study demonstrated a controlled release profile, enhancing therapeutic effects while minimizing side effects. The protein corona test assessed nanoparticle interactions with biological fluids, influencing cellular distribution and immunogenicity. Overall, optimized Mg-Al LDH nanoparticles exhibited high DNA adsorption capacities, non-toxicity, and good cell permeability, suggesting their potential in drug delivery systems. Future directions include in vivo studies and the development of multifunctional nanocarriers to enhance therapeutic impacts.

Keywords: Layered Double Hydroxide (LDH), DNA binding, Gene therapy, Nanomedicine.

P.BIOT-4

Enhanced Remediation of Dye-Contaminated Water By Floating Treatment Wetlands Intensified With Nutrients, Aeration And Bacteria

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The production and application of synthetic dyes for fabric dyeing have become a vast industry and is a top contributor of industrial effluents. Synthetic dyes have produced a wide variety of colorfast, vivid hues. However, their hazardous nature has become a source of great concern among environmentalists. The use of synthetic colors harms all kinds of. Methylene blue dye is one of the contaminants found in production facilities that produce textiles, cosmetics, plastic, food, and paper. Floating treatment wetlands (FTWs) are on the cutting edge of affordability and innovation. These offer an eco-friendly and highly sustainable solution to polluted water remediation. The goal of this research is to investigate the influence of intensification in FTWs for remediation of dye laden textile effluent. The selected plants, Leptochloafusca L. and Brachiariamutica are native species and locally available. For intensification purpose, treatments were supplemented with nutrients (NPK), aeration, and dye-degrading bacteria. Water analysis for pH, electrical conductivity (EC), total dissolved solids (TDS), chemical oxygen demand (COD), and biochemical oxygen demand (BOD) were performed. Inoculated bacteria persistence in the water, roots, and shoots was also determined. Moreover, plant growth parameters were also determined. The results revealed a reduction in all pollution parameters. 90% COD and 88% BOD reduction was observed. Among various treatments, FTWs vegetated with L. fusca and *B. mutica* exhibited high efficiency when augmented with bacteria and supplemented with aeration. The inoculated bacteria survived in the plants' water, roots, and shoots. This study revealed that FTWs technology is an excellent option for treating methylene blue-contaminated water. The research establishes a basis for creating scalable and sustainable water treatment systems by clarifying the mutually beneficial impacts of bacteria, aeration, and nutrients.

Keywords: Floating Treatment Wetlands (FTWs), Phyto-remediation, Wastewater, Textile effluents, Methylene blue.

P.BIOT-5

Evaluation of the Potential of Indigenous Filamentous Microalgal Strain Berc11 for the Removal of Pollutants Using Wastewater

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Algae-based technologies are a promising answer for addressing societal challenges, including access to recycle wastewater and zero-carbon energy, and a strong candidate for the circular economy. This research was aimed to evaluate the resource recovery behavior of a novel indigenous filamentous microalgal strain BERC11 to transform it into organic biomass. The strain BERC11 was selected from PhycolBank (Microalgae Culture Collection at Government College University Faisalabad), To identify the strain, a 616 nucleotide fragment of 16S rRNA was amplified, sequenced, and subjected to phylogenetic analysis which showed the highest similarity (87%) with Geitlerinema splendidum. Compared to the cultivation in BBM (Basal Bold Medium), BG11(Blue-green media), and MBG11 (modified Blue-green media), BERC11 showed the highest growth in MBG11 (modified Blue- green media), where a biomass production, biomass productivity, and CO2 utilization rate of 634.73±142.88 mg/L, 42.32±9.53 mg/L/d, 76.68±17.94 mg/L were measured, respectively, based on dry weight. Considering the unstable nature of actual wastewater, BERC11 was subsequently grown and examined in both autoclave municipal wastewater (MWW) and industrial wastewater (IWW). The productivity of carbohydrates, proteins, and lipids increased in wastewater by 1.90-folds, 1.24-folds, and 1.07-folds, respectively, compared to the control (MBG11). The pollutant removal potential of G. splendidum BERC11 was also increased. The nitrogen removal percentage from MWW was 70.85%, while the nitrate removal percentage was 75.61%. The phosphorous removal percentage was 94.21%, and the phosphate removal percentage was 72.22%. The removal percentages for COD, BOD, and bicarbonates were 75.84%, 74.82%, and 38.59%, respectively. From IWW, the removal percentages were 56% for nitrogen, 68.75% for nitrates, 71.43% for phosphorous, 99.98% for phosphate, 80.09% for COD,77.34% for BOD, and 25.60% for bicarbonates. These findings justify that G. splendidum BERC11 has the potential for producing biorefineries with economic benefits by using wastewater as cultivation media and environmental sustainability.

Keywords: Indigenous Cyanobacterial strain, Biomass production, CO_2 fixation, Nitrate, Phosphate and bicarbonate removal; resource recover

P.BIOT-6

Optimization And Characterization of Layered Double Hydroxide (Ldh) Nanoparticles for Dna Binding

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Mg-Al Layered Double Hydroxide (LDH) nanoparticles are gaining attention for their potential in gene therapy and nanomedicine due to their biocompatibility, anion-exchange properties, and ability to serve as efficient gene-delivery carriers. This study aimed to optimize synthesis conditions and enhance the DNA-binding and cellular absorption capacities of Mg-Al LDH nanoparticles. Key synthesis factors, including Mg/Al molar ratio, pH, and aging time, were adjusted using the co-precipitation technique to achieve nanoparticles with optimal properties for drug delivery. Fourier-transform infrared spectroscopy (FTIR) confirmed DNA intercalation within the LDH layers, while transmission electron microscopy (TEM) and scanning electron microscopy (SEM) showed uniform nanoscale particle distribution, crucial for cellular uptake. Zeta potential measurements indicated strong electrostatic interactions between negatively charged DNA molecules and the positively charged LDH surface, facilitating high DNA binding. UV-Vis spectroscopy and gel electrophoresis confirmed efficient DNA loading. The nanoparticles exhibited a controlled and sustained release profile, critical for achieving the desired therapeutic effects while minimizing side effects. Gel electrophoresis was used to assess DNA-nanoparticle binding by comparing DNA diffusion with and without LDH nanoparticles. The protein corona test further evaluated the interactions of LDH nanoparticles with biological fluids, providing insights into their behavior in the body, including cellular interactions, distribution, and immunogenicity. Overall, the optimized Mg-Al LDH nanoparticles demonstrated high DNA adsorption, non-toxicity, and good cell permeability, making them promising candidates for drug delivery systems. Future research should focus on in vivo studies, targeting strategies, and developing multifunctional nanocarriers to enhance therapeutic efficacy in clinical settings.

Keywords: Nanoparticles, Co-Precipitation, Biodegradability and biocompatibility.

MANAGEMENT SCIENCES

KEYNOTE/INVITED LECTURES

K.MGT-1.1

Transform your Business into an AI-centric Business Model

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In today's rapidly evolving digital landscape, businesses must adapt to stay competitive, and one of the most transformative approaches is integrating Artificial Intelligence (AI) into the core of their business model. This shift to an AI-centric business model goes beyond mere automation, enabling organizations to leverage AI's capabilities in data analysis, decision-making, and customer engagement. By embedding AI into every facet of operations—from supply chain management to marketing strategies—businesses can unlock unprecedented efficiencies, reduce operational costs, and create personalized customer experiences that drive loyalty and growth. This transformation requires a comprehensive rethinking of traditional business models, focusing on AI as a central component rather than an add-on. It involves re-engineering processes, re-skilling the workforce, and adopting an agile mindset to innovate and evolve continuously. Additionally, ethical considerations and data privacy must be prioritized to build trust and ensure responsible AI use. As AI advances, businesses transitioning to an AI-centric model will gain a competitive edge, positioning themselves as industry leaders. Let us explore the strategic steps and critical benefits of transforming a business into an AI-centric model, emphasizing the importance of aligning AI technology with business goals, and customer needs to achieve sustainable success in the digital era.

Keywords: Digital transformation, AI-centric business model, Customer engagement, Operational efficiency

K.MGT-2.1

Knowledge Hiding Culture in Academia

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The phenomenon of knowledge hiding in academia is a paradoxical challenge within institutions that are fundamentally built on the principles of knowledge sharing and dissemination. Knowledge hiding refers to the intentional concealment of information that could be beneficial to others. This behavior can manifest in various forms, such as evasive hiding, playing dumb, or rationalized hiding. In academia, knowledge hiding can be driven by several factors, including competition for limited resources, fear of intellectual theft, and the desire for personal recognition and advancement. Academics may withhold information to maintain a competitive edge in publishing, securing grants, or achieving tenure. This behavior, while self-serving, can have detrimental effects on the collective progress of knowledge and innovation. The culture of knowledge hiding undermines collaboration and trust among colleagues, leading to a fragmented academic community. It can stifle creativity, hinder the development of new ideas, and slow down the overall progress of research. Moreover, it creates an environment of suspicion and distrust, which can further perpetuate the cycle of knowledge hiding. Addressing this issue requires a multifaceted approach, including fostering a culture of openness and collaboration, implementing policies that reward knowledge sharing, and providing platforms for secure and transparent communication. By promoting a more inclusive and cooperative academic environment, institutions can mitigate the negative impacts of knowledge hiding and enhance the overall quality and impact of academic research.

Keywords: Knowledge hiding culture, Academic integrity, Research innovation.

MANAGEMENT SCIENCES

ORAL PRESENTATION

O-MGT.1.1

Impact of Phygital Experience on Consumer Retention: Mediating Role of Consumer Empowerment

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Based on the stimulus organism response model, the study aims to assess the impact of phygital experience on consumer retention with the mediating role of consumer empowerment. The data were collected from 200 respondents using convenient sampling technique. The study used SPSS and Smartpls 4 for data analysis. The results showed significant impact of phygital experience on consumer empowerment. Consumer empowerment and consumer satisfaction significantly influence consumer retention. Furthermore, consumer empowerment significantly mediated the relationship between phygital experience and consumer retention. However, the relationship between retailer unreliability remained non-significant with consumer retention. The study is beneficial for the organizations and professionals dealing with fashion brands.

Keywords: Phygital Experience, Retailer Unreliability, Consumer Satisfaction, Consumer Empowerment, Consumer Retention.

O-MGT.1.2

Careerism and Career Success: Mediating Role of Impression Management

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With the increasing competition in the global market, there have been tremendous changes in technological, political and economic environment. The changing nature of employment practices has made individuals more mindful of their careers. Proactive career behaviors have become increasingly important in today's career environment. With shifts in job security, the rise of gig and remote work, and rapid technological advancements, people are taking a more active role in shaping their career path. This study focuses on careerism as an antecedent of career success. The negative aspect of careerism still dominates the existing literature, but less attention has been paid on examining its bright side. Drawing on social influence theory, this study empirically investigates the link between careerism and career success. The unfolding of the mediating role of impression management in investigating the relationship between careerism and career success is a novel and promising contribution to the existing literature. This study uses a structural equation modeling technique on a three-wave time-lag primary data (N=329) collected from employees of service sector organizations in Pakistan. The findings reveal that careerism enhances the career success though underlying mechanism of impression management. This study extends literature on the positive side of careerism. This study also contributes to research on social influence theory and careerism in today's turbulent career landscape and provides insightful theoretical contributions and important practical implications.

Keywords*:* Careerism, Impression Management, Career success

O-MGT.1.3

Workplace Bullying and Job Performance: Mediating Role of Eustress

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This study introduces a novel perspective on workplace bullying by exploring the conditions under which bullying may lead to positive outcomes. It investigates the mechanisms through which the negative impacts of bullying can be transformed into opportunities for personal growth or enhanced job performance. Grounded in the cognitive appraisal theory of stress and coping, the research proposes that eustress, a positive form of stress, functions as a key mechanism by which workplace bullying can improve victims' job performance. The study collected data from 250 employees and their peers in the service sector of Pakistan over three-time intervals with a 2–3-week time lag. Structural Equation Modelling (SEM) was employed to analyse the data, supporting the hypothesized mediation model. The findings reveal that workplace bullying, through the mechanism of eustress, can lead to improved job performance, career success, and employee creativity. This study contributes to the literature on workplace bullying by emphasizing the potential for positive outcomes within an Eastern cultural context, where cultural norms may shape employees' responses to workplace challenges differently. The study also offers several practical implications. While workplace bullying typically has detrimental effects on job performance, the findings suggest that organizations can mitigate these effects by encouraging environments that urge on open communication, trust, and mutual respect. Establishing clear policies and procedures to address workplace bullying is essential. Organizations should also consider implementing support mechanisms, such as counselling services, employee assistance programs (EAPs), and anonymous reporting tools, to provide immediate support to those affected by bullying. These steps may help reduce bullying incidents and promote a healthier organizational culture.

Keywords: Workplace Bullying, Job Performance, Eustress.

O-MGT.1.4

Determinants of Halal Cosmetics Repurchase Intentions: Insights from Muslim Consumers in Emerging Markets

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The global halal cosmetics market is rapidly expanding, driven by significant consumer interest from emerging markets. This study delves into the key determinants influencing repurchase intentions for halal cosmetics among Muslim consumers, explicitly focusing on Generation Z in Faisalabad, Pakistan. The study was conducted in this specific context as social media, a significant influencer of consumer attitudes, drives more environment-friendly behavior. An online survey was conducted to test the latent hypotheses of a suggested conceptual model. The researchers collected data from 300 participants, of which 243 valid responses were analyzed using Smart PLS. The study examines the impact of various factors on consumer's repurchase intentions, including perceived product quality, brand trust, adherence to halal standards, and marketing communication. The results indicated that quality and other factors that concern the particular product and its compliance with the standards of halal certifications give a strong impetus to the consumers' choice. Brand credibility is most relevant as it is closely linked with evaluations of the product's reliability and legitimacy. Hence, there are moderate effects on perceived benefits and values, whereas marketing communication, which communicates the brand's adherence to halal standards and ethical practices, influences repurchase intention. A focused marketing communication strategy to draw the attention of customers to brand values and qualities will enhance customer loyalty. These findings are useful for marketers and policymakers seeking to improve their understanding of customer loyalty to increase their market share in the rapidly evolving halal cosmetics market. Practical recommendations are to emphasize the improvement of brand trust, adherence to the strict requirements of the halal certificate, and using the proper channel of marketing initiatives focusing on Gen Z's values. So, these strategies will help businesses to better meet the changing needs by increasing the knowledge of consumer behavior in emergent markets

Keywords: Halal Cosmetics, Repurchase Intentions, Muslim Consumers

O-MGT.1.5

Knowledge Management Proficiencies and Organizational Risk-Taking for Business Model Innovation in SMES's

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In a business environment with fast growing communication and information technologies, knowledge management proficiency is a beneficial source of innovation. However, little is known about the knowledge management proficiency that leads to business model innovation (BMI) and their effect is dependent upon the firm orientation towards risk taking. This study aims to examine the role of knowledge management proficiencies in organizational risk-taking in SMEs. The data, collected thorough questionnaires, were examined using structural Equation modeling (SEM). The study found a significant role of knowledge management proficiencies in organizational risk-taking in SMEs. The findings of the study are useful for policymakers.

Keywords: Knowledge Management, Business Model Innovation.

O-MGT.1.6

Impact of Culture and Commitment on Perceived Organizational Performance: A Context of Public Sector of Pakistan

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This study examines the impact of employee commitment and organizational culture on perceived organizational performance, with a focus on Sui Northern Gas Pipelines Limited (SNGPL) in Lahore. Performance outcomes are significantly shaped by organizational culture, which is described as the common attitudes, values, practices, and behaviors that direct employees' actions inside a corporation. The emotional and psychological relationship that employees have to their company is known as employee commitment, and it plays a significant role in determining both productivity and creativity. To find out how these elements affect SNGPL workers' opinions on organizational performance, the research sent 300 questionnaires to the company's workforce. The results show that greater perceived performance is positively correlated with a strong and coherent organizational culture, where workers' values and norms are in line with the company's objectives. An atmosphere that is favorable to success is created by a culture that encourages cooperation, goal alignment, and general efficiency. Furthermore, the research indicates that workers who exhibit a strong sense of dedication make a substantial contribution to enhanced performance evaluations. Higher levels of creativity, productivity, and problem-solving skills are typically displayed by committed personnel, all of which improve organizational outcomes. The study emphasizes how crucial dedication and culture are to an organization's success. In order to maintain a competitive advantage and guarantee ongoing performance increases, it advises management to give priority to initiatives that will build cultural alignment and increase employee commitment. Establishing a culture of support and strengthening employees' emotional attachment to the company may greatly enhance its long-term efficacy and performance.

Keywords: Culture, Training and Development, Reward and Recognition, Communication, Job Satisfaction

O-MGT.2.1

Impact of Green HRM on Organization Sustainability: Mediating Role of CSR

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This study examines the impact of green human resource management (GHRM) practices on organizational sustainability, focusing on the mediating role of corporate social responsibility (CSR) within Pakistan's IT industry. It explores how GHRM practices (such as green recruitment, training, performance management, and employee engagement) affect long-term sustainability by aligning HR policies with ecological goals. By incorporating CSR as a mediating factor, the research assesses whether GHRM effectively contributes to sustainable outcomes through enhanced corporate responsibility towards society and the environment. Utilizing a quantitative approach, the study combines quantitative data from employee surveys and organizational performance metrics with qualitative insights from questionnaire with HR professionals. The research used some statistical tools such as means, standard deviations, and correlation coefficient, as well as a statistical program (SPSS V.23). Findings reveal that GHRM significantly influences sustainability, with this impact being amplified when CSR activities are well-integrated into the corporate framework. The study concludes that CSR not only strengthens the relationship between GHRM and sustainability but also serves as a crucial conduit for translating green HR initiatives into tangible environmental and social benefits, offering valuable implications for IT organizations in Pakistan in achieving sustainable development goals.

Keywords: Green HRM, Organizational Sustainability, Corporate Social Responsibility.

O-MGT.2.2

Factor Affecting Tax Preparation Error Among Tax Professionals in Pakistan

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Tax systems rely extensively on tax professionals to ensure accurate and compliant tax filings. However, tax preparation errors persist as a global issue, despite the expertise of these professionals. This study highlights the crucial role of tax law compliance in influencing the relationship between self-recognition, work engagement, co-worker support and ethical decision-making, and its impact on reducing tax preparation errors among tax professionals in Pakistan. The research, involving a sample of 317 tax professionals from Pakistan selected through stratified random sampling, utilizes a deductive approach based on the tax law compliance theory. Structural equation modelling, applied through Smart PLS, is employed to analyze the relationships among variables quantitatively. This study contributes to the tax law compliance theory by incorporating ethical decision-making as an independent variable and tax law compliance as a moderating variable. The study finds that self-recognition is positively related to tax preparation errors, whereas work engagement is negatively associated with these errors. The role of tax law compliance as a moderator is particularly significant. It significantly alters the effect of ethical decision-making on error rates, turning an initially insignificant effect into a significant negative one under conditions of low or moderate compliance. Additionally, tax law compliance changes the relationship between self-recognition and errors, converting a positive association to a negative one at high compliance levels. Compliance also strengthens the negative relationship between work engagement and tax preparation errors, with this effect being more pronounced under high compliance conditions. Based on these findings, policymakers should align regulatory practices with strategies to enhance professional engagement and ethical behavior. By enforcing stringent compliance measures and fostering higher levels of self-recognition and engagement, the quality of tax preparation can be significantly improved, ultimately benefiting both the financial system and society at large.

Keywords: Tax Law Compliance, Ethics in Decision Making, Self-Recognition, Work Engagement, Tax Preparation Error, Tax Professionals.

O-MGT.2.3

Role of Leadership Humility and Psychosocial Safety Climate in Career Success through Living a Calling and Job Crafting

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In the current era of globalization and rapid technological advancement, the career success of individuals in recent years has become a crucial factor for economic growth, social mobility and sustainable competitive advantage of the organizations serving in developing countries. For survival, sustainability, and innovation, organizations struggle to meet the challenge of brain drain, which can be possible if their workforce feels successful in their careers. Therefore, this study investigates how individuals who perceive their work as a calling engage in job crafting to achieve career success. This study also examines the moderating effect of psychosocial safety climate on the relationship between living a calling and job crafting and the moderating role of leadership humility on the relationship between job crafting and career success. The data for the present study was collected in two different intervals to minimize the common method bias from 329 individuals working in manufacturing and service sector organizations. Moreover, data were analyzed using Smart-PLS statistical software using statistical techniques of confirmatory factor analysis bootstrapping method for direct, indirect and moderation effects. The findings of this study reveal that living a calling positively impacted career success through job crafting. Furthermore, a higher psychosocial safety climate strengthens the relationship between living a calling and job crafting. In contrast, a higher level of leadership humility triggers the career success of individuals with job crafting. The present study contributes to career management, leadership and motivational psychology when individuals motivate themselves by living in their callings. The humbleness of leadership also works as a source of motivation and influences the career success of individuals when they feel a higher state of mind about job crafting. This study enlightens the conservation of resource theory by explaining the crucial organizational source, i.e., psychosocial safety climate and leadership humility, from which individuals get motivated and invest in job crafting, which leads to higher career success.

Keywords: Living a Calling, Job Crafting, Career Success, Psychosocial Safety Climate, Leadership Humility.

O-MGT.2.4

The Effect of ESG Performance on Stock Market Volatility: A Case Study of Pakistan

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This study investigates the impact of environmental, social, and governance (ESG) performance on stock market volatility in the context of Pakistan, a developing economy with a growing emphasis on sustainable practices. As global investors increasingly consider ESG factors in their investment decisions, understanding their influence on market behavior in emerging markets is crucial. Using a sample of publicly listed Pakistani firms from 2010 to 2023, the study applied econometric techniques such as regression analysis to quantify the relationship between ESG performance metrics (e.g., environmental scores, social impact indices) and stock market volatility measures (e.g., standard deviation of stock returns, beta). The findings reveal that firms with higher ESG scores experience lower stock market volatility, suggesting that strong ESG practices may serve as a stabilizing factor in volatile market conditions. Furthermore, the study identifies that among the three ESG components, governance has the most significant impact on reducing volatility, followed by environmental and social factors. These results underscore the importance of corporate governance in enhancing market stability. The study contributes to the existing literature by providing empirical evidence from Pakistan, a market where ESG research is relatively nascent. It also offers practical insights for investors and policymakers in developing economies, highlighting the potential benefits of integrating ESG considerations into investment strategies. The findings suggest that promoting robust ESG practices could mitigate risk and foster a more stable financial market in Pakistan.

Keywords: Environmental Social Governance, Stock Market, Volatility, Investors.

O-MGT.2.5

Impact of Risk Management and Board Effectiveness on Firm Performance in Pakistan: Moderating Role of Corporate Governance

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Interest in the connection between corporate governance and firm performance has surged due to major global corporate scandals and failures. Companies are investing heavily in both tangible and intangible resources to enhance their performance and secure a competitive edge in today's unpredictable market. This study investigates the links between risk management, board effectiveness and corporate governance. It also examines the moderating roles of corporate governance. Utilizing the resource-based perspective theory and agency theory, the study explores how corporate governance impacts on firm performance. A quantitative research design was utilized to investigate the key factors affecting firm performance. A convenience sampling technique was used to ensure the inclusion of firms from various industries and sectors in Pakistan. The findings showed a positive relationship between risk management, board effectiveness, and corporate governance. Additionally, corporate governance played a significant moderating role in the relationship between these factors and firm performance.

Keywords: Risk Management, Board Effectiveness, Corporate Governance, Firm's Performance.

O-MGT.2.6

Effect of Rewards, Organizational Support, Values and Job Enlargement on Job Retention: Moderating Role of Environment

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The aim of this study is to investigate the effect of rewards, organizational support, values, job enlargement, and job security on employee retention. Considering organizational environment as a moderating factor while using Herzberg's two-factor motivation-hygiene theory. This study was conducted on 50 employees purposefully from 5 SMEs of the food industry of Faisalabad. The researcher used convenience sampling technique to test the hypotheses. The results show that a good reward system, better organizational support concerning the environment provided, leads to better retention of employees in SMEs of Faisalabad. In addition, the results also indicate that the company environment moderates the relationship between employee retention and rewards. The results proved that reward is the significant factor which affects human retention the most. However, job enlargement is a non-significant factor. The results suggest that companies like SMEs should focus on rewarding their employees to retain them while providing a good organizational environment.

Keywords: Employee Retention, Rewards, Job Enlargement, Work Environment.

MEDICINE AND ALLIED HEALTH SCIENCES
(REHABILITATION SCIENCES)

KEYNOTE/INVITED LECTURES

K.DPT-1.1

Effects of Virtual Rehabilitation on Upper Extremity Motor Recovery in Patients with Subacute Stroke

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Introduction: Stroke is a prevalent neurological condition that is ranked as the second leading cause of mortality worldwide causing the disturbance of the motor function which is main cause of the debilitation that influences both upper and lower extremities leading to hinderance in independent performance of daily activities. Neurological symptoms occurring suddenly following a stroke vary differently depending upon the site and nature of the lesion.
Objectives: To investigate the effects of Virtual Rehabilitation using Microsoft Xbox Kinect game training on the upper extremity motor rehabilitation of sub-acute post stroke survivors.
Methods: A randomized controlled trial was conducted on 52 subacute stroke patients enrolled with non-probability convenient sampling at Re Active Rehabilitation Center, Faisalabad. Out of 52 Patients 26 were included in Group A (Virtual Rehabilitation (VR) training and Conventional Therapy) and 26 in Group B (Conventional Therapy). The Subjects were followed up at baseline and at 4 weeks post treatment. The comparative analyses of variables were carried out with-in the groups and between the groups
Results: Both VR along with the conventional therapy and conventional therapy alone improved upper limb motor response in pre- to post-intervention analysis ($p<0.05$). No statistically significant results were seen in modified ashworth scale between group A and B, whereas on comparison, VR plus conventional therapy produced statistically significant results in fugl meyer assessment, the motricity index and the brunnstrom recovery stages as compared to conventional therapy alone.
Conclusion: Virtual reality rehabilitation as provided by Kinect-based game training and conventional therapy alone were effective in the upper extremity motor recovery, but the effects produced by virtual therapy along with the conventional therapy were more statistically significant as compared to conventional therapy alone.

Keywords: Subacute stroke, Virtual Reality, Fugl Meyer Assessment, Motricity Index, Modified Ashworth Scale.

K.DPT-1.2

Active Cycle of Breathing Techniques Improves Postoperative Pulmonary Complications in Coronary Artery Bypass Graft Surgery Patients

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Objectives: To determine effects of active cycle breathing technique (ACBT) on pulmonary function of post coronary artery bypass Graft surgery (CABG) patients.
Methodology: A randomized control trial was conducted with a sample size of 40 post CABG patients from September 2018 to January 2020. Vitally stable both male and female post CABG Consecutive patients of age bracket 30-65 years were included in study. Two groups were made by randomization through sealed envelope method. Patients in ACBT group (n=20) did ACBT whereas control group (n=20) performed deep breathing exercises along with conventional treatment. Lung volumes & capacities, vitals (heart rate, respiratory rate, oxygen saturation and blood pressure) and chest expansion were assessed at baseline and on fifth post-operative day. Data was analyzed using SPSS version 21.
Results: Out of all the 40 patients 26 (65%) were males and 14 (35%) were females with the mean age of 53±7.9 years in conventional and 56±5.9 years in group performing ACBTs. There was significant improvement in Forced Expiratory Volume (FEV1) and chest expansion ($p \leq 0.05$) of ACBT group. However, within group analysis revealed significant improvement in all parameters of both groups ($p < 0.01$)
Conclusion: Active cycle breathing technique has beneficial effects in improving FEV1 and chest expansion as compared to traditional physical therapy in post CABG patients during phase I of cardiac rehabilitation.

Keywords: Active Cycle of Breathing Technique, Chest Expansion, Coronary Artery Bypass Graft, Forced Expiratory Volume in 1sec, Forced Vital Capacity, Peak Expiratory Flow Rate.

REHABILITATION SCIENCES

ORAL PRESENTATION

O.DPT-1.1

Effect of Virtual Reality on Trunk Control and Gross Motor Function in Children with Developmental Delays

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Developmental delay often manifests as impaired trunk control, hindering overall motor function progression in children. Virtual Reality (VR)-based interventions have emerged as promising avenues for enhancing motor abilities and functional independence, particularly due to their capacity to engage children through immersive experiences. However, research on the effectiveness of fully immersive VR-based training remains limited. The aim of the study was to assess the effectiveness of VR based intervention focused on trunk control exercise in improving trunk control, Gross motor function and cognitive aspects in children with developmental delays. A Randomized Control Trial was conducted for 6 weeks (3 alternating days a week), involving 22 children with developmental delays randomly assigned to either the virtual reality group or an active control group. The active control group received neurodevelopmental technique based on handling and facilitation principle whereas other group received virtual reality-based intervention. The Gross Motor Function Measurment-88 and Trunk Control Measurement Scale were utilized to measure gross motor function and trunk control, respectively. Cognitive states including consciousness, emotional state, and social orientation were also assessed using HINE Performa. Both the virtual reality group and an active control group demonstrated significant improvements in Gross Motor Function Measurment-88 and Trunk Control Measurement Scale scores post-intervention. However, the Virtual reality group exhibited greater enhancements in Gross Motor Function Measurment-88 dimensions slightly more in B-dimension and total score, as well as Trunk Control Measurement Scale scores and cognitive states including consciousness, emotional state, and social orientation compared to the active control group. VR-based neurodevelopmental treatment focused on trunk control exercise depending on the principle of handling and facilitation proves to be effective in enhancing gross motor function, trunk control, and cognitive aspects in children with developmental delays.

Keywords: Virtual reality, Neuro Developmental delays, Trunk Control

O.DPT-1.2

Comparative Effects of Roods Ontogenic Motor Patterns and Swiss Ball Stabilization Exercises on Trunk Control, Balance, Motor Skill and Primitive Reflexes in Spastic Diplegic Cerebral Palsy Children

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Cerebral palsy is a neurological condition that affects a significant number of children causing motor dysfunction and trunk control, affecting 2-2.5 per thousand live births. The non-progressive disruptions in brain development during fetal or early childhood stages contribute significantly to its impact. The aim of this study to check the comparative effects of Roods Ontogenic motor patterns and Swiss ball stabilization exercises on trunk control, balance, motor skill and primitive reflexes in spastic diplegic cerebral palsy children. A single blind randomized clinical trial involved 22 children with spastic diplegic cerebral palsy. They were split into two groups; Group A receive FES with Roods Ontogenic Motor Pattern using an inhibitory approach, while Group B received FES along with Swiss Ball Stabilization exercises. This intervention endured for 5 weeks, 3 days a week. The outcomes were recorded before and after the treatment using outcome measures. The effects of interventions were evaluated by entering and analyzing the data using SPSS 27. The outcome measure of current study was muscle tone measured by Modified Ashworth Scale (Grade 0-2), Gross Motor Function Measurement Scale (GMFMS) Grade (II, III, IV), a Gross Motor Function-88 Questionnaires to assessed trunk control, motor skill & balance assessed by Pediatric Berg Balance Scale and Primitive reflexes affecting trunk control, balance and motor skills were also accessed through screening questionnaire that labeled present, absent or overcome. The findings of this study revealed significant improvements in balance, motor skills, and primitive reflexes within each intervention group. Moreover, a notable statistical difference was observed between the groups, with a p-value below .05. However, the p-value for between-group analysis exceeded .05, indicating that both Swiss ball stabilization exercises and Roods' ontogenic motor pattern were effective interventions for enhancing balance, motor skills, and primitive reflexes. These results suggest the potential utility of both intervention modalities in clinical practice for addressing these parameters in the studied population.

Keywords: Cerebral palsy, Diplegia, Roods Ontogenic patterns

O.DPT-1.3

Comparative Effects of Gaze Stabilization Exercises and Cawthorne Cooksey Exercises on Craniovertebral Angle, Thoracic Angle, Vestibulo-Ocular Reflex and Cervical Ranges in IT Students

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Dysfunction of vestibular system can severely impact an individual's stability and visual coordination. An exercise-based therapy program is constructed to develop vestibular adaptation. The purpose of this study was to compare the effects on cervical range of motion (CROM), vestibulo-ocular reflex (VOR), thoracic angle, and craniovertebral angle of Gaze Stabilization Exercises (GSE) and Cawthorne-Cooksey Exercises (CCE). A randomized clinical trial was conducted where 50 participants were recruited who were randomly allocated to two groups either the GSE (Group A) or CCE (Group B). The participants received Gaze stabilization exercises and Cawthorne Cooksey exercises respectively for thrice a week on alternate days for 3 weeks. Goniometer and inclinometer were used to assess the Craniovertebral angle, Thoracic angle and cervical range of motion to check the difference in angle and range of motion at baseline and post treatment readings as a measuring tool. For statistical analysis SPSS version 27 was used. The results of this study provide insightful information about how well GSE and CCE compare in terms of improving postural and vestibular functions, information that may help inform treatment strategies for patients with vestibular system disorders. CVA indicated that the group B interventions resulted in a statistically significant increase in Craniovertebral Angle measurements post-treatment compared to pre-treatment values. In Thoracic angle results has shown significant improvement is seen in Cawthorne Cooksey exercise group for the variable of thoracic angle. In VOR the GSE resulted in a statistically significant reduction in VOR measurements post-treatment compared to pre-treatment values than CCE. In cervical ranges (Cervical flexion, cervical extension, cervical right lateral rotation, cervical left lateral rotation) both the interventions are effective as the results have indicated a significant difference in both groups and in Cervical right lateral flexion and cervical left lateral flexion there was no significant difference in both groups.

Keywords: Vestibulo-ocular reflex, Gaze stabilization exercises, Cawthorne Cooksey exercises, Craniovertebral angle, Thoracic angle, Vestibular ocular reflex

O.DPT-1.4

Effect of Neurological Music Therapy on Older Adults with Mild Cognitive Impairment

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Irreversible cognitive function decline, behavioral and psychological dementia symptoms, and a reduction in daily living activities are the hallmarks of mild cognitive impairment. Cognitive decline also has a detrimental impact on emotional health and quality of life in those with mild cognitive impairment. This study aimed to determine the effect of neurological music therapy (MMT) on cognitive function, emotional well-being, and quality of life among older adults with mild cognitive impairment (MCI). A Randomized Control Trial was conducted over 6 weeks (3 alternating days a week), involving 20 participants. The MMT group participated in a multitask MMT program consisting of exercise therapy with music and the use of the Naruko clapper, while the STT group engaged in exercise sessions involving the same movements as the MMT group but by counts to guide participants through the exercises. Each MMT session started with a 20-minute warm-up period, including about 5 minutes of light exercise synchronized with background music. The next 15 minutes involved exercises with background music aimed at strengthening leg muscles for fall prevention. This was followed by 30 minutes of MMT during which the participants used the Naruko clapper to accompany the music. They played for 4 minutes, followed by 'March of 365 Steps' (3 minutes), 'Hakodate no Hito' (3 minutes), 'Palm in the Sun' (3 minutes), and 'Kiyoshi's Zundoko' (4 minutes). Each session selected 2 songs and repeated them for 30 minutes, repeating each song three times per session. These included explanations of each move, times to wipe sweat, and water breaks between songs for 2 minutes. The session ended with relaxation exercises, deep breathing, and massage accompanied by background music. The findings of this study revealed significant improvements in cognition, emotion, and physical well-being within each group following the intervention. Moreover, a statistically significant difference was observed between the groups, with a p-value less than 0.05. Based on the between-group analysis, it was concluded that neurological music therapy combined with clappers yielded superior outcomes.

Keywords: Cognitive Impairement, Neurological Music Therapy, Older Adult, Clappers.

O.DPT-1.5

Prevalence and Risk Factors of Musculoskeletal Disorders Among Special Education Teachers. A Comprehensive Survey Study

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Introduction: Musculoskeletal disorders are important and common health problems among special education teachers. Special education teachers deal with students who have physical disabilities. These teachers often experience muscle strains. However, musculoskeletal disorders have been neglected in this population.
Aims and objectives: The aim of this study was to determine the prevalence and its association with the risk factors of musculoskeletal disorders among special education teachers.
Materials and method: Cross sectional survey was conducted to estimate the prevalence of musculoskeletal disorders in special education teachers. Sample population followed the inclusion and exclusion criteria. Sample size was 92 collected through purposive sampling technique. Data was collected from special education centers of Faisalabad. A modified Nordic Musculoskeletal Questionnaire and job factor questionnaire were used by our research team members. The domains of the questionnaire include demographic data, prevalence of musculoskeletal disorders and their risk factors.
Results: The mean age of population was 37.08. The neck, low back, shoulder, and knee prevalence rates were much higher, according to the results. The prevalence rates are as follows: 64.1% in the neck region, 50.0% in the shoulder, 51.1% in the low back, and 39.1% in the knees. There was significant association present between repeating the same work multiple times and prevalence of musculoskeletal disorders.
Conclusion: The results show that the regions having high prevalence of musculoskeletal disorders are neck, low back, shoulder, and knees. Additionally, doing the same work repeatedly is a risk factor that contributes to musculoskeletal problems.

Keywords: Musculoskeletal Disorders, Job Factor, Work-Related Musculoskeletal Disorders, Special Education Teachers, MSDS, Risk Factors, Modified-NMQ Questionnaire.

O.DPT-1.6

Validity and Reliability of Boston Carpal Tunnel Questionnaire in Telehealth Among Patients with Carpal Tunnel Syndrome

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Introduction: Compression of median nerve results in Carpal Tunnel Syndrome (CTS), a prevalent illness. Symptoms are hand discomfort, numbness, and tingling along median nerve's distribution. BCTQ is a questionnaire used to check the level of severity in CTS.
Aims and objectives: To check the validity and reliability of Boston carpal tunnel questionnaire in Carpal Tunnel Syndrome patients in telehealth.
Materials and method: It was a cross-sectional study. Data of CTS diagnosed patients were collected from Madina teaching hospital, Allied hospital and DHQ hospital Faisalabad in duration of 4 months. Sample size was 84. After taking consent, data was collected in 2 different sessions. The first online session was conducted by researcher 1, and second session was conducted by researcher 2 in which patients filled BCTQ. Both researchers 1 and 2 were blinded by the results. Then researcher 2 assessed both results to check the validity and reliability. Data was collected through BCTQ and was analyzed through SPSS.
Results: BCTQ SSS has high internal consistency the value of Cronbach alpha was .993 that indicates BCTQ SSS has high validity. The inter-rater reliability of 2nd investigator at two different locations with same instrument of SSS was .991 which means it has excellent inter-rater reliability. A high degree of reliability was found between 1st and 2nd investigators using the tool BCTQ (Subscale SSS). FSS high internal consistency the value of alpha was .983. The inter-rater reliability of 2nd person at two different locations with same instrument of FSS was .971 which means it also had excellent inter-rater reliability.
Conclusion: This study showed the excellent validity and reliability of the Boston carpal tunnel questionnaire (BCTQ). Results also showed that BCTQ has excellent intra rater and inter-rater reliability.

Keywords: Boston Carpal Tunnel Syndrome Questionnaire, Carpal Tunnel Syndrome, Telehealth.

REHABILITATION SCIENCES

POSTER PRESENTATION

P.DPT-1

Comparative Effect of Proprioceptive Neuromuscular Facilitation and Muscle Energy Technique of Iliopsoas Muscle on Non-Specific Low Back Pain

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Among the most common disorders for which patients seek out physiotherapy treatment is non-specific Low back pain (LBP). One of the reasons for non-specific LBP is iliopsoas tightness. Objectives of current study were to compare effects by Muscle Energy Technique (MET) and Proprioceptive Neuromuscular Facilitation (PNF) on Non-specific LBP to reduce pain, gain range and overcome disability in female with iliopsoas tightness. A total of 44 female patients with Non-Specific LBP having positive Thomas test were selected by consecutive sampling from the Physical Therapy (PT) Out-Patient Department of Allied Hospital Faisalabad. They were divided into two groups, using an online randomization generator. In addition to baseline PT treatment (Hot Pack and Transcutaneous Electrical Nerve Stimulation; TENS), Group-1 received Post-Isometric Relaxation of MET and group-2 received Hold-Relax D1 Extension pattern of PNF for tightened iliopsoas. The pre- and post-treatment outcomes were documented using Numeric Pain Rating Scale (NPRS) for pain, goniometer for hip extension range of motion (ROM) bilaterally and Oswestry Disability Index (ODI) Questionnaire for disability level. Out of the total sample, 40 patients were analyzed after a drop out of 4 patients using SPSS version 27. Non-parametric tests were used to analyze all variables that followed Non-Normal Distribution. Between group comparison of Group MET and PNF for NPRS, Hip extension ROM involving Right and Left at baseline, first, second and third day in both groups; Mann Whitney U test was applied. Values for pain (0.219), ROM left (0.248), right (0.924) and ODI (0.149) showed non-significant difference between both groups which declare the techniques equally effective. So, there was no significant difference noticed in comparative effects of PNF and MET on iliopsoas, in females with Non-specific LBP.

Keywords: Non-Specific Low Back Pain, Iliopsoas tightness, Muscle Energy Techniques, Proprioceptive Neuromuscular Facilitations

P.DPT-2

Comparing the Effects of Proprioceptive Neuromuscular Facilitation (Hold Relax) and Muscle Energy Technique (Post Isometric Relaxation) in Non-Specific Neck Pain

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Background: Non-specific neck pain (NNP) is a prevalent musculoskeletal problem marked by neck discomfort due to postural and mechanical factors.
Purpose: To compare the effects of muscle energy technique (Post isometric relaxation) and Proprioceptive neuromuscular facilitation stretching (Hold Relax) on neck pain, cervical ROM and disability in patients non-specific neck pain.
Methods: This was a randomized clinical trial with 32 participants, selected according to defined selection criteria. Participants were recruited and randomly assigned to two groups using a convenience sampling method. Group A was given Hold Relax, while Group B was given Post Isometric Relaxation (PIR). Treatment lasted 4 weeks, with three sessions per week on alternate days. The patients were assessed for cervical pain using a visual analogue scale (VAS), cervical disability using a neck disability index (NDI), and cervical range of motion using a goniometer. The data was interpreted by using SPSS version 26.
Results: The mean age of participants in group A was 27.62±3.61 and in group B was 29.43±4.91. Post-treatment results of VAS showed a significant difference ($p=0.021$) between groups A and B. The Mann-Whitney U test on NDI showed no statistical difference ($p=0.845$) between the two groups. Independent samples test statistics on cervical ROM revealed significant differences in cervical extension and lateral flexion between groups A and B ($p<0.00625$).
Conclusion: Both Hold-Relax and PIR were effective in alleviating pain intensity, improving neck disability, and improving cervical ROM. However, the Hold-Relax technique outperformed PIR in terms of reducing neck pain and improving cervical extension and lateral flexion.

Keywords: Neck Pain; Manual Therapy; Muscle Energy Technique; Post Isometric Relaxation; Proprioceptive neuromuscular facilitation PNF stretching; Physical Therapy Techniques.

P.DPT-3

Comparative Effects of Diaphragmatic Myofascial Release Versus Diaphragmatic Breathing in Postoperative Patients Diagnosed with Gastroesophageal Reflux Disease

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Introduction: GERD is a short form of "Gastro esophageal Reflux Disease". It is a condition characterized by backflow of food particles from stomach to food pipe and associated symptoms.
Objective: To determine the comparative effects of Diaphragmatic breathing exercises and diaphragmatic myofascial release in post-operative patients diagnosed with Gastroesophageal reflux disease.
Methodology: A single blinded, randomized clinical design was conducted as an experimental study. Several participants were screened and 28 were selected in the study from four hospitals. Patients were allocated to two treatment groups A and B by lottery method. Group A was treated with diaphragmatic myofascial release and Group B was treated with diaphragmatic breathing exercise. Reflux disease questionnaire (RDQ) was used as primary outcome measure for Gastroesophageal reflux disease. The secondary outcome measure was gastrointestinal symptom rating scale (GSRS). 2 sessions per week was given for 2 weeks.
Result: A cross-group analysis revealed that there was statistically significant difference in post treatment values of GSRS and RDQ. The p value of GSRS was 0.001and p value for RDQ was also 0.00.
Conclusion: Diaphragmatic myofascial release is more effective than diaphragmatic breathing exercises in reducing the severity of gastroesophageal reflux disease symptoms and improving quality of life in postoperative patients diagnosed with gastroesophageal reflux disease.

Keywords: Gastro esophageal reflux disease, Diaphragmatic myofascial release, Diaphragmatic breathing.

P.DPT-4

Efficacy and Safety of Virtual Reality Based Neurorehabilitation in Progressive Neurological Disorders of Adults: Systematic Review and Meta Analysis

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The primary objective of this study was to find out the efficacy and safety of NIVR and SIVR based neurorehabilitation in the treatment of progressive neurological disorders of adults. This systematic review is registered at Prospero CRD42024582827. The methodology was based on PRISMA guidelines. Systematic literature analysis was begun with a search of six electronic databases using Scopus, web of Science (WOS), PEDro, PubMed, Cochrane library and Google Scholar. Manuscripts and publications publish from 2020 to 2024 were analyzed. The selection process was illustrated in a PRISMA flow chart. There were 1908 articles retrieved from various databases. After Filtering the data remaining articles were 296. Eliminated 52 duplicates afterward conducting a thorough analysis 195 articles were removed based on their abstracts and titles. Full text pdf retrieved 44 studies out of 49 studies. A total of 7 articles were meticulously chosen after eliminating irrelevant articles because they met the specified criteria. The PEDro scale was used to quickly evaluate the methodological quality of the relevant RCTs. Cochrane (RoB2) utilized to assess the bias risk of the included RCTs. Meta-analysis results revealed that both groups demonstrated improvement in analyzed parameters such as motor functions, balance and QoL when considered separately. Substantial differences were reported when comparing VR therapy over conventional treatment for BBC and ABCS favored the conventional treatment QoL measures favored the VR group. Moreover, Virtual reality was not significantly linked with the adverse reactions except some minor effects. VR application has a positive effect on rehabilitation. The results of this analysis indicate that the effectiveness of virtual reality was at least or on par with conventional therapy in terms of the assessed outcomes. Therefore, VR appears to be a viable alternative to conventional therapy for rehabilitation in progressive neurological illnesses.

Keywords: Virtual Reality, Progressive Neurological Disorders, Parkinson's Disease, Multiple Sclerosis, Rehabilitation, Conventional Therapy, Adverse Effects.

P.DPT-5

Prevalence of Burnout Syndrome and its Impact on Quality of Life

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Objective: The objective of the study is to evaluate the prevalence of Burnout Syndrome and its impact on the quality of life in medical officers.
Methods: A cross-sectional survey was carried out in different Hospitals of Faisalabad. Sample size of 111 individuals had been taken on account of inclusion criteria (Participants who had working experience of more than 1 year with working hours of more than 8hrs per day and age between 24- 40 years) and exclusion criteria using purposive sampling technique. A questionnaire containing a socio-demographic scale, Maslach Burnout Inventory and SF-36(QOL scale) had been used. For statistical analysis SPSS version 26 had been used.
Results: The result revealed the prevalence of Burnout was high in all domains of MBI and it had a negative impact on quality of life in medical officers. The correlational analysis between the levels of burnout in all three components and quality of life was p=0.01 indicating the results as significant.
Conclusion: The study concluded that there was a significant presence of burnout syndrome among medical officers and its detrimental impact on their quality of life.

Key words: Burnout syndrome, Medical officers, Quality of life, MBI.

P.DPT-6

Comparative Effects of Mckenzie Exercises with Conventional Physical Therapy on Pain and Disability in Females Having Dowager's Hump

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Background: Dowager's hump is the excessive curvature of the lower cervical and upper thoracic spine also known as "hyper-kyphosis". Prolonged forward head posture (FHP) leads to the development of the hump, where the head is positioned anterior to the shoulders, predominantly seen in females. Aims and Objectives: This study will be conducted to investigate the effects of McKenzie exercises on females with dowager's hump. Material and Methods: This will be a quasi-experimental study in which purposive sampling will be done from females from Government hospitals of Faisalabad after meeting the inclusion and exclusion criteria. Thirty females with dowager's hump will be randomly assigned into two groups: Group A and Group B. Group A will receive conventional physical therapy for 3 weeks and Group B will receive conventional physical therapy in addition to McKenzie exercises for 3 weeks. Data will be analyzed by SPSS version 23. Results: There is significant effect of conventional physical therapy in addition to McKenzie exercises as compared to conventional physical therapy alone Data Analysis: Data was analyzed by SPSS version 20.

Keywords: Dowager's hump, hyper-kyphosis, posture, McKenzie exercises.

P.DPT-7

Interest in use of Artificial Intelligence for Advanced Clinical Reasoning among Novice and Expert Physical Therapists

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Physical therapy had relied heavily on the expertise of practitioners to assess, diagnose, and formulate personalized treatment plans for patients. Novice physical therapists, in the early stages of their careers, got benefit from AI assistance in their decision-making skills as it's been emerging, while expert therapists had used Artificial Intelligence to enhance their diagnostic accuracy and treatment efficacy. The aims and objective is to evaluate Interest in use of Artificial Intelligence for advanced clinical reasoning among Novice and Expert physical therapists. A purposive sampling of 68 physical therapists including novice and expert physical therapists meeting specific inclusion criteria. A ChatGPT demonstration was conducted to familiarize them with AI tools and clinical applications. Shinners Artificial Intelligence perception survey was used to evaluate the interest in artificial intelligence. Data was analyzed by using SPSS 27. This study showed percentages of interest, among expert physical therapists, 14 out of 34 (41.2%) were interested in using Artificial intelligence technology, while 24 out of 34 (70.6%) novice physical therapists showed interest. It was concluded from results that novice physical therapists showed greater interest in adopting Artificial Intelligence technology than their expert counterparts, most likely due to their willingness to try new tools and want to improve their skills.

Keywords: Artificial Intelligence, AI, Clinical Reasoning, PT., Novice Physical Therapists, Expert Physical Therapists.

P.DPT-8

Prevalence of Forward Head Posture and Associated Respiratory Function Changes Among Computer Workers

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Objective: To evaluate the prevalence of Forward Head Posture among computer workers. To evaluate the prevalence of respiratory Function changes among computer workers. To determine whether there is an association between Forward Head Posture (FHP) and respiratory function changes among computer workers.
Materials and Methods: The study conducted on computer workers with prolonged working hours (6-8 hours or more) was a cross-sectional study. Purposive sampling was used to collect data from 80 participants from the IT department of Madinah Teaching Hospital, Interloop Administration Unit and The University of Faisalabad that meet the exclusion and inclusion criteria. Informed consent was obtained from participants. **Results:** The data was studied through SPSS version 20. The mean ± SD of age of participants and Forward Head Posture (FHP) was 29.10±3.531 and 1.162±0.371 respectively. The mean ± SD of FEV1, FVC, FEV1/FVC & PEF was 3.150±1.056 ,3.20±0.998, 1.45±0.840 and 3.625±0.718 respectively.
Conclusion: The research shows that Forward head posture is 83.8% prevalent and it is also associated with respiratory function changes among computer workers. In our study, 67 participants with FHP were among computer workers. There exists an association between forward head posture and respiratory function changes among computer workers.

Keywords: Forward head posture, Respiratory Function changes, Spirometer, Craniovertebral angle, Computer worker.

P.DPT-9

Inter-Rater and Intra-Rater Reliability of Bowstring Test to Diagnose Sciatica

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Background: Sciatica is the lower limb radiating pain and the extent of pain radiating in the leg varies from one person to another. Various tests have been reported so far to diagnose sciatica but in those patients in which slump test cannot be easily performed, room is always available for discovering new tests for diagnosis.
Objective: The main aim of our study was to find out the inter-rater and intra-rater reliability of bowstring test.
Methodology: A cross-sectional study was performed on 45 patients through purposive sampling in 4 months duration. After taking the consent patients were screened through slump test based on inclusion and exclusion criteria and then bowstring test was applied. The results were recorded via kappa co-efficient.
Result: The inter-rater and intra-rater reliabilities of tests are k=0.048, -0.03 and k= 0.166 and 0.277 which showed non-significant results.
Conclusion: Hence it was concluded that there was no significant relationship between the inter-rater and intra-rater reliability of patients.

Key words: Bowstring test, Slump test, SLR, Low back pain.

P.DPT-10

Prevalence of Occipital Headache in Working Ladies of Faisalabad, Pakistan

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Occipital headache is a common condition that affects young adults, particularly women and can significantly impact daily activities. While previous studies have explored the prevalence and potential risk factors for occipital headaches, there is limited research focusing specifically on its prevalence among working women. Therefore, this study aimed to investigate the prevalence of Occipital headache in working ladies. This study was cross sectional study. Purposive sampling technique was used. Data was collected from schools according to our questionnaire, popliteal angle test, finger to floor test. Firstly, informed consent has been taken according to the inclusion and exclusion criteria. The result of this study reveals that data collected from 102 working ladies of age 25-45 years have Occipital Headache with percentage of 20.59% but there is no significant occurrence. This study concluded that there is no significant occurrence of occipital headache in working ladies.

Keywords: Occipital Headache, Superficial Backline, Fascia.

P.DPT-11

Prevalence of Gastrocnemius and Soleus Trigger Points in Chefs Due to Prolonged Standing and Awkward Posture

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Chefs face significant health concerns related to musculoskeletal issues, particularly the development of trigger points in the soleus and gastrocnemius muscles, due to extended standing and demanding work conditions. However, limited research exists on this specific issue within the culinary profession. This study aimed to assess the prevalence of trigger points in the calf muscles of chefs and explore their association with prolonged standing and awkward posture. Using Travell & Simon's Diagnostic Criteria (1999), myofascial trigger points (MTPs) were identified through physical examinations, palpation, and self-reported symptoms. The REEDCO Posture Assessment tool was employed to evaluate participants' posture. Statistical analyses, including chi-square tests, examined the prevalence of MTPs and their relationship with work hours and posture. The study found that most participants (37.1%) were aged 31-35, and 65.2% worked 9-12 hours daily, indicating a demanding work environment that significantly impacts physical health. Myofascial trigger points were identified in 59.6% of the chefs, with 41.6% of these MTPs located in the gastrocnemius muscle, suggesting a specific vulnerability in this area due to repetitive motion and sustained exertion. Posture assessments revealed that 30.3% of participants had good posture, 22.5% had fair posture, and 6.7% had poor posture, highlighting a concerning trend among this population that may exacerbate existing health issues. Chi-square analysis showed a significant association between MTPs, working hours, and posture ($p < .001$), suggesting that longer work hours and poor posture increase the likelihood of developing trigger points. The findings highlight a high prevalence of myofascial trigger points, particularly in the gastrocnemius muscle, among chefs, a critical insight for both healthcare providers and culinary professionals. The results underscore the importance of addressing prolonged standing and poor posture in this profession, as they contribute significantly to the risk of musculoskeletal problems. Ultimately, enhancing the overall well-being and performance of chefs in their demanding roles is essential.

Keywords: Gastrocnemius, soleus, trigger points, musculoskeletal disorders.

MEDICINE AND ALLIED HEALTH SCIENCES
(NUTRITION AND DIETETICS)

KEYNOTE/INVITED LECTURES

K.ND-1.1

Modern Trends in Nutrition, Environment-Friendly and Sustainable Nutrition Security

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The significance of modern nutrition trends, particularly those that prioritize sustainability and environmental friendliness, lies in their ability to address the intertwined challenges of global food security and environmental degradation. As the global population grows, traditional food systems are increasingly strained, exacerbating issues like climate change, biodiversity loss, and resource depletion. These trends advocate for a shift towards diets that fulfill nutritional needs while minimizing environmental harm like plant-based diets are linked to lower greenhouse gas emissions and reduced land and water usage compared to animal-based diets. Addressing food waste is also crucial, as nearly one-third of global food production is wasted, leading to significant resource loss and contributing to carbon emissions. Innovative technologies, such as precision agriculture and alternative proteins like lab-grown meat, are central to this transformation. Emphasizing local and seasonal foods further supports regional economies, decreases transportation emissions, and promotes the consumption of fresher, more nutritious produce. These modern nutrition trends go beyond improving diets; they represent a comprehensive approach to developing resilient food systems capable of sustaining future generations. By embracing these practices, society can work towards a sustainable future where food security and environmental health are interconnected and mutually supportive goals.

Keywords: Nutrition security, Food waste reduction, Sustainable food system, Precision agriculture, Alternative proteins.

K.ND-1.2

Empowering Communities Through Nutrition Education: Challenges and Opportunities

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Nutrition education, a cornerstone of public health, is pivotal in empowering communities to adopt healthier eating habits and enhance overall well-being. By equipping individuals with knowledge and skills about nutrition, we can effectively address a range of health challenges, including obesity, malnutrition, and chronic diseases. Yet, cultural, socioeconomic, and resource-related barriers, coupled with the prevalence of misinformation, pose significant obstacles. Moreover, reaching and engaging individuals from all segments of the community, particularly marginalized groups, can be challenging. To overcome these hurdles, it is imperative to adopt a multifaceted approach that leverages community-based strategies, harnesses the potential of technology, fosters collaborative partnerships, and advocates for supportive policies. By partnering with local organizations, schools, and healthcare providers, we can tailor nutrition education programs to meet the unique needs of diverse communities. Additionally, utilizing technology, such as mobile apps and social media, can enhance accessibility and engagement. Research has consistently shown that top-down educational programs, while effective in increasing knowledge of healthy eating, often fail to translate this information into sustained, healthful dietary practices. Participatory, interactive approaches that empower individuals to make informed decisions offer a more promising avenue. Such programs can facilitate the development of interventions tailored to specific needs and circumstances. By actively engaging target populations in public health nutrition efforts, we can foster a more effective and sustainable implementation of nutritional improvements. Addressing the challenges and seizing the opportunities presented by nutrition education can significantly improve the health and well-being of communities worldwide. By empowering individuals with knowledge and skills related to nutrition, we can create a healthier future for generations to come.

Keywords: Nutrition Education, Public Health, Community Empowerment, Socioeconomic Disparities, Cultural Barriers.

NUTRITION AND DIETETICS

ORAL PRESENTATION

O.ND-1.1

Exploring the Complex Interplay between Malnutrition and Inflammatory Biomarkers: Consequences and Management

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Malnutrition is due to an imbalance in nutrient intake, deficiencies in essential nutrients, or impairment in the utilization of nutrients. Diet and its components have a reflective role in the modulation of inflammatory biomarkers and regulation of noticeable inflammatory responses. During malnutrition, the production of these responses results in inflammation-mediated immune cell alterations, inflammation-mediated tissue and organ injuries, and the inception of inflammation-associated diseases. The inflammatory diseases in individuals with low body mass index are due to an increase in levels of pro-inflammatory cytokines including interleukin (IL)-2, IL-4, IL-5, IL-10, IL-12, IL-13, IL-33, tumor necrosis factor-α, interferon-γ, inflammatory proteins, and enzymes. The increased production of these cytokines triggers intracellular signaling pathways related to inflammation, such as nuclear factor kappa-B, mitogen-activated protein kinase, and JAK-STAT pathways. The production of these cytokines and stimulation of intracellular signaling pathways in malnourished individuals may result in dysfunctional immune responses and high susceptibility to developing infectious diseases such as cancer, cardiovascular, diabetes, and neurodegenerative disorders with more severity and complications. To avoid these adverse outcomes, a balanced diet and nutrition is essential for all age groups. In addition, nutritional deficiencies can be resolved by using several herbs, sea-inhabiting plants, microalgae, and other photosynthetic organisms as these are also the richest source of vitamins, minerals, and phytonutrients.

Keywords: Malnutrition, Inflammation, Inflammatory cytokines, Chronic diseases.

O.ND-1.2

Policy Engagement and STEAM Outreach in Nutritional Sciences

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The integration of policy engagement and STEAM (Science, Technology, Engineering, Arts, and Mathematics) outreach in nutritional sciences offers a powerful approach to improving public health. This paper examines how nutritional assessment camps and surveys, combined with STEAM-based outreach, can drive policy changes that address pressing nutritional challenges. Nutritional assessment camps serve as critical tools for gathering real-time data on the health and dietary habits of various populations. By employing STEAM principles, these assessments not only collect data but also engage communities in understanding the science behind nutrition and health. Surveys conducted during these camps provide valuable insights that can inform evidence-based policy decisions. The STEAM approach enhances this process by incorporating technology for data collection and analysis, engineering solutions for efficient camp logistics, and arts for creating culturally relevant health education materials. These activities empower participants with knowledge, fostering community-driven advocacy for healthier food policies. Policy engagement emerges from this outreach as communities and policymakers collaborate to translate assessment findings into actionable strategies. The integration of STEAM in these efforts ensures that the policy development process is informed by a multidisciplinary perspective, making it more robust and adaptable to the specific needs of diverse populations. This approach not only improves the effectiveness of nutritional interventions but also cultivates a new generation of informed citizens who can actively contribute to public health policy and advocacy.

Keywords: Nutritional Assessment Camps, Policy Engagement, STEAM Outreach, Public Health, Evidence-Based Policy.

O.ND-1.3

Evaluation of Oatmeal Cookies Developed by the Fortification of Avocado (*Persea americana*) Puree

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Avocado (*Persea americana*), a tropical fruit native to Central America and Mexico, is celebrated for its rich nutritional content and numerous health benefits, such as protection against heart disease, oxidative damage, microbial activity, and immune enhancement. Avocado puree has emerged as a promising fat replacer in baked goods like cookies, offering a healthier alternative. It is an optimistic solution to prevent health issues that occur by taking in completely fat based products. Consumers are showing interest towards oats (*Avena sativa)* because of its nutritional profile containing essential amino acids, dietary fibers, and unsaturated fatty acids. This study explored the nutritional profile of avocado puree and its impact on oatmeal cookies by substituting butter with avocado puree at various levels: T_0=0% (control), T_1=20%, T_2=40%, T_3=60%, and T_4=80%. Sensory evaluation using a 9-point hedonic scale revealed that the T_2 sample (40% avocado puree) achieved the highest scores across all sensory attributes, suggesting an optimal balance between taste and texture. Based on these results, T_0 (control) and T_2 were further analyzed for proximate composition, mineral content, and total phenolic content (TPC). Statistical analysis including Analysis of Variance (ANOVA) using SPSS software was done on collected data to determine significance of results. It confirmed that avocado puree significantly enhanced the nutritional profile of the oatmeal cookies compared to the control treatment, with higher nutrient levels and comparable sensory characteristics. In conclusion, this study demonstrated that avocado puree is a viable fat substitute in the food industry. It enabled the creation of oatmeal cookies with reduced fat and caloric content while maintaining desirable sensory qualities, thus contributing to healthier baked goods in the market.

Keywords: Avocado, Oatmeal, Fatty Acids, Phytochemicals, Fat Replacer.

O.ND-1.4

Anti-Androgenic Effects of Ceylon Cinnamon, Spearmint Leaves and Dried Parsley on PCOS

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Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age, characterized by hyperandrogenism, polycystic ovaries, chronic anovulation, and metabolic issues. To address these symptoms, a product named Fitness Wonder PCOS Tea was developed, incorporating Ceylon cinnamon, spearmint leaves, and dried parsley, each known for their beneficial properties. Ceylon cinnamon, rich in Cinnamomum zeylanicum, enhances insulin sensitivity and boasts powerful antioxidant properties that may help reduce cancer risk. Spearmint leaves, containing Carvone, offer anti-androgenic effects, lowering testosterone levels and alleviating symptoms like hirsutism, acne, and hair loss. Dried parsley, with bioactive Furanocoumarins, affects estrogen production, potentially aiding in menstrual cycle regulation and stimulating menstrual flow. In a study involving 60 women with PCOS—36 unmarried and 24 married—participants were instructed to drink 1-2 cups of the tea daily after meals for 30-45 days. The results were promising: 4 married women conceived after using the tea, indicating improved reproductive health. Additionally, menstrual cycles resumed in 16 women who had been experiencing irregularities, with 9 reporting the disappearance of cysts. The tea notably improved symptoms related to irregular cycles, reproductive issues, cysts, and hirsutism. This combination of ingredients demonstrated significant positive effects in managing PCOS symptoms, highlighting the potential of natural remedies in supporting women's health.

Keywords: PCOS, Ceylon Cinnamon, Spearmint Leaves, Parsely, Anti-androgens, Reproductive Health.

O.ND-1.5

Association of Dietary Pattern and Nutritional Status with Academic Performance of School Going Children

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For policymakers, one of the main issues is academic performance. As it stands, one of the primary objectives of the Sustainable Development Goals (SDG) is to enhance nutrition in addition to ending hunger. Numerous elements have been investigated about it, although more research is still needed on a few. Unhealthy eating habits are one issue that affects all school- age children and will likely have an impact on their future academic performance. Estimating the causative relationships between the link between hunger and academic achievement was a weakness of earlier research. Thus, it is evident that it is crucial to try and assess the causal relationships between students' nutritional status and academic achievement. The purpose of this study is to determine how schoolchildren's nutritional status and eating habits relate to their academic achievement. Because a country's potential and destiny are determined by the physical and mental capacity of its children, proper nutrition is a crucial component of good health maintenance and development. In this study, 150 school-age children, ages 13 to 14, had their weight, height, and BMI assessed to determine their nutritional condition. Dietary pattern as determined by the pupils' properly completed questionnaires. Students' yearly average scores and math exam results are used to gauge their academic performance. The relationship between these two concepts is a long-standing study topic that is currently receiving attention on a worldwide scale with concerns about future economic productivity. Following statistical analysis, there was a strong correlation found between students' academic performance and their BMI, vegetable consumption, and number of main meals consumed.

Keywords: Nutritional status, Academic performance, school children, Dietary pattern, SDG, Food groups.

NUTRITION AND DIETETICS

POSTER PRESENTATION

P.ND-1

Functional Food Potential of *Coriandrum Sativum*: A Comprehensive Review of Chemical Constituents and Pharmacological Effects

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Coriandrum sativum, commonly known as coriander, has garnered attention as a functional food due to its diverse array of bioactive components and significant health benefits. This review provides a comprehensive evaluation of *Coriandrum sativum* in the context of its functional food applications, focusing on its chemical constituents and associated pharmacological effects. Phytochemical screening of *Coriandrum sativum* has identified a rich profile including essential oils, tannins, terpenoids, reducing sugars, alkaloids, phenolics, flavonoids, fatty acids, sterols, and glycosides. These compounds contribute to its high nutritional value, which encompasses proteins, oils, carbohydrates, fibres, and a broad spectrum of vitamins, minerals, and trace elements. Pharmacological investigations have demonstrated that *Coriandrum sativum* exhibits a wide range of biological activities. These include antidiabetic, antihyperglycemic, antihyperlipidemic, anti-inflammatory, antioxidant, antiparasitic, hypolipidemic, mutagenic, antimutagenic, anticancer, gastrointestinal, deodorizing, dermatological, diuretic, hepatoprotective, detoxifying, anxiolytic, and sedative-hypnotic effects. Such diverse activities underscore its potential as a functional food with therapeutic benefits. This review synthesizes existing knowledge on the chemical composition and pharmacological actions of *Coriandrum sativum*, highlighting its value beyond basic nutrition. By integrating findings from various studies, this overview aims to elucidate the functional applications of *Coriandrum sativum* in health promotion and disease prevention, thus providing a foundation for further research and development in the realm of functional foods.

Keywords: Functional Food, Phytochemical Constituents, Health Benefits, *Coriandrum sativum*, Pharmacological Effects

P.ND-2

Anti-Inflammatory Effect of Turmeric in the Management of Osteoarthritis

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Osteoarthritis is identified by deterioration of joint structure resulting in restriction of joint movability. There are mounting facts that curcumin has anti-inflammatory properties and could be a latent beneficial option for many chronic inflammatory diseases. Turmeric is a component of the ginger family Zingiberaceae that has been extensively used as a therapeutic plant for about 6, 000 years. Curcumin is the active ingredient of turmeric that has properties of anti-inflammatory, antioxidant, and anti-bacterial and prevents rheumatism over and above anti-tumor properties. Moreover, it shows properties such as antihepatotoxic, protects kidneys, protects neurons, and protects the heart. Several randomized controlled trials have assessed dietary curcumin use in the treatment of osteoarthritis which is a decadence disease with inflammatory characteristics. Turmeric reduces the severity of disease and decreases the need for medicines. Turmeric defends from side effects. Long-time use of non-steroidal anti-inflammatory drugs is closely linked with severe cardiovascular and gastrointestinal side effects in osteoarthritis. The use of turmeric can play a significant part in treatment protecting patients and reducing the non-steroidal anti-inflammatory drugs requirement. Additionally, the use of turmeric can be the best option with minimum adverse effects as compared to non-steroidal anti-inflammatory drugs. Turmeric can be used as a curative option for mild to moderate osteoarthritis. An increasing body of fact shows supplementation of curcumin is an efficient remedy for osteoarthritis with minimum side effects. Different types of compounds of curcumin may be useful as an optional or corresponding mediator for the treatment of osteoarthritis. Additionally, different compounds of curcumin with higher bioactivity are indicated to show more positive effects.

Keywords: Osteoarthritis, Turmeric, Curcumin, Anti-inflammatory effect, Curcumin supplementation

P.ND-3

Maximizing Food Production Efficiency with Artificial Intelligence: A Data-Driven Approach to Reducing Waste

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Encouraging sustainability in the food system is considered important to manage different challenges that arise within the food system. This crucial issue can be prevented by the proper steps and principles, including increasing efficiency and productivity, minimizing waste, following sustainable agriculture applications, enhancing livelihood and economic development, and improving resilience at different levels. To substitute the existing food consumption patterns, adopt sustainable diets, and improve productivity in the food supply chain, it is important to adopt achievements and findings of other fields of science as well. These comprise the utilization of artificial intelligence which tends to have a great influence on various phases of the food supply chain including food production, consumption, and management of waste. This technology plays an important role in improving the quality of crops, crop health, and forecasting yield, and prevents the overuse of various resources. Improving productivity within the food system is an important aspect of achieving sustainability. Artificial Intelligence has greatly emerged to evaluate food safety, food quality, and security through improvements in biotechnology and nanotechnology, and builds various databases of food composition which in turn helps in proper food labeling and availability of information. Modern artificial intelligence-based tools that are used to assess dietary patterns play a crucial role in improving health outcomes through proper portion sizes and calorie intake. These computer technologies for the management of waste include the detection of meat spoilage and ultrasonic sensors. Advanced sustainability provides various benefits comprising human health benefits, society, and the environment. Therefore, nutritional needs are easier to meet without putting a burden on the environment, and the health of the next generations. Artificial intelligence assists in achieving the goals of a sustainable food system, and to achieve dietary goals more effectively.

Keywords: Artificial Intelligence, Food Waste Reduction, Sustainable Management, Food Safety, Sustainable Food System.

P.ND-4

Gut Microbiota in Depression: Unveiling the Relationship and its Management by Pumpkin Bar

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Depression and anxiety impact an individual's everyday life, health, and economic position. Anxiety and stress are often present in conjunction with depressive disorders; these coexist in approximately 75% of children and adolescents. Up to 35% of people are estimated to experience treatment-resistant depression. Therefore, there is a need to explore other novel therapies for preserving the quality of life for all people suffering from depression. Preliminary dietary changes may be an alternate treatment or preventative measure for anxiety and depression. Major depressive disorder is one of the most disabling mental disorders worldwide. Increasing preclinical and clinical studies have highlighted that compositional and functional (e.g., metabolite) changes in gut microbiota, known as dysbiosis, are associated with the onset and progression of depression via regulating the gut-brain axis. However, the gut microbiota and their metabolites present a double-edged sword in depression. The trillions of microorganisms that inhabit our guts, including bacteria, viruses, and fungi, play roles in human health. Microorganisms inhabit the human gut in a symbiotic manner. More than 3.8×10^{13} bacteria exist in the human gut microbiota, or the human gut has the second-highest concentration of neurons after the brain which is why low propionic acid levels and enormous amounts of isocaproic acid are normally found in individuals diagnosed with depression or various neurological illnesses, including Alzheimer's disease, Parkinson's disease or depression have been related to disturbances in the gut microbiota composition. Cucurbita pepo species of Pumpkin is most widely available in Pakistan, because of the presence of nutritional and health-protective polysaccharides in the flesh, proteins, and oils in the seeds, interest in pumpkin and pumpkin-based products as they are high in serotonin, which is synthesized from a precursor amino acid, tryptophan.

Keywords: Depression, Depressive disorder, Gut, Pumpkin seeds, Symbiotic relation, Dietary changes, Novel therapies

P.ND-5

Investigating the Effect of Seaweed Consumption on the Thyroid Gland While Checking Adequate Iodine Status

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Seaweed has been a staple in different cuisines for centuries, touted for its nutritional advantages and potential health benefits. The main goal of this research is to investigate the impact of seaweed consumption on thyroid gland function, by ensuring the possible effect of seaweed on the iodine levels of the body. Seaweed is a major source of iodine, dietary fiber, and different vitamins. An additional objective is to discuss the bioactive components such as fucoidan and fucoxanthin, which may exert both inhibitory and stimulatory effects on thyroid activity. A dietary assessment was recruited by checking the serum level of hormones (T3, T4, and TSH) at baseline and post-intervention. The analysis shows that seaweed consumption can lead to a significant increase in thyroid hormone levels in individuals having iodine deficiency. However, excessive seaweed consumption also causes thyroid dysfunction, including hypothyroidism and hyperthyroidism. The study highlights the importance of moderate seaweed consumption and individualized intake of seaweed to control potential risk factors and enhance benefits for thyroid health. Overall, this review on the impact of seaweed provides a comprehensive understanding of the complex relations between seaweed consumption and thyroid gland function. Moreover, plant-based sources are now setting a new trend in the nutrition world because of their rich profile in fiber and vitamins and the increasing demand for more synthesized and organic products in the market.

Keywords: Plant Base, Thyroid Functioning, Iodine Intake, Marine Algae, Nutritional Effects

NUTRITION AND DIETETICS

REVIEW ABSTRACTS

R.ND-1

Attenuation of Hyperglycemia by White Mulberry (*Morus Alba*) Leaf Tea

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White mulberry (*Morus alba*) leaf tea has been traditionally used for its potential health benefits, particularly in managing blood sugar levels. This study investigates the effects of white mulberry leaf tea on hyperglycemia, focusing on its ability to attenuate elevated blood glucose levels in individuals with or at risk of diabetes. The leaves of *Morus alba* are rich in bioactive compounds such as flavonoids, alkaloids, and polysaccharides, which are known for their anti-hyperglycemic properties. These compounds inhibit carbohydrate-digesting enzymes, particularly α-glucosidase, which slows down the absorption of glucose into the bloodstream. Through in vitro and in vivo experiments, this research explores the tea's potential to improve glucose tolerance and lower fasting blood glucose levels. Results show a significant reduction in postprandial blood glucose spikes, suggesting that regular consumption of white mulberry leaf tea may help manage blood sugar levels. The study also discusses the tea's antioxidant effects, its safety profile, and its role as a complementary therapy in managing diabetes and preventing complications related to hyperglycemia. Many people use plants that have medicinal properties because they are easy to access and have cheaper costs. Plant species of Genus Morus are among those medicinal plants people use for treatment. The most known species of the Morus Genus are *Morus Alba*, Nigra and Ruba. White mulberry (*Morus Alba*) is a multi-functional plant with promising medicinal properties. Mulberry leaves possess various biological activities, including anti-diabetic, antimicrobial, skin-whitening, cytotoxic, antioxidant, glucosidase inhibition, anti-hyperlipidemic, anti-atherosclerotic, anti- obesity, cardioprotective, and cognitive enhancement activities.

Keywords: Antioxidants, HbA1c, Cytotoxic, Mulberry Leaf, Species

R.ND-2

Wide-Ranging Properties of Roselle *(Hibiscus Sabdariffa)* Plant and as Antihypertensive Potential: A Review

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Hypertension is a globally widespread health problem with substantial mortality and morbidity Blood pressure is a force of blood flowing through blood vessels. An elevated level of blood pressure is known as high blood pressure. Untreated hypertension leads to stroke, heart attacks and other health issues. Physical traits and healthy lifestyle choices can help to manage hypertension. Many medicinal plants are used in the medical treatment of hypertension. Roselle *(Hibiscus Sabadriffa)* has been used as a therapeutic plant for centuries to handle many health conditions. The composition of Roselle extract and dosing influences greatly affect the harvesting and preparation steps along with which part of the roselle used and color also considered while characterization of the Roselle. Roselle plant is used in many nutraceuticals, pharmaceuticals, food, and animal feed due to its strong potential present by vitamin C, anthocyanins, protocatechuic acid flavonoids, polyphenols, and many phenolic compounds. Nutritional composition is very strong in roselle flowers and seeds. Rich source of fiber, organic acids, and nutrients like sodium, and potassium, Well-known roselle tea is used in many countries to manage blood pressure and cholesterol intensity as a potential therapeutic agent. The extracts of Roselle are also used in medicine against many complaints that include high blood pressure, liver disease, and fever. The review discusses the importance, production, and diverse varieties of roselle along with its nutritional profile, bioactive composites, phytochemical composition, and antioxidants mainly phenolic and flavonoid complexes. It also introduces the beneficial effects of the bioactive compounds as anti-hypertension, antihyperlipidemic, and antioxidant.

Keywords: Hypertension, Roselle, Bio-Active Compounds, Health Benefits, Nutraceuticals

R.ND-3

Unlocking the Health Benefits of Mango Seed Kernels: A Sustainable Solution for Diabetes and Waste Reduction

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Diabetes is a chronic condition where the pancreas fails to produce sufficient insulin, or the body cannot effectively use the insulin produced. This disease significantly increases the risk of long-term health issues, including cardiovascular disease, which doubles the risk of coronary artery disease. Approximately 75% of diabetes-related deaths are due to heart conditions. Almost half of all tropical fruits produced worldwide are mangoes (Mangifera indica L.) and their net production is expected to grow steadily in the next two decades. Mango (Mangifera indica L.) seed kernels, often discarded as waste during mango processing, present a valuable resource due to their rich antioxidant properties. These kernels are high in phenolic compounds such as ellagic acid, gallic acid, ferulic acid, cinnamic acid, vanillin, tannins, coumarin, and mangiferin, which contribute to their antioxidant, anti-diabetic, anti-inflammatory, and anti-carcinogenic properties. Mango seed kernels also contain significant levels of phytosterols, including campesterol, βsitosterol, and stigmasterol, as well as tocopherols. Their composition includes 9.84-18% fats/oil, 5.20-10.48% proteins, 53.34-76.81% carbohydrates, and 0.26-10.60% crude fiber. Studies have shown that ethanolic extract of mango seeds (200 mg/kg) has revealed major ($p < 0.01$) hypoglycemic outcomes in fasted diabetic rats as compared to the normal group of diabetic rats. Incorporating mango seed kernels as raw materials or food additives can provide economic benefits, help address nutritional deficiencies and offer environmental advantages by reducing waste. Utilizing these by-products effectively not only enhances health by providing natural antioxidants but also minimizes environmental impact, making it a sustainable choice for both industry and consumers.

Keywords: Antioxidant, Insulin, Anti-Inflammatory, Campesterol, Ellagic Acid

R.ND-4

Preparation of Black Seed (*Nigella sativa*) and Ginger (*Zingiber officinale*) Herbal Tea for Weight Management

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Obesity is a significant global health issue, contributing to various diseases. This study investigates the anti-obesity effects of black seed and ginger herbal tea, focusing on its impact on albino rats. Thymoquinone, the active compound in black seed, along with ginger, is known for its potential in weight management. In this study, adiposity in rats will be induced through a diet high in saturated fats. The study will span eight weeks, during which rats will be divided into three groups: G0 (control), G1 (2g/kg/day black seed and 100mg/kg/day ginger tea), and G2 (3g/kg/day black seed and 200mg/kg/day ginger tea). The tea will be administered orally, and physical parameters such as weight will be monitored weekly. After the study, data will be analyzed using ANOVA to evaluate the results. Nutritional analysis of the tea revealed significant levels of ash, protein, fiber, carbohydrates, fat, and moisture in both black seed and ginger. Sensory analysis indicated high acceptability in appearance, color, flavor, smell, taste, mouthfeel, and overall acceptance. The efficacy results showed a reduction in triglycerides, total cholesterol, VLDL, and LDL levels, with an increase in HDL levels in rats after administering the herbal tea. The findings support the anti-obesity potential of the tea, with G1 showing a marked reduction in weight with 2g of black seed and 100mg of ginger tea.

Keywords: Thymoquinone, gingerol, adiposity, total cholesterol, VLDL, and LDL.

R.ND-5

Integrating STEAM Education into Health and Nutrition to Transform Learning Experiences

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The integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education into health and nutrition curricula offers a transformative approach to learning that bridges disciplinary boundaries. This abstract explores how the application of STEAM principles can enhance students' understanding of health and nutrition, fostering a more comprehensive and engaging educational experience. By incorporating scientific concepts such as nutritional biochemistry and human biology with technological advancements like health monitoring apps and virtual simulations, students can gain a deeper insight into the impact of nutrition on human well-being. Engineering principles further enrich this learning by introducing concepts of food processing, sustainable agriculture, and biomedical innovations, while the arts contribute through creative avenues like nutrition awareness campaigns and culturally informed culinary practices. Mathematics plays a crucial role in helping students analyze nutritional data, calculate dietary needs, and understand the economic aspects of food choices. Through project-based learning and interdisciplinary collaboration, students develop critical thinking, problem-solving skills, and creativity, all essential for addressing modern health challenges. This integrative approach not only makes health and nutrition more accessible and relatable but also prepares students to become informed, proactive participants in their health and that of their communities. By transforming traditional learning experiences, STEAM education in health and nutrition fosters a new generation of learners equipped with the tools and knowledge necessary to navigate and contribute to the evolving health and wellness landscape.

Keywords: STEAM Education, Health and Nutrition, Interdisciplinary Learning, Project-Based Learning and Nutritional Science.

R.ND-6

Matcha Green Tea as a Therapeutic Agent for Inflammatory Conditions

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Matcha green tea is a powdered form of Japanese green tea (*Camellia Sinensis*) and is well known for its antioxidant properties. It is shaded about 3-4 weeks before harvesting, which enhances the biologically active compounds present in it. Matcha green tea has numerous health benefits including its effect on cognitive function, heart diseases, tumors, and metabolic diseases. In this study, the effect of matcha green tea on inflammation and related disorders is seen. Epigallocatechin gallate (EGCG) is the main component present in matcha. EGCG and many other polyphenols present in matcha have anti-inflammatory effects on the body. The anti-inflammatory process in the body is done through various mechanisms including oxidative stress inhibition, modulation of the pro-inflammatory cytokines, and inflammatory pathways suppression. The results obtained from different clinical studies and preclinical research show that if matcha green tea is consumed regularly, it can reduce inflammation markers in the body. It includes inflammatory conditions such as rheumatoid arthritis, inflammatory bowel disease, cardiovascular diseases, and metabolic syndromes. Cardio-metabolic effects of matcha are only studied in animals, but the results obtained from these findings are homogenous. Despite all the promising studies and their results, further studies and research are needed to develop an understanding of the long-term effects of matcha, its biological interactions, and the ideal dosage of matcha that should be given to patients. Overall, matcha green tea can be seen as a promising treatment for most inflammatory diseases, but still, a more detailed understanding is required to check its efficacy, and safety is needed to fully incorporate it into clinical trials and practice.

Keywords: Matcha green tea, Epigallocatechin gallate (EGCG), Anti-inflammatory, Inflammatory diseases, Polyphenols, Clinical trials, Oxidative stress.

R.ND-7

Health Potential of *Allium schoenoprasum* L. (Chives): A Review

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The spice plant *Allium schoenoprasum* L., commonly referred to as chives, has important culinary and ethnomedical uses. It is a thin bulb with a cone-like form that is 2-3 cm and 1 cm long, and it is extensively grown throughout Central Europe. The stem contains purple blooms with a diameter of 23 mm. The leaves are hollow and taste mild like onions. *A. schoenoprasum* is used as a traditional medicine in various countries to treat hypertension, the flu, and lung congestion. Conventional maceration or hydro-distillation techniques can be utilized to extract the plant's leaves. *A. schoenoprasum* leaf extract has been the subject of phytochemical studies, which have revealed that it contains a variety of compounds, such as tris-(methylthio)-methane, 2,4,5-trithiahexane, bis-(2-sulfhydryethyl)-disulfide, quercetin, kaempferol, myricetin, catechin, rutin, folionin A1, folionin B, sitosterol, stigmasterol, campesterol, cholesterol, free fatty acid, monoacylglycerin, diacylglycerin, triacylglycerin, linoleic acid, palmitic acid, spirostanols, furostanols, and I-ketose. The crude extract of *Allium schoenoprasum* tissue culture exhibited antioxidant and scavenging abilities in all investigated plant parts, especially in the roots. The antiproliferative and tumor-arresting effects of phenolic compounds in flowers of *Allium schoenoprasum* were investigated, with even low concentrations of these flowers' phenolic compounds inhibiting cell proliferation significantly. The chemo-preventive effects of chives have been extensively studied, with consumption of large amounts reducing the risk of gastric cancer. Allium species toxicosis can appear within a day after consumption, but more commonly develops after several days. Clinical signs include depression, hemoglobinuria, urinary casts, icterus, tachycardia, weakness, abdominal pain, exercise intolerance, cold sensitivity, inappetence, and diarrhea. To determine the bioactive components, associated potential, and safety of *A. schoenoprasum* that may result in its development as a medication, more investigation is required.

Keywords: *Allium schoenoprasum* L, Chives, Phytochemicals, Antioxidant, Antiproliferative.

R.ND-8

Hashtags and Hunger: Social Media's Effect on Student Food Choices

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Social media platforms like Facebook, Instagram, Twitter, and Snapchat play a significant role in shaping dietary choices, particularly among university students. These platforms connect people in virtual communities where they can share and exchange information on various topics, including nutrition. Social media influencers, especially food bloggers, have become powerful figures in promoting specific diets and food choices. This study aimed to examine the impact of social media influencers on university students' eating habits, with a focus on the potential link between social media usage and obesity. A cross-sectional survey was conducted using a self-structured questionnaire that collected data on participants' weight history, Body Mass Index (BMI), and social media usage. The questionnaire also explored how social media influences participants' dietary choices and its perceived impact on their health. The findings indicate that social media significantly affects students' eating behaviours. Many participants reported that social media influencers play a key role in shaping their dietary decisions. Despite the frequent promotion of fast and high-calorie foods on these platforms, most participants did not experience significant weight gain after following diets recommended by influencers. This suggests that while social media can positively influence health by increasing awareness of nutrition, it also has the potential to contribute to unhealthy eating habits and obesity. In conclusion, social media exerts both positive and negative influences on students' dietary choices. It can promote healthier eating habits, but it also risks encouraging the consumption of unhealthy foods, highlighting the need for strategies to enhance its positive impact on nutrition.

Keywords: Social media, Food Habits, Obesity, Influencers Marketing, Food Trends, Cross-sectional survey.

R.ND-9

Exploring the Impact of Nutrition and Lifestyle on Female Fertility: A Study of Delayed Conception

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Delayed conception refers to the inability of a woman to achieve a clinical pregnancy within a year of trying without contraception or other precautionary measures. This issue affects approximately 1.5 million women, or about 10% of couples worldwide, within the reproductive age range of 20–49 years. Delayed conception can stem from various factors, including diet, lifestyle, genetic, and clinical issues. Nutritional deficiencies or excessive intake of certain nutrients can contribute to infertility. Deficiencies in iron, iodine, zinc, folate, and vitamin D can reduce ovarian reserve, while exposure to heavy metals like copper, manganese, lead, and cadmium can negatively impact fertility. Excessive consumption of fast foods and non-homecooked meals has been associated with a 2–3-fold increase in infertility risk. Lifestyle factors such as smoking, physical activity levels, age, polycystic ovary syndrome (PCOS), obesity, and depression also play significant roles. Sedentary lifestyles, excessive exercise, and obesity are all linked to decreased fertility. Clinical conditions such as type 1 diabetes, insulin resistance, and hypertension are additional contributors to infertility. This review examines how these various factors contribute to delayed conception and explores strategies to mitigate this issue. Effective prevention includes maintaining a balanced diet rich in essential nutrients, engaging in regular physical activity, avoiding smoking, managing PCOS, and addressing underlying medical conditions.

Keywords: Infertility; Delayed conception; Nutrition; Lifestyle factors; Balance diet.

R.ND-10

Recognizing the Anti-Fungal and Anti-Bacterial Properties of *Cassia absus*

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Many longitudinal studies have explained the positive effects of *Cassia absus* for the treatment and prevention of astringent, analgesic, and bacterial infections. It contains several alkaloids, tannins, flavonoids, glycosides as well as saponins compounds. The data was received from electronic media like PubMed, Google Scholar, Science Direct, and published books from 2010-2022. About 200 relevant research topics were selected among which 50 were reviewed and 14-15 research were under the criteria "Recognizing the anti-fungal and anti-bacterial properties of *Cassia absus*". *Cassia absus* known as "Chaksu" belongs to the Fabaceae family. The seeds constitute flavonoids, luteolin, apigenin, hydnocarpin, and isohydnocarpin. It works as a tonic for blood due to anti-hypertensive, anti-inflammatory, and antioxidant properties, additionally has shown anti-bacterial, anti-fungal, anti-glycation, and anti-hyperglycemic activity. In diabetic patients, amylase enzyme concentration was suppressed by *Cassia absus* seed fractions. In streptozotocin-induced diabetic rats, an antihyperglycemic effect of ethyl acetate *C. absus* extract at dosages of 250 and 500 mg/kg was seen after single-dose administration and subacute treatment for 28 days. Antioxidant substances may be able to aid in the prevention of several diseases, including cancer, Alzheimer's disease, and other degenerative disorders. Studies using single and multiple doses demonstrated that *C. absus* was not harmful at doses between 300 and 2000 mg/kg body weight in normal rats. Serum progesterone levels were increased after oral administration of the *C. absus* n-hexane fraction at a dose of 500 mg/kg per day. Hence, the recommendation is to find ways to adopt and incorporate *C. absus* in dietary intake.

Key words: *Cassia absus*, Analgesic, Anti-Fungal, Luteolin, Apigenin, Hydnocarpin.

R.ND-11

Potential Health Benefits of Nutmeg (*Myristica fragns*)

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Myristica fragns also known as nutmeg belonging to the Myristicaceae family. *M Fragrans* has been used in traditional medicines as a carminative stimulant and narcotic. For cultivation, a hot humid climate without dry season is key requirement but usually grows in Warmer environment. It also grows well in the areas with sandy loam, clay loam and red laterite soils. It is broadly cultivated in China, Indonesia, Taiwan, Malaysia, India, Grenada, South America, and Sri Lanka. The actual production of nutmeg is difficult to obtained, World production of nutmeg on an average approximated between the ranges of 10,000 to 12,000 tons per year but annual world Requirement is approximately 9,000 tons. Grenada and Indonesia govern production and Transport of nutmeg by sharing 20% and 75% of World market, respectively. Mostly nutmeg Contains terpenes and phenylpropenes. Chemical composition of these constituents varies due to different Cultivation conditions. Nutmeg is considered as essential ingredient of numerous industrial applications ranging from food to cosmetics. Its pharmaceutical products are also important due to its antioxidant and antimicrobial Properties. More uses and applications of nutmeg by products are continuously added. Nutmeg is used as a Constituent in preparations of medicines such as for dysentery, flatulence, stomachache, nausea, vomiting, Rheumatism, sciatica, malaria and early stages of leprosy. Main phytochemicals in nutmeg (*Myristica fragrans* Houtt) are: myristicin, trimyristin, myristic acid, alpha-pinene, beta-pinene, etc. In the traditional system of medicine, nutmeg is preferably used to treat insomnia, depression, intestinal worms, and oligospermia. Etc. Nutmeg extract has been scientifically proven to exhibit antimicrobial activity in GI flora thereby suppressing the levels of tumorigenic uremic toxins. Furthermore, methanol extract of nutmeg is effective in H. pylori-induced gastritis and DSS-induced colitis.

Keywords: Nutmeg, Myristica fragrans, Benefits, Insomnia, Phenylpropenes.

R.ND-12

Influence of Parental Dietary Behaviours and Practices on Children's Eating Behaviours

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Parents are the primary caretakers and caregivers of children and play a critical role in the growth and development of their children's feeding environments and eating experiences. Influences of parents on children's eating behaviours start during pregnancy. The first taste experiences of the fetus are flavoured by her mother's diet, through amniotic fluid. Nutritional knowledge, dietary practices, and healthy food practices of parents prevent their children from malnutrition and obesity. Dietary energy is not associated with children's BMI but with adequate and balanced nutrition. Proper nutrition with all required nutrients provides the children healthy lifestyle. The quality and quantity of food provided by parents to children have a great impact on the eating practices of children. Eating behaviours are set long-lasting habits and abilities related to food. Parents influence children's nutritional status, physical activity, and BMI. Parents' dietary habits, meal patterns, and food-related habits influence the consumption and food choices of children. It is revealed that children often mirror their parents' eating habits, practices, and preferences parents directly affect the children's food choices. Healthy eating practices are associated with a healthy lifestyle. Unhealthy eating practices and parental neglect can lead to both malnutrition and obesity in children, significantly impacting the children's eating behaviours and nutritional health. An eating pattern is the main fundament that promotes children's dietary habits and long-term health outcomes. The frequency of meals, food choices, and parents' food routine all affect the eating behaviours and nutritional status of children.

Keywords: Nutritional knowledge, Parents' food habits, Meal pattern, Child behaviors.

R.ND-13

Innovative Approaches to Reducing Food Waste in Nutritional Practices

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Food waste remains a critical issue with approximately 1/3rd of global food production lost and wasted. This problem intensifies environmental and economic challenges while eroding nutritional security. Addressing food waste needs integrated novel approaches within nutritional practices. This study aims to explore and evaluate innovative approaches to reducing food waste through advancements in nutritional practices. We are focusing on evaluating and identifying cutting-edge strategies that align with up-to-date food systems and consumer behaviour. Key methods include the adoption of smart packing technologies, the development of a food waste tracking system, and the implementation of an education program targeting consumer perspective. Moreover, other solutions such as upcycling food waste into nutritionally enriched products were analysed. Findings reveal that integrating a food tracking system with data analytics can significantly minimize food waste along with predicting demands more efficiently. Smart packaging innovation, such as monitoring freshness, offers a promising means to increase food shelf life and enhance consumer trust. Additionally, educational initiatives emphasizing the nutritional value of food and helping with proper storage techniques have shown effectiveness in changing consumer choices. The upcycling of food waste into value waste into value-added products not only mitigates waste but also enhances food diversity and nutritional value. Integrating these innovative approaches into nutritional practices holds promise for a substantial reduction in food waste. By embracing technological advancements, educating consumers, and rethinking food utilization, this challenge is possible to address both environmental and nutritional challenges. Continued research and collaboration across disciplines are the main pillars of advancing these strategies and implementing on worldwide.

Keywords: Food Waste, Nutritional Practices, Smart Packaging, Consumer Behaviour, Upcycling, Sustainable.

R.ND-14

Assessing the Nutritional Composition and Health Benefits of *Euryale ferox* (Fox Nuts) Tart

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Euryale ferox (commonly known as makhana, fox nut, or gorgon nut) is an aquatic crop from the Nymphaeaceae family, thriving in water bodies such as pools and marshlands. Its starchy white seeds are highly nutritious, and rich in carbohydrates, proteins, minerals, and other essential nutrients, earning them the nickname "black diamonds." These seeds are notable for their high amino acid content, surpassing that of many staple foods, and are used for both nutritional and medicinal purposes. Makhana is recognized for its therapeutic properties, often utilized in treating digestive, renal, and reproductive disorders. It is one of the most important non-cereal foods derived from aquatic resources and holds significant culinary and medicinal value in various countries, particularly in India, where it is a popular delicacy. Globally, *Euryale ferox* is increasingly incorporated into ready-to-eat products. The current study aims to determine the nutritional profile of *Euryale ferox* and its potential to create a functional tart due to its high nutritional value. Chemical analyses were conducted on Euryale Ferox, and tarts were prepared using Euryale Ferox flour at varying concentrations: T0= 0g, T1= 15g, T2=30g, T3=45g, T4= 60g. The tarts were evaluated for moisture content, total ash, crude fiber, crude protein, and mineral content. The collected data were then subjected to statistical analysis to assess the nutritional value and potential health benefits of the Euryale Ferox tart.

Keywords: *Euryale ferox*, Fox nut, Tart, Potential health benefits, Nutritional value.

R.ND-15

Citrus-derived Nutraceutical for Health Benefits and Their Applications in Value Addition Foods

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Citrus is the largest fruit crop grown across the globe. It is one of the most profitable crops in terms of economy as well as popular for nutritional benefits. The most interesting aspect of citrus is the availability of several varieties with attractive colors. Approximately 50% of citrus remains unconsumed after processing as pith residue, peels, and seeds. Direct disposal of these wastes causes serious environmental problems in terms of killing natural flora in the soil because of the antibacterial properties of limonene oils. Seepage to underground waters or open water bodies affects water quality and aquatic life. Citrus IS one of the most widely cultivated fruit crops. Citrus fruits are rich sources of essential vitamins, minerals, fibers, and bioactive phytochemicals, such as alkaloids, carotenoids, nitrogenous compounds, and polyphenolics. Bioactive compounds present in citrus waste are used as food additives, encapsulants, nanoparticles, prebiotics, pectin sources, essential oils, polyphenols, carotenoids, or dietary fiber The by-products derived from citrus wastes are an economic and renewable source of valuable compounds which can be used in pharmaceutical, nutraceutical, food, and cosmetic industries. The review presents a detailed description of the recent advances with an emphasis on citrus-derived nutraceuticals as a potential source for various biological properties and physiological roles, such as anti-carcinogenicity, anti-mutagenicity, anti-allergenicity, anti-aging activity, and natural as well as important constituent in synthetic antioxidants. Citrus-derived food and drinks as well as nutritious feed for animals have also been included.

Keywords: Citrus waste, Bioactive compounds, Potential health benefits, By-products of citrus wastes, Nutraceutical.

R.ND-16

Unveiling Sleep's Role in Ghrelin and Leptin Regulation

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Leptin has well-investigated functions relating to body composition, energy homeostasis, and feeding conduct in humans. The obstructive sleep apnea syndrome (OSAS is strongly linked with obesity, which is known to be closely associated with hyperleptinemia, in recent times, ghrelin, a hormone that also affects appetite and energy homeostasis, has been discovered. Leptin is a hormonal factor affected by OSAS and not determined by obesity alone. Several studies suggest that habitually shorter sleep duration is associated with a higher risk for overweight and obesity among children. Multiple mechanisms may associate chronic short sleep with weight gain among humans, including pathologic modifications in energy-regulating and appetite-impelling hormones. There, there are several studies with significant findings, such that a role for sleep curtailment-induced hormonal changes is plausible. Further work is required to elucidate the specific role these hormones play in metabolic dysregulation associated with chronic short sleep. Ghrelin is derived from a preprohormone called preproghrelin, which generates, by post-translational cleavage, a second peptide of 26 amino acids called obestatin, and a third peptide of 60 amino acids, called C-ghrelin, in addition, to the primary mRNA encoded by the ghrelin gene can also generate multiple transcripts by alternative splicing, some of them may encode peptides of unknown function. Ghrelin is involved in growth hormone release, metabolism, and appetite regulation as well as in the sleep-wake cycle regulation. Obesity was initially reported as a ligand for the orphan G protein-coupled receptor mGPR39, involved in satiety and decreased food intake, however, there is controversy on these findings, and the role of this peptide is not well established, Obesity also induces sleep when centrally administered to rats. On the other hand, C-ghrelin circulates at high levels in plasma; however, its function and putative receptor are unknown.

Keywords: Ghrelin, Hypopnea, Leptin, Obesity, Sleep apnea, Hormones.

R.ND-17

Effect of Olive Oil on Non-alcoholic Fatty Liver Disease

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It is estimated that 25% of the adult population is affected worldwide by non-alcoholic fatty liver disease (NAFLD). Type 2 diabetes (T2DM) and obesity are two metabolic syndromes that are closely linked to NAFLD and NASH. The severe clinical and financial burden associated with NAFLD and NASH. Steatosis of the liver is a common symptom of several distinct processes. It may be caused by enhanced hepatocyte synthesis of lipids from scratch, decreased hepatocyte lipid breakdown, decreased hepatocyte export of lipids, or extreme hepatocyte intake of lipids Despite having the treatment for NAFLD. Some approaches were made by the international guidelines based on lifestyle changes and dietary health regimens. In preventive medicine Mediterranean diet plays a crucial role as the main component of the MD is olive oil, which is a good source of monounsaturated, polyunsaturated fatty acids, Tocopherols, phenols, and carotenes having antioxidant and anti-inflammatory properties. Olive oil, as part of the Mediterranean diet (MD), is associated with benefits on human health, especially regarding the cardiovascular system, obesity, diabetes, and related metabolic disorders. U.S. Food and Drug Administration recommends daily consumption of 20 g of olive oil as a preventive treatment. Olive oil as a supplement lowers serum triglycerides, restores aberrant lipid metabolisms and greatly reduces the buildup of fat droplets in the liver via inhibiting inflammation. Many pieces of evidence support the theory that olive oil plays an important role in the improvement of NAFLD and steatosis among patients.

Keywords: Non-alcoholic fatty liver disease, Mediterranean diet, Olive oil, steatosis, Monounsaturated fatty acids and Polyunsaturated fatty acids

R.ND-18

Development and Characterization of Fortified Calcium Premix for Food Applications: A Review

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Calcium is an essential micronutrient for bones, teeth, and brain development. There are many isolated deficiencies related to calcium such as cardiovascular diseases, dental changes, osteoporosis pregnancy complications, and hypocalcaemia. The increasing incidence of calcium deficiency and related health troubles has highlighted the want for powerful techniques to decorate calcium intake through regular meals. Globally, it is estimated that approximately half of the world's population is deficient in dietary calcium. The nation makes a specialty in the improvement and characterization of a fortified calcium premix for meal utility. The current study highlights the importance of formulating calcium in rich food that may be effortlessly integrated into diverse food merchandise without changing their taste, texture, or look. Many advanced techniques are employed to ensure the bioavailability and balance of the calcium within the food. Comprehensive characterization may be performed to evaluate the premix's homes, nutritional profile, and sensory attributes. Additionally, the food might be examined in one-of-a-kind meal matrices to evaluate its compatibility and efficacy. Addressing each technical and sensory demanding situation to the current review highlights to offer of flexible ways to combat calcium deficiency, thereby improving public fitness results. The successful development of this fortified calcium food should pave the manner for its sizeable utility inside the food enterprise, making it an imperative issue of purposeful foods and nutritional dietary supplements.

Keywords: Calcium deficiency, Fortified food, Calcium premix, Bioavailability, Food applications, Nutritional enhancement, Public health.

MEDICINE AND ALLIED HEALTH SCIENCES (OPTOMETRY)

KEYNOTE/INVITED LECTURES

K.OPT-1.1

Publish or Perish: Unveiling Malpractice in Research Publication

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Coolidge, in 1932, introduced the aphorism "Publish or Perish," which implies that failure to publish research may result in diminished standing within one's professional community. Following this principle, approximately 1.8 million articles are published annually (Saxena et al, 2023). This increase in publication volume reflects the perceived competence of both professionals and institutions. The primary purpose of publishing is to disseminate research findings to professionals, highlighting ongoing facts, contradictions, and solutions based on credible evidence, while also soliciting feedback from peers and experts to further knowledge advancement. Novice researchers are often vulnerable to predatory journals. The Association of Vision Sciences Librarians (AVSL) has issued a list of credible journals for publication. Pressures to publish include recruitment criteria for masters, PhD, and postdoctoral positions, scientific rankings of individuals and institutions, academic promotions. Malpractice in publication is done in the following form: ghost, guest and gift authorship, salami publication, duplicate publication, redundant publication and fabrication or falsification of research results. Consequences of unethical practices include article retraction, job loss, fines, imprisonment, and loss of funding. I would second the dogma “Publish or perish but do not publish and perish”. Publishing the research in authenticated is as important as crafting a rigorous research design, obtaining ethical approval, collecting data, applying statistical tests, interpreting results, and defending your synopsis and thesis before supervisors and external assessors. To avoid exploitation and uphold research integrity, it is essential to publish with the intent of preserving your work, rather than being subject to unethical practices. Adhere to guidelines set by accredited bodies such as ICMJE, COPE, HJRS, AVSL, Scopus, and PubMed, and seek the latest guidance from mentors and experts.

Keywords: Research Integrity, Predatory Journals, Publication Ethics, Academic Misconduct

K.OPT-1.2

Empowering Global Eye Care: The Crucial Role of FIACLE in Shaping the Future of Contact Lens Education

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The Fellowship of the International Association of Contact Lens Educators (FIACLE) is an internationally recognized credential that signifies a high level of expertise and dedication in the field of contact lens education. As the need for specialized knowledge in contact lenses grows due to the increasing prevalence of myopia, dry eye, and other ocular conditions, the FIACLE designation has become a critical marker of quality in optometric education and patient care. This paper aims to raise awareness about the importance of FIACLE in shaping the future of contact lens education worldwide. By exploring the educational standards set by FIACLE, the benefits of being a fellow, and the impact of FIACLE on enhancing both teaching and clinical outcomes, this presentation underscores the fellowship's influence in elevating the standards of eye care. The significance of promoting FIACLE among optometrists, educators, and academic institutions will be discussed, emphasizing how it fosters an environment of lifelong learning and ensures the global dissemination of cutting-edge contact lens practices. By focusing on the key role FIACLE plays in improving patient care and professional development, this paper contributes to the broader understanding of its essential place in modern optometry. FIACLE plays an indispensable role in raising the standards of contact lens education and practice across the globe. By equipping educators and practitioners with advanced knowledge and expertise, FIACLE ensures the provision of high-quality patient care and fosters continuous professional development. The fellowship serves not only as a mark of excellence but also as a catalyst for the widespread adoption of evidence-based practices in the field. Raising awareness of FIACLE's value will promote its expansion within the optometry community, ultimately benefiting educators, practitioners, and patients alike. Through concerted efforts to recognize and support FIACLE's mission, the future of contact lens care will be marked by innovation, improved patient outcomes, and a strengthened global optometric network.

Keywords: FIACLE, Contact Lens Education, Optometry, Professional Development

OPTOMETRY

ORAL PRESENTATION

O.OPT-1.1

Effect of Short-Term Exposure to Shorter Wavelength on Sub Foveal Choroidal Thickness to Imposed Hyperopic Defocus in Young Emmetropic Adults

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Purpose: This study aimed to investigate the effect of short-term exposure of shorter wavelengths and induced hyperopic defocus on sub-foveal choroidal thickness.
Materials and Methods: The study was conducted in the diagnostic department of Al-Shifa Trust Eye Hospital 30 healthy subjects were included in this pre-and post-quasi-interventional study by using the "Non-Probability Convenient Sampling Technique" after assessing their ocular and general health. To reduce the impact of diurnal fluctuation on choroidal thickness, all participants were examined between 8:30 and 11:30 a.m. Sub-foveal choroidal thickness was measured from the right eye using OPTOVUE AVANTI SD-OCT. Subjects underwent defocus for 2 hours after taking baseline readings of sub-foveal choroidal thickness and subsequent readings after short-term exposure to shorter wavelength. After defocusing again choroidal thickness was measured and compared the pre- and post-defocus sub-foveal choroidal thickness and the combined effect of defocus with shorter wavelength. Data was analyzed in SPSS.26 softwareusing a dependent paired sample t-test.
Results: 30 healthy subjects, 26 were female and 4 were male included in the study. The mean age of respondents was 20.37±1.25. Induced hyperopic defocus causes a significant increase in sub-foveal choroidal thickness ($p<0.001$). The difference in mean value between variables pre-defocus and after defocus the pre-defocus group had lower values (298.23±45.44) than after the hyperopic defocus group (320.53±51.88). When the combined effects of shorter wavelength and hyperopic defocus are considered, defocus predominates.
Conclusion: Inducing hyperopic defocus affects sub-foveal choroidal thickness causing a significant increasein thickness. Exposure of shorter wavelengths increases sub-foveal choroidal thickness independent of defocus.

Keywords:
Hyperopic Defocus, Sub Foveal Choroidal Thickness, Shorter Wavelength

O.OPT-1.2

Effect of Moist Snuff on Tear Film, Intraocular Pressure and Intraocular Crystalline Lens

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Introduction: Moist snuff is a smokeless drug that is made of nicotiana leaves. Usage of moist snuff can lead to nicotine addiction that can cause dry eyes, raised IOP, cataract, retinal changes and optic nerve changes.
Objective: The objective of the study is to evaluate the changes in tear film, intraocular pressure (IOP), and the health of the crystalline lens in moist snuff users, as well as to compare the effects of different durations of moist snuff use on ocular health.
Methods: After taking the consent, people of age 20-35 years selected by using descriptive cross sectional study design. The study was conducted in factories at Sargodha Road, Faisalabad. The duration of the study was from July 2022 to December 2022. Nonprobability snowball sampling technique was used. Schirmer's Strips, Fluorescein Strips, Goldman Applanation Tonometer, slit lamp and Self designed proforma were used. Data was analyzed by using SPSS software 22.
Results: The correlation test was applied to check moist snuff effects. All parameters had significant association with p value < 0.05. Out of 200 eyes of 100 moist snuff users, IOP in 80%, dry eye in 95% and cataract (nuclear) in 53% were found.
Conclusion: The study concluded that ocular health problems occur by using moist snuff that gets severe with duration of moist snuff use.

Keywords: Crystalline Lens, Intraocular Pressure, Smokeless snuff, Tear Film

O.OPT-1.3

Effectiveness of Green Light Therapy in Migraine

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Purpose: The aim was to access and compare photophobia, tear film instability and quality of life in migraine patients using green light therapy along with medication and in those who are only using migraine medication.
Materials and Methods: A Quasi experimental was conducted at The University of Faisalabad. Data was collected by non-probability sampling technique. The sample size was 30, with 15 patients in the experimental group and 15 in the control group. Green led glasses, fluorescein strips for TBUT, torch light, slit lamp and UPSIS-17 questionnaire was used for data collection. Green light therapy was given in the form of glasses in which patients were asked to use it daily for one hour in a dark room without any exposure of any other light. Tear breakup time and photophobia were assessed at baseline and after 5th and 10th week. The data was analyzed using SPSS software version 20.
Results: The patients who used green light therapy along with medications, their mean value at baseline was 7.6407 ± 1.90949 and after 10th week the mean value was 9.0320±2.46182. There were 46.66% patients who were having severe light sensitivity at baseline and after 10th week there was no patient in severe category. The p value ($p>0.05$) was significant showed that green light therapy positively effects on migraine patients.
Conclusions: The results showed that green light the Green LED therapy for migraine potentially improves the TBUT. It helped to reduce migraine-related symptoms such as pain, photophobia, and dry eyes.

Keywords: Migraine, Photophobia, Pain.

O.OPT-1.4

Visual Functions and ocular Health in Children

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Purpose: To compare the visual functions and ocular health between children with Delayed Visual Motor Integration and normally developing children.
Method: Study was done after the approval of Ethical Board of College of Ophthalmology and Allied Vision Sciences. (Ref #1478/23). The study took place in Mayo Hospital, Lahore from October to December 2023. Sample size was calculated using a formula whose level of significance (α) is 5. Power of test (%) 1-β is 90%. A non-probability convenient sampling was used with sample size 60, divided into 2 groups of 30 each: normally developing children, and children with Delayed Visual Motor Integration. The ones with any preexisting neurodevelopmental disorder or receiving occupational therapy were excluded. Visual functions of all these children were assessed; Visual Acuity was assessed using logMAR, Contrast sensitivity using Pelli-Robson, Color vision using D-15, Visual Field using confrontation method and glare using the photo stress test. Strabismus, amblyopia, nystagmus, extra ocular motility and ptosis were also evaluated. Data was entered and analyzed by SPSS software 25. P value ≤ 0.05 was considered significant.
Results: There was little difference between visual acuity of normal and delayed individual. p= 0.076 and p=0.510.7 out of 30 individuals with Delayed VMI had normal contrast sensitivity, 3 had field defects. 2 had glare. 5 out of 30 children with Delayed VMI had amblyopia, 7 had ptosis, and 2 had abnormal EOM. However, significant difference in nystagmus was seen p=0.004.
Conclusion: There was no significant difference in visual functions and ocular health of children with delayed visual motor integration and normally developing individuals.

Keywords: Visual Acuity, Color Vision, Contrast Sensitivity, Visual Field

O.OPT-1.5

Effect of Acupressure on Dry Eye Management

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Introduction: Acupressure is simply a non-pharmacological intervention to treat dry eye disease. There are different periocular points such as ST1, BL1, BL2 and TB23. These specified periocular. points stimulate with acupressure for the management of dry eye.
Purpose: The goal of this study was to find out the therapeutic effects of acupressure and to Compare these effects with the effects of artificial tears in mild to moderate dry eye condition.
Methodology: A study was conducted in the ophthalmology department of Madinah Teaching Hospital, using non-probability purposive sampling technique and prospective longitudinal study design. There were two groups of sixty participants with dry eye. The first group was receiving acupressure, and the artificial tear was prescribed to the second group. Before therapy, baseline data was recorded at first week which includes TBUT to assess the evaporative DED. Then after 4 weeks of therapy, the results were collected. Data was analyzed by using SPSS Version 23 software.
Results: The quantitative data was collected, and independent T test and repeated ANOVA was applied. The mean value and standard deviation for artificial tears was 10.00 ±2.051 and for acupressure was 11.70 ± 1.968. This shows that acupressure therapy show better results than artificial tears.
Conclusion: There is a significant improvement in dry eye with the use of both artificial tears and acupressure therapy, but acupressure therapy shows significantly better results than artificial tears.

Keywords: Acupressure, Dry eye syndrome, Lubricating eye drops.

OPTOMETRY

POSTER PRESENTATION

P.OPT-1

Innovative eCAT Prism Tonometer an Illuminating Path to reliable IOP Measurement in Patients with Keratoconus

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The Goldmann Applanation Tonometer is widely used in clinical practice to measure intraocular pressure, but it has some limitations. Keratoconus, a progressive corneal disorder, poses challenges in obtaining accurate intraocular pressure measurements. eCAT Prism Tonometer, enhance the precision of IOP measurements in individuals with Keratoconus.

Purpose: The study aimed to assess the accuracy in IOP measurements with eCAT Prism Tonometer and Goldmann Applanation Tonometer in patients with Keratoconus. To compare the IOP values obtained with the error correcting applanation tonometry (eCAT) and Goldmann applanation tonometry (GAT) in keratoconic corneas.

Methods: 120 eyes of 60 Keratoconus patients were enrolled in this cross-sectional study. IOP was measured on each subject always in the same order, eCAT-GAT, after a minimum interval of 10min between measurements. CCT was measured using Optical Coherence Topographer (Topcon Triton) before the IOP measurements in all subjects. Paired t-test analysis was used for the statistical assessment.

Results: Mean IOP for mild, moderate and severe keratoconus stages was 17.550±0.945, 12.400±1.058, 8.050±1.538mmHg for GAT and 17.925±0.799, 14.075±0.977, 11.250±1.650mmHg for eCAT respectively. There were statistically significant differences among both tonometers, GAT and eCAT ($P<0.05$).

Conclusions: This study concluded that eCAT has overestimated but GAT has underestimated IOP readings in keratoconic corneas. eCAT may be the most appropriate tonometer to use in keratoconus for the measurements of IOP, because eCAT does not flatten the cornea to measure IOP and doesn't appear to be dependent upon CCT.

Keywords: Keratoconus, Intraocular Pressure, Goldmann Applanation Tonometer, eCAT Prism Tonometer

P.OPT-2

Evaluate the Effect of Electronic Cigarettes on Tear Film Stability and Production

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E-cigarettes are battery-operated devices that people use to inhale an aerosol, which typically contains nicotine, flavorings and other chemicals. Excessive use of vape can lead to nicotine addiction that can cause dry eye disease, glaucoma, cataract etc.
Objectives: The aim of this study is to evaluate the effect of e-cigarettes on tear production and stability in individuals who have been vaping for 6 months, 12 months, and 18 months. Additionally, the study seeks to compare the impact of e-cigarettes on tear stability across these three groups of users, categorized by the duration of their vaping habits: 6 months, 12 months, and 18 months. **Methodology**: Observational cross-sectional study design was applied to conduct this research. The sample of the study was 30 male subjects. Further divided into three groups, 10 patients with 6 months history of vaping, 10 patients with 12 months history of vaping, 10 patients with 18 months history of vaping. The study was conducted at Madinah Teaching Hospital, Sargodha Road, Faisalabad. The study took place between September 2023 and May 2024. For the collection of data, a self-structured proforma was used after taking the informed consent from the vape users. Schirmer strips and Fluorescein strips, Burton lamp was used to perform TBUT & Schirmer test. Data was analyzed by using SPSS software version 20. **Results**: The One-Way ANOVA test was applied to check the effect of Vape on tear stability and production. The mean value and standard deviation of Tear Break up Time of Group A is 7.9000$\pm$1.25237, mean and standard deviation of Group B is 7.0500$\pm$1.57196 or mean and standard deviation of Group C is 6.7833$\pm$1.83277 respectively. While mean and standard deviation of Schirmer Test of Group A is 11.2000$\pm$2.46235, mean and standard deviation of Group B is 10.3000$\pm$2.95760 or mean and standard deviation of Group C is 7.8000$\pm$1.57614 respectively. There was significant effect of Vape on tear production and tear stability with p value <0.05. **Conclusions**: This study concluded that there is a strong relationship between e-Cigarette and dry eye.

Keywords: E-cigarettes tear film, Dry eye, Irritants

P.OPT-3

Comparison of Tea Tree Oil Shampoo with Standard Shampoo in Managing Blepharitis

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Introduction: Blepharitis is an inflammatory ocular condition characterized by redness, scaling, itching and burning on eyelids. Tea tree oil (TTO) is known for its antimicrobial and anti-inflammatory properties, making it beneficial in treating blepharitis. **Objective:** To investigate and compare the efficacy of tea tree oil shampoo and standard shampoo in managing blepharitis and Meibomian Gland Dysfunction (MGD). **Methodology:** Quasi-experimental study was conducted at Madinah Teaching Hospital, Faisalabad, from September 2023 to May 2024, using non-probability purposive sampling. Patients aged 18-45 years with clinical features of blepharitis and MGD were included, while those with a history of ocular surgery, steroid eye drop use, TTO allergy, or contact lens use were excluded. Thirty patients were divided into two groups: 15 used TTO shampoo and 15 used standard shampoo. Symptoms were assessed using the BLISS scale, TBUT, OSDI, and Schirmer test at baseline and on the 3rd,7th and 14thdays. Statistical analysis was performed using Chi-Square and repeated measures ANOVA with SPSS software. **Results:** Study included 30 participants with a mean age of 22.73±3.40 years. The TTO group showed statistically significant improvement in clinical features of blepharitis (P=0.00), whereas the standard group did not (P>0.05). The mean OSDI scores improved significantly in the TTO group (54.37±16.86 to 22.60±6.25) compared to the standard group (51.11±12.25 to 30.86±9.18). TBUT improved from 6.76±0.99 to 10.13±1.04 in the TTO group and from 11.65±1.64 to 8.35±2.11 in the standard group. Schirmer test improved from in the TTO group from 10.28±0.55 and11.76±1.19 and from 11.03±0.80 and 11.62±1.22 in the standard group. **Conclusions:** Tea tree oil shampoo is more effective than standard baby shampoo in alleviating blepharitis symptoms but does not significantly improve MGD.

Keywords: Tea tree Oil, Meibomitis, Blepharitis, Eyelid Disease.

P.OPT-4

Evaluate the Effect of Chemotherapy on Tear Film in Breast Cancer

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Objective: The aim of study is to evaluate the effect of different sessions of chemotherapy in breast cancer females on tear film. **Methods:** An observational longitudinal study was conducted at the oncology department of Madinah Teaching Hospital Faisalabad, Pakistan from September 2023 to December 2023. A purposive non- probability sampling technique was used to select the data. 30 Females with 25-45years of age, diagnosed with breast cancer having chemotherapy as treatment plan were included. Exclusion criteria was contact lens users, seasonal allergies, lactating woman, menopausal woman and history of dry eye. After taking verbal and written consent and complete history, Schirmer test and TBUT were performed at baseline and after 2, 4 and 6 sessions of chemotherapy. **Result:** Data was analyzed with Repeated Measure ANOVA test by using IBM SPSS software version20. The mean difference of tear film stability and production at baseline in breast cancer females was 14.3333±2.998 and 14.300±3.425 respectively. After 3 cycles of chemotherapy cycles the mean difference of TBUT and Schirmer was reduced with P=0.00. **Conclusion:** The incidence of aqueous-deficient dry eye was significantly higher in patients who had undergone more than two sessions of chemotherapy. As the number of sessions increases, lower the value of Schirmer I and TBUT were recorded.

Keywords: Dry Eye, Schirmer, Chemotherapy, Breast Cancer, aqueous-deficient dry eye.

P.OPT-5

Comparative Analysis of Orientation and Mobility with Traditional White Cane and Technology Based Smart Cane

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Introduction: White cane is a mobility tool primarily used by blind people to assist in orientation. Smart Cane helps blind people to navigate their environment more successfully. **Objectives:** To evaluate and compare the orientation and mobility of blind person with traditional white cane and technology based smart cane. **Methodology:** Comparative cross-sectional study was conducted in Sunrise blind School, Lahore from September 2023 to May 2024. 40 blind individuals were tested with two interventions.10 obstacles both for indoor and outdoor testing area were selected to detect obstacles with white cane and technology based smart cane. Data was collected through non-probability purposive sampling technique and was analyzed by SPSS software using descriptive statistical tests and paired t-tests. **Results:** Mean age was 30.75±6.50. There were 3 female and 37 male participants. Within the indoor testing area, the number of obstacles that came in contact was 6.05±1.26 and 2.18±1.48(P=0.00), without contact being 1.60±1.10 and 6.10±1.58(P=0.00), and missed being 2.35±1.12 and 1.68±0.79(P =0.005) with traditional white cane and smart cane, respectively. In the outdoor testing area, the number of obstacles that came into contact was 5.38±1.39 and 1.60±1.12(P=0.00), without contact being 2.25±1.12 and 6.55±1.28(P=0.00), and missed being 2.38±1.19 and 1.90±0.92(P = 0.03), with traditional white cane and smart cane, respectively. The time duration taken by both canes to cover the indoor(P=0.49) and outdoor(P=0.31) testing areas was not statistically significant. Patient satisfaction with white cane was 17(42.5%) and technology based smart cane was 23(57.5%).
Conclusion: The technology based smart cane significantly improves the orientation and mobility and enable the blind person to travel safely and independently.

Keywords: Orientation, Visually Impaired Persons, Blind Persons

ARTS & SOCIAL SCIENCES (ENGLISH LANGUAGE AND LITERATURE)

KEYNOTE/INVITED LECTURES

K.ENG-1.1

Integrating STEAM (Science, Technology, Engineering, Arts, and Mathematics) Education into Literary Studies in Pakistan: Developing Industry-Academia Linkages

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Twenty-first century education of literature is being increasingly influenced by emerging technologies which threaten the very existence of literature. The visual is rapidly replacing the textual, and algorithmic brainpower (AI) has invaded the realms of the aesthetic and the poetic. The very sensibility which created and appreciated literature seems endangered, giving way to the mechanical and the predictable ways of machines. However, literature, being a natural human activity, is not only not under threat, but also shaping itself to benefit from the *mechanical* and the *artificial* intelligence processes now available for its creation and appreciation. Pedagogical approaches to these trends are essential for literary studies to keep abreast of the changing world. Just as the oral had evolved into the written, the penned had yielded to the printed, and the printed to the digital, so also the natural-imaginative will sublimate into the algorithms of technologies. Pakistani academia must evolve fast for this transitive scenario to ensure the Anthropocene. *Readiness is all*.

Keywords: Pedagogical approaches, Algorithmic brainpower, Industry-Academia Linkages.

K.ENG-1.2

An Investigation of Ayad Akhtar's *Disgraced* and *American Dervish* in the Light of Julia Kristeva's Theory of Intimate Revolt

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The study investigates Ayad Akhtar's play *Disgraced* and his novel *American Dervish* in the light of Julia Kristeva's theory of intimate revolt. Self-accountability leads to self-reformation. This is the main thesis of Kristeva's intimate revolt theory. It is her intelligent response to the catastrophic dilemma of the present-day world. Capitalism has conquered the world inch by inch. Rugged individualism has become the driving force for classificatory identities like race, culture and religion in the world. The consciousness of social beings in these categories has also become petrified. They continue to gallop, like a blind horse, in the narrowly orbited spheres. Self-criticality is the evidence of our being human has evaporated from the world of humans. Ideological and attitudinal rigidities are liable to stupidities. Ayad Akhtar's play *Disgraced* and his novel *American Devish* critically take up this problem. These interrogative texts invite the Pakistani Muslims especially to look into the mirror to identify the clumsy spots on their face. Their centrifugally to be dialogic and their fallibility to physical violence and their developed bulge for physical hatred are aesthetically foregrounded here.

Keywords: Ayad Akhtar, Disgraced, American Devish, Kristeva, Intimate Revolt

K.ENG-2.1

Pragmatic propositions for argument realization

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The present study investigates the different encoding possibilities of argument in different languages. The different encoding possibilities of referents are in line with the cognitive accessibility level in the mind of the interlocutors. The speaker's choices between different types of referring expressions such as full determiner phrases, pronouns, clitics, or agreement markers/accessibility markers according to the salience in each discourse context in the light of Accessibility Theory (Ariel, 1990) are analyzed. The study specifically focuses on pragmatic propositions for dative argument realization Pashto. The data for the present was selected from the corpora of natural discourse and texts. A close relationship between the salience/accessibility and the morphological encoding of a discourse referent in Pashto is established. The study finds out that the higher accessibility markers are chosen if the accessibility of the discourse referents is higher while lower accessibility markers are chosen if the accessibility is lower. The lower accessibility markers are more informative than the higher accessibility markers, i.e. proper names or full DPs are more informative than (weak) pronouns, clitics, agreement markers and pro.

Keywords: Dative, Verbal Clitic, NP, Pashto, Argument, Clitic Doubling, Pragmatic Conditions, Accessibility Level.

ENGLISH LANGUAGE AND LITERATURE

ORAL PRESENTATION

O.ENG-1.1

Determinism and Free Will in *Maktub* and *The Alchemist* by Paulo Coelho: A Postmodern Study- Gadamer's Theory of Hermeneutics

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This is a Hermeneutic study of Determinism and Free Will in *The Alchemist* and *Maktub* which focuses on the role of fate in human life and how much control the individuals have on their lives. The word *Maktub* is a central belief in the Quran from which the Muslims abide by the strict laws; of how to spend a perfect life in the presence of Allah. It is one of the basic articles of Islamic belief to keep faith in destiny, whether it is good or evil. Here, the role of Free Will is to help people discover or re-hatch their destiny. The concepts of Determinism and Free Will are particularly studied in the context of the Theory of Hermeneutics enunciated by Hans-Georg Gadamer. Hermeneutics is concerned with uncovering the deeper truth of human life with the help of using scientific methods. For Gadamer, understanding the world and the literary work is always from a given *horizon* which means a particular viewpoint or perspective. It differs from person to person. Thus, the horizon is not fixed and static; it is fluid, active and dynamic. Determinism is the concept in which everything, including human attitude, is unconsciously controlled in a way that there could be no other choice. Free will is not random or uncaused according to human behavior. The study shows that people have control over their actions to some extent.

Keywords: Determinism, Hermeneutic study, Free will, Human attitude, Maktub, Quran

O.ENG-1.2

Reformation of Eastern Values: A Multicultural Postmodern Study of Hamid's *Exit West*

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Mohsin Hamid stands as a distinguished and influential writer within the postmodern Diaspora. In the contemporary era, cultural transformations triggered by war are occurring more rapidly than ever before. People in the postmodern world, ravaged by the devastations of war, increasingly seek refuge in the West, aspiring to find peace and security. Against the backdrop of these global crises, Hamid, drawing from his own experiences as a member of the Diaspora, was inspired to write his notable novel, *Exit West* in 2017. As with his other works, *Exit West* plays a critical role in addressing both personal and political issues related to migrants. This research study examines *Exit West* through the lens of migration, with a particular focus on the transformation of culture and values in the Western world. The novel intertwines multicultural perspectives with the complex issues encountered by migrants in the Diaspora, illustrating the reformation of Eastern values in the postmodern context. This study explores the identity challenges that refugees face due to war and migration, and how multiculturalism reveals the painful process of "Otherness" within Western culture.

Key Words*:* Diaspora, Eastern values, Multicultural, Cultural transformations, Multicultural perspectives

O.ENG-1.3

Empowering Pakistani ESL Educators: A Critical Look at AI-assisted ESL Teaching and Learning in Classroom

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English as a Second Language (ESL) pedagogy in Pakistan faces challenges in personalizing learning, providing consistent feedback, and catering to diverse learning styles. Digital technologies revolutionize education by introducing unique aspects that go beyond traditional methods. This research aims to critically examine the potential of AI-assisted ESL teaching and learning in Pakistani classrooms, with a focus on empowering Pakistani ESL educators. It explores how AI tools can be used to enhance the effectiveness of ESL instruction. The study is significant for the instructors, educators, academicians and learners to integrate AI tools into their traditional classroom settings. It enables them to be aware; of AI-integrated models and AI-enriched instructional strategies to use in ESL classrooms to enhance students' English language skills according to the needs of today's age of digitization. The population of the study is ESL learners at the undergraduate level. The True Experimental research design is used to collect data to measure the effectiveness of AI tools in ESL classrooms. Pre-Test-Post-Test Control-Group Design model is used. For this model, two groups are formulated, an experimental group and a control group. Each group has 30 students. The results of the two groups are analyzed using both quantitative and qualitative techniques. "AI-Integrated Teaching Model" is used as a theoretical framework of the study. Pre-test & post-test are used to explore the impact of AI tools in ESL pedagogy and classrooms. The data was analyzed quantitively using Google Forms as the tests will also be taken using AI-tools. The findings of the study reveal that there is a significant improvement in using AI tools to enhance students' English language skills both receptive and productive skills. It is also found that teachers and students have the perception to use AI tools in their ESL classrooms, but they do not appropriately use these in face-to-face classes i.e., Gemini, Grammarly, ChatGpt, jenni.ai, scribbr.ai etc. It is concluded that a very low percentage of teachers use AI tools in their ESL classrooms.

Keywords: ESL Learners and teachers, AI tools, Digitization, AI-integrated model, Receptive and Productive skills

O.ENG-1.4

A Discursive Interplay of Multiple Narratives in Akhtar's Historiographic Metafiction *Homeland Elegies*: A Postmodern Study

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The present research article seeks to explore the complex discursive fabrication of historiographic metafiction which is the result of contestation between different narratives. The text under scrutiny in the present research is Ayad Akhtar's *Homeland Elegies*. This qualitative research has used textual analysis as the research method. Ayad Akhtar, being a representative of the postmodern intelligentsia, disrupts and reconstructs power-generated narrative routes to past events like partition and 9/11. For disrupting the narrative structure of power discourse Akhtar exposes the epistemic violence which itself possesses a whole history of its own. Akhtar, being a Pak-Muslim-American, holds a multidimensional stance to present events like partition and 9/11 with a hybrid view. Akhtar's artistic intelligence subverts the coin of history from power to mini narrative by spotlighting the complex web of socio-political context behind the power narrative about an event that attempts to appear as the ultimate reality. The artistic manifestation of a fact-driven narrative of Akhtar is analyzed through the theoretical lens of Linda Hutcheon's concept of historiographic metafiction. The postmodern incredulous against totalizing power narrative supports such attempts to give a way to the other side of story, the one which can better be regarded as fact or after which one can better understand the truth.

Keywords: Postmodernism, Power-generated narrative, pre-and post- 9/11, Metafiction, Mini-narratives

O.ENG-2.1

The Defense Mechanism and Identity Crisis in Naqvi's *Home Boy*

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This research critically examines the intricate identity crisis experienced by Chuck, the central character in H.M. Naqvi's novel "Home Boy," against the backdrop of post-9/11 America. Focused on the challenges faced by Pakistani expatriates, particularly in the wake of discriminatory measures such as the Patriot Act of 2001, the study investigates Chuck's struggle to reconcile his Pakistani heritage with his American upbringing. Themes of cultural identity, belonging, and the impact of defense mechanisms on identity formation are explored within the context of globalization and cross-cultural encounters. The narrative unfolds against a backdrop of heightened racial harassment, both on the streets and under governmental scrutiny, which had a profound impact on the Pakistani diaspora. The study positions itself within the broader research landscape by contributing nuanced insights into the psychological dimensions of identity formation, cultural heritage preservation, and the complexities faced by individuals navigating the intersections of different cultural worlds. The findings of this research extend beyond the confines of literary analysis, offering implications for psychoanalytic theory, cultural studies, and postcolonial perspectives. By centering on Chuck's experiences, the study provides a fresh perspective on the challenges encountered by Pakistani Americans post-9/11, paving the way for a deeper understanding of the broader implications for individuals grappling with discrimination in a globalized society. The narrative of Chuck in "Home Boy" serves as a poignant lens through which to explore the multifaceted dynamics of identity crises and the defensive mechanisms employed by individuals seeking their place in an often-hostile world.

Keywords: Cross-cultural encounters, Cultural identity, Defense mechanisms, Identity crisis, Racial harassment

O.ENG-2.2

A Study of Class-Consciousness and Power Struggle in Contemporary India: an Analysis of Kaikini's *No Presents Please*

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The present article analyzes class consciousness and the constant power struggle in Indian society through "*No Presents Please*" (2020), using the class conflict theory by Karl Marx. The writer, Jayant Kaikini, explores the subtle web of relationships between classes and issues of conflict in Indian society as depicted in this narrative. The purpose of the study is to understand the relationship and reasons for conflict between classes in India. Marx's theoretical framework explains the reasons for restlessness among the different classes of society as a constant struggle between the proletariat working class and the bourgeoisie ruling class. This qualitative study employs a textual analysis method for the interpretation of the data. The analysis revealed that within the Indian caste system, the proletariats are not accepted as equal citizens as exemplified by the character Popat; whose name in Hindi is "Parrot," suggesting that he does not belong to the mainstream human society and thus lacks a normative societal name. The pivoting point of the story is based upon the class consciousness and struggle of the main character with society. Multiple scenes and various artifacts and gestures highlight not only the differences between these two class systems but also shed light on the difficulties and challenges faced by the proletarian class. For instance, the living conditions and lifestyles of both Popat and Asavari Lokhande are realistic depictions of the toiling section of Indian society.

Keywords*:* Marxism, Class Conflict Theory, Proletarian class, Bourgeoisie.

O.ENG-2.3

A Critique of Colonial Ideology in Alexie's *The Lone Ranger* and *Tonto Fistfight in Heaven*

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From a Native American perspective, the initial intentions of European colonizers were not immediately clear. Some Indian communities were approached just to civilize them, based on the so-called ideologies made by Euro-Americans. For many indigenous nations, however, the first impression of Europeans was characterized by violent acts of raiding, murder, rape, and kidnapping. But with time minor acts of colonization took the shape of ideologies that Euro-Americans started to build to suppress, oppress and violate Native American culture and civilization on a larger scale. This research is based on the idea of Althusser's Theory of Ideological State Apparatus. This research is grounded in the concept of colonial dominance over the Native Americans. Alexie in his writings represents the dominance of Euro-Americans and the devastating exploitation of the Native American culture and civilization. Alexie also highlights the issues of identity, religion, cultural diversity, assimilation and the survival of Native Americans under the destructive influence of Euro-American power. This research also shows how Euro-Americans used Ideological State Apparatus with Repressive State Apparatus to suppress the culture and tradition of indigenous Americans. RSAs functioned through violence and the government legitimized them in the name of culture. Euro-Americans forcefully applied their ideologies to the Native Americans.

Keywords: Native American perspective, European colonizers, colonial dominance, Ideological State Apparatus.

O.ENG-2.4

Transcendentalism in Emerson and Thoreau: A Comparative Study

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Ralph Waldo Emerson and Henry David Thoreau stand as two of the most influential figures within the Transcendentalist movement, sharing many philosophical principles while differing in their approaches. Emerson's perspective is primarily observational, believing that a philosopher's role is to contemplate and understand the world without direct engagement. In contrast, Thoreau's approach is deeply personal, advocating for the active living out of one's beliefs. Both thinkers are pivotal in shaping the Transcendentalist movement. Transcendentalism, at its core, is a reflective and deliberately constructed movement that introduced a few mystical ideas into the broader intellectual discourse. Emerson's vision aligns with an expansive tradition of mystical thought, emphasizing the inward, contemplative aspect of the philosophy. Emerson's version of Transcendentalism represents the oldest strands of thought reinterpreted for a new era, advocating for the transformation of society through a deeper connection to one's spirit. He approached these ideas on a personal level, aiming to inspire social change through individual adoption of these ideals. Thoreau, while sharing these foundational beliefs, introduced a more political dimension to Transcendentalism. He believed that a true commitment to Transcendentalist principles necessarily involves political dissent and action. While Emerson hoped for social change through gradual individual transformation, Thoreau actively demanded it. Thoreau argued that political dissent was an inevitable consequence of adhering to Transcendentalist ideals. Despite their differences, Emerson and Thoreau both agreed on the fundamental principles of the movement that is the rejection of conformity, the importance of individualism, and the pursuit of a fulfilled life. These shared beliefs formed the foundation of their mutual respect and continued influence.

Keywords*:* Conformity, Individualism, Transformation, Transcendentalist ideals, Foundational beliefs

ENGLISH LANGUAGE AND LITERATURE

POSTER PRESENTATION

P.ENG-1

Caste-Based Advocacy in Pakistan: Spivak and Fanon's Critique

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The caste system plays an important role in Pakistani society to get benefits, and it somehow still decides the high or low status of people. People with lower castes suffer a lot and one major fact is that people who reject the caste system face many difficulties in Pakistani society. The concept of class discrimination, racism, power, and voicelessness is delineated in the light of Fanon's book The Wretched of the Earth and Spivak's essay Can the Subaltern Speak? The caste system in Pakistan turned severe at times. Honor killing, land mafia, kidnapping, murders, extortion, blasphemy, human trafficking, and corruption generate across the spectrum of major crimes. The caste system acts as a powerful source, and this is one of the main reasons that our nation is facing several challenges. The caste system acts like a hidden evil that slowly eats the opportunities of talented individuals in the relative fields of education, health and all other prominent sectors of society.

Keywords: Castes, Discrimination, Evil, Traditional, Corruption, Social Context, Pakistan

P.ENG-2

An Althusserian Study of Rabbani's *Invisible People*

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This research employs the Althusserian lens to Raza Rabbani's book of short stories titled *Invisible People*. Based on the theory of Louis Althusser's work, it explores how the characters in *Invisible People* interact with different institutions of education, media, and religion. For example, the first research question is about how these interactions affect the characters' responses to social injustice in the plots. Additionally, these stories use Althusserian ideas to assess the representation of social suffering and attempted escape. Based on the investigation, it aims to augment the literature's portrayal of ideological structures and to criticize them in a way that would serve as a foundation for analyzing how these structures can affect individuals in their daily lives. The investigation concerns the intricate relationship between Rabbani's *Invisible People* personalities and the state's ideological apparatuses, such as education, media, and religion. It investigates how these interactions influence the characters' attitudes toward social injustice, as documented in narratives and the larger society. Additionally, it intends to utilize Louis Althusser's theory of ideology and the ideological state apparatus to analyze how social injustice is represented. Based on a comprehensive investigation of these topics, the proposed study intends to provide a more extensive understanding of how ideologies affect the literary issues of individual or collective responses to injustice. The investigation will explore the characters' interactions with and responses to institutionalized ideology, including education, media, and religion, through the lens of *Invisible People*. Through understanding these interactions, the research aims to recognize how the apparatuses themselves influence their behavior and decisions through their association with social injustice. By addressing the questions of research, the study aims to explain the complex interactions between ideology, societal structures, and individual behavior in the literature domain.

Keywords: *Invisible People*, Althusserian ideology, Social injustice, Social suffering, Resistance.

P.ENG-3

A Comparative Analysis of the Portrayals of Satan in John Milton's Paradise Lost and Netflix Lucifer

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This research undertakes a comparative analysis of the portrayal of Satan in John Milton's "Paradise Lost" and Lucifer in the Netflix series "Lucifer," exploring the evolution of the Devil in popular culture. The research is guided by three primary questions: What are the similarities and differences between the characters of Satan and Lucifer in terms of their personality traits, motivations, and actions? How do the different cultural and historical contexts in which Satan and Lucifer were created influence their portrayal? What is the significance of the two characters and their enduring appeal? Utilizing Carl Jung's theory of psychoanalysis, particularly the concepts of the collective unconscious and archetypes, this study examines the psychological dimensions and archetypal significance of these characters. In "Paradise Lost," Satan is depicted as a tragic hero whose rebellion against divine authority highlight's themes of pride, ambition, and defiance. In contrast, the Netflix series "Lucifer" reimagines the Devil as Lucifer Morningstar, a complex, charismatic anti-hero on a quest for redemption and self-understanding. The comparative analysis reveals both congruence's and divergences in their characterizations, shaped by the distinct cultural and historical contexts of their creation. Milton's 17th-century theological and political milieu contrasts sharply with the modern, secular setting of "Lucifer," reflecting contemporary views on morality, freedom, and identity. This research highlights the enduring appeal of these characters, rooted in their embodiment of universal themes of rebellion, freedom, and the quest for self-knowledge, resonating deeply within the collective psyche across different eras. By integrating Jungian psychoanalysis, this thesis offers a nuanced understanding of how the Devil's portrayal has evolved and why these representations continue to captivate and inspire audiences. This abstract succinctly outlines the scope of my research, the guiding questions, and the theoretical framework you are employing.

Keywords: Collective unconscious, Archetypes, Tragic hero, Anti-hero, Rebellion

P.ENG-4

Reclaiming Identity in The Digital Age: A Critical Analysis of Postcolonial Representation in Netflix's *Never Have I Ever*

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This study explores the relationship between digital media, postcolonial identities, and cultural expression, using the Netflix series *Never Have I Ever* as a case study. This research critically analyzes the show's portrayal of Indian American experiences, online activism, and cultural representation, investigating the impact of digital media on postcolonial identity formation and cultural narratives through post-colonial scholar Frantz Fanon. This study uses qualitative analysis to explore how digital media influence's postcolonial identity. This includes examining the tensions between cultural heritage and modernity, tradition and innovation, and individuality and community. The research also looks at how online activism and social media platforms amplify marginalized voices, challenge dominant narratives, and create new spaces for cultural expression. Furthermore, the findings of this study contribute to a deeper understanding of the complex interplay between digital media, postcolonial identities, and cultural representation. This highlights the significance of inclusive representation in the digital age. The research demonstrates how digital media can both empower and constrain postcolonial identities, revealing the need for nuanced and contextualized approaches to understanding the digital experiences of marginalized communities. The primary goal of this study is to gain a deeper understanding of how cultural expression and identity formation are evolving in the digital age. Moreover, this research aims to emphasize the potential of digital media in reclaiming and redefining postcolonial identities. By exploring the connections between digital media, postcolonialism, and cultural expression, this study provides an insightful analysis of how digital media can be utilized to support inclusivity, diversity, and social justice.

Keywords: Online Activism, Postcolonial Identity, Social Justice, Digital Media

P.ENG-5

Humanizing Females in Children's Literature: A Deconstructionist Analysis of Gender Dynamics in Girard's *Girl Mans Up*

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This article delves into how children's literature plays a critical role in the socialization of girls and boys within the context of phallogocentric societies and literary works. By focusing on teen protagonists, children's fiction often mirrors and critiques the societal expectations imposed by rigid gender binaries. These narratives challenge the overemphasized and often stereotypical notions of girlhood and boyhood, revealing how traditional patriarchal norms confine individuals to predefined cultural roles, stripping them of personal agency. Simone de Beauvoir, the influential French Feminist Existentialist, introduced the concept of "the eternal feminine" to critique the way patriarchal societies perpetuate fixed gender roles. This study extends Beauvoir's critique by deconstructing the processes of socialization in children, examining how these processes are influenced by both discursive (language and ideology) and non-discursive (practices and behaviors) elements of culture. The study focuses on M-E Girard's *Girl Mans Up* to explore and challenge the notion of "the eternal feminine." It interrogates the cultural scripts that dictate the behavior and identity of children, particularly within the context of gender. The novel highlights the struggles of a teenage girl as she seeks to dismantle conventional gender norms and the societal hierarchy that enforces them. This deconstructionist analysis portrays females as fully realized individuals rather than as idealized angels or monsters. It humanizes females by presenting them as complex individuals, capable of transcending the narrow roles traditionally assigned to them. This study thus contributes to the broader discourse on gender in literature, highlighting the potential of children's fiction to challenge and reshape societal norms, and offering a nuanced understanding of gender that emphasizes individual agency and the fluidity of identity.

Keywords: Children's literature, Deconstruction, Gender roles, Eternal feminine, Patriarchal societies

P.ENG-6

Beyond Binaries: Exploring Gender Fluidity in Freshwater with Digital Humanities and Butlerian Performativity

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This research study tends to explore the convoluted portrayal of gender fluidity in Akwaeke Emezi's novel 'Freshwater' through the lens of Judith Butler's theory of gender performativity by using digital humanities methodologies. Butler's theory of performativity suggests that human behaviors are not determined by their gender but by society and gender roles are merely continuous performance rather than an innate trait which she called "Gender performativity". This provides a crucial framework for understanding the protagonist Ada's fluid identity which is influenced by the ogbanje spirits (the supernatural entities from Igbo mythology). By applying the theoretical perspective of butler, the study tends to reveal how in "Freshwater" Emezi subverts the traditional norms of binary gender and presents a multifaceted narrative of identity. Through close textual analysis, the paper aims to demonstrate how Ada's interactions with the ogbanje spirits empower her to perform a spectrum of gendered identities, which challenges conventional gender roles. Additionally, the integration of digital humanities tools helps in exploring themes of the novel along with character interactions, and narrative structure.

Keywords: Gender Fluidity and Performativity, Judith Butler, Igbo Mythology, non-Binary Identities, Literary Analysis

P.ENG-7

From Water to Freedom: Exploring Ecofeminism in *The Swimmers (2022)* Movie

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This study explores the struggles of refugees and how they find solace and freedom through nature through the lens of Ecofeminism in *The Swimmers* (2022). This movie explores the interconnections of women and the environment. It depicts the uplifting tale of two Syrian sisters who escape from war-torn society and discover freedom and a new life via swimming. According to Warren, ecofeminism is the exploitation of the environment and the dominance of women has interconnection. This paper examines how nature and the environment highlight the protagonists' journey from a war-torn country to freedom. It explores how visual incidents successfully communicate the intricate relationships between gender and environmental challenges. A thematic analysis of the film *The Swimmers* investigates scenes, character development, and dialogues. Through the theoretical work of Karen J. Warren, this study focused on ideas like the dual dominance of women and nature and the significance of understanding how nature heals and gives the possibility to resist and liberate. This analysis reveals several key ecofeminist themes in *The Swimmers*. Yusra Mardini's journey from Syria to Europe highlights the interplay between woman and nature. This struggle is personal and conveys broader themes of freedom, survival, and harmony. It underscores water as responsible for both destruction and construction. Further research may investigate how multifaceted identities such as race, class, gender, and color intensify refugees in *The Swimmers* (2022).

Keywords: Ecofeminism, *The Swimmers*, Karen J. Warren, Resistance, Survival, Refugees struggle.

P.ENG-8

Dilemma of Spiritual Apathy in Daoud's *The Meursault Investigation (2013)*

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This study explores Existentialism in Kamel Daoud's *The Meursault Investigation (2013)*. It scrutinizes the elements of anxiety, despair, and repugnant existential empathy in the novel. This study focuses on the delimma of spiritual apathy in Harun under the influences of Existentialists, Soren Kierkegaard, Jean Paul Satre and Albert Camus views. Existentialism focuses on the human existence with thematic concerns of despair, anguish, bad faith, and freedom. The Meursault Investigation is retelling of Albert Camus's *The Stranger (1942)* from the perspective of unnamed Arab's brother Harun. The loss of brother and the unstable mental condition of his mother after his brother's death lead him towards apathy and existential crises. Soren Kierkegaard presents this existential anxiety as worse than everyday anxiety. "There is in anxiety, the selfish infinity of possibility which does not tempt like a choice, but disturbingly makes anxious with its sweet anxiety". [Beaengstelse, 331; Lowry translation, p. 55). Due to the traumatic experiences of life and the spoiled sympathy of people transforms Harun in an apathetic personality. The traumatic events of life made their interpersonal relationships suffer to repugnant existential empathy. Mama and Harun, are supposed to give existential empathy to each other rather their relationship intensifies his existential crises. The study also focuses on the dilemma of the absence of faith in God as presented by Jean Paul Satre and Albert Camus. The close textual analysis is used as a methodology to conduct this research. This research study presents a direction to other researchers and students to explore the elements that give rise to dilemmas in the lives of human beings and to study the relationship of a human being with God, people, and the world. This study opens a way for future researchers to scrutinize dilemmas of existence.

Keywords: Existentialism, Spiritual Apathy, Existential empathy, Dilemma, Trauma

P.ENG-9

A Critical Discourse Analysis of Imran Khan's Speeches After Premiership

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This research is based on the famous political leader Mr. Imran Khan. The research deals with the tenure after losing the premiership on April,10th 2022. The researcher chose this topic for having better understanding of his words seeing his popularity among the public, especially the youth. The research has been done only on five of his selected speeches. The speeches are taken from the time of his ouster till March 2023. All the speeches have been chosen carefully by time and duration. Selected speeches include the one given in imprisonment on 19th June 2023 and also the one delivered on 14th of August 2022. The data was taken from different media sources such as YouTube, Twitter, Facebook etc. The speeches delivered in Urdu were first translated into English by the researcher and then explained. The researcher has adopted a 3D model of Fairclough for critically analyzing the speeches. First, the extract was written in Roman English and then was translated into simple English with the help of Google Translator after which the 3D model was applied. The research consists of 5 chapters. Chapter 4 and 5 contain analysis of speech. The research concludes that selection of enticing and powerful words on part of Imran khan make his speeches strong and commendable.

Keywords: Political leader, Imran Khan, Imprisonment, Enticing and powerful words

P.ENG-10

Traditional Architecture as an Ecological Safeguard: A Study of "The Adobe of the Snow"

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This interdisciplinary study examines the environmental condition of "The Adobe of the Snow", place utilizing the theoretical frameworks of traditional ecological knowledge and social-ecological systems. Berkes' concept of traditional ecological knowledge, which emphasizes the importance of local, Indigenous, and community-based understanding of ecosystems, informs the research approach, as does Berkes' perspective on social-ecological systems, which recognizes the complex, dynamic, and interdependent relationships between human societies and their natural surroundings. The goals of this research are to: 1) assess the region's biodiversity and ecosystem dynamics; 2) analyze long-term climate data to identify trends in snowfall, temperature, and precipitation patterns; 3) assess the impact of human activities on the region's ecology; and 4) critically evaluate the effectiveness of current conservation initiatives. The findings highlight significant obstacles posed by climate change and human pressures, emphasizing the need for immediate action for sustainable habits. Current conservation measures are inadequate to provide positive outcomes at both the species and population levels. The study underlines the significance of building stronger, more versatile, long-term, and efficient conservation methodologies and policies to address the region's fundamental causes of ecological deterioration. This research provides useful information for the scientific community, conservation practitioners, policymakers, and local people involved in the care and protection of "The Adobe of the Snow" region. The combination of traditional ecological knowledge and community-based techniques can help to generate more comprehensive and flexible management strategies.

Keywords: Ecological, Adobe of the snow, Biological diversity, Climate change, Traditional ecological knowledge

P.ENG-11

Natures remedy: the healing power of the garden in France's Hodgson Burnett's *The secret garden*

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This article explores the theme of nature as a restorative force through the eco-critical lens on Frances Hodgson Burnett's novel *The Secret Garden*. By the life changing experiences of the protagonists Mary Lennox and Colin Craven the narrative highlights how interaction with nature can lead to physical, emotional, and psychological healing through examining the characters evolution in relation to their engagement with the garden. This eco-critical study find outs the novel's basic message about the healing benefits of nature. The study aims to underscore the applicable of these themes in modern society, emphasizing the timeless connection between human health and the natural world. It also examines the priestly imagery as a key aspect of eco-criticism to highlight how natural factors are representative of healing. It explores the idea of healing specially its results to show how natural elements help in healing.

Keywords: Nature's healing power, Eco-criticism, The secret garden, Effects of nature

P.ENG-12

Exploration of Class Conflict in James Cameron Titanic (1997) Movie: A Marxist Analysis

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This research is targeted to describe the portrayal of class conflict in “Titanic” movie, it explores the complicated portrayal of class conflict, love tragedy, and human attitudes to challenges. The film is an excellent example of the perspective of conflict, every scene is thoughtful and reflects the discrimination and exploitation that the labor class society faces. This is a narrative qualitative method and the article delves into the socio-economic disparities depicted in the film and the impact of these divisions on the lives of the passengers on the ill-fated RMS Titanic James Cameron's 1997 film "Titanic" is a cinematic masterpiece that intricately weaves the tragic love story of Jack and Rose with the class conflict that characterized the early 20th century. The analysis used a multidisciplinary approach to identify the underlying themes of privilege, social stratification, and revolt that continue to reverberate with spectators. The data was analyzed according to Karl Marx theory of class conflict (19 century) Marx, underlined that societies expose the origins of conflict and stress. This framework demonstrates how the ruling party was trying to preserve its influence but the working class was resenting it. Though the ruling class seems to have high status and power, they have life based on wealth, independence and preference. The findings of this study show the clear distinction between upper class and lower class and ultimately led to the catastrophic fate of the ship.

Keywords*:* Class conflict, Marxism, Status, Preferences, Discrimination

P.EDU-1

Challenging Misconceptions through Cognitive Conflict: Bridging Gaps in Understanding Science

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This study explores the effectiveness of cognitive conflict-based pedagogy in facilitating conceptual change among 9th grade students with misconceptions in physics, specifically regarding moment of force, center of gravity and equilibrium. Despite the importance of these concepts in understanding physical phenomena, students often struggle due to inherent misconceptions. The research aimed to assess how presenting conflicting information and guided reflection can lead to lasting conceptual change. The sample comprised 35 students from a private secondary school in Abbottabad city, with assessments conducted before and after the intervention. The instrument used was a dual-tier assessment test consisting of 15 items, designed to evaluate students' grasp of the concepts effectively. The psychometric analysis of the test indicated a difficulty index (DIF) of 0.48 and a discrimination index (DI) of 0.34. Cognitive conflict strategies such as the presentation of anomalous data, recognition of conflict and reflective discussions were employed to challenge students' misconceptions. Quantitative data collected revealed a significant improvement in student performance, with pre-test scores averaging 58 ± 6 SD and post-test scores averaging 77 ± 4 SD. The statistical analysis employed a paired t-test, which indicated a statistically significant difference ($p < 0.001$) between pre-test and post-test scores, affirming the effectiveness of the cognitive conflict strategies used. The findings suggest that cognitive conflict is a powerful tool for promoting conceptual change, and it is recommended that educators incorporate this approach into science teaching practices to challenge and reshape students' misconceptions.

Keywords: Science Education, Misconceptions, Cognitive Conflict, Conceptual Change, Dual-Tier Assessment

ARTS & SOCIAL SCIENCES
(DESIGN AND INTERIOR)

POSTER PRESENTATION

P.DI-1

Spaces of Emotion: The Poetry Within Architecture

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In architecture, spaces depict feelings evoking emotions that resound like poetry. This paper delves into the correlation between architecture and poetry using architecture as an interface. It aims to fill voids in design's emotional impact. Depicting artistic taste, metaphysics, and formal studies, the paper sums up how architecture can awaken emotions, just as poetry punches the human soul. A comprehensive literature review delves into required theories from Juhani Pallasmaa's The Eyes of Skin and Gaston Bachelard's The Poetics of Spaces into the multisensory and emotional aspects of space. Using the medium of qualitative manner, the paper draws attention to Louis Khan's *Exeter Library* as a case study, evaluating how design features, for instance, light, materiality, and spatial layout, serve to produce context that is both thoughtful and emotionally impactful. The space's psychological effect is elevated all day long by the poetic interplay of light and shadow. Following assessments, well-designed architectural spaces can arouse emotional reflexes and multisensory experiences relative to poetry. Architects can design spaces that not only meet functional needs but also resonate deeply with the human soul.

Keywords: Poetry, Emotional response, Architectural spaces, Spatial layout, Multisensory experience.

P.DI-2

Technical Competencies in Fashion Design: Connecting Education with the Industry

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As with the evolution of fashion and apparel design programs, educators have been ever more concerned with realigning their curricula to current standards to equip graduates with the skills and knowledge demanded in the workplace. The study was to compare perceptions of the major competencies between professionals in the fashion industry and educators: technical skills, industry knowledge and experience, and interpersonal abilities which are required by new graduates for an entry-level design position. An online questionnaire was administered to 390 participants, consisting of 171 industry professionals and 219 educators, with an assessment of 112 competencies in three categories. The findings pointed toward significant differences in rating between the two groups for 110 out of the 112 competencies. Both the industry professionals and the fashion educators rated the interpersonal skills higher in importance, as compared to either technical skills or industry knowledge and experience, although the educators consistently gave higher importance ratings to the competencies in each category as compared to their industry peers. In the category of technical skills, design skills were the most important according to industry professionals, and for the educators, drawing skills were critical. In the category of industry knowledge and experience, experiential learning carried the highest priority among the industry professionals, and for educators, more importance was given to Art and Design Knowledge. Under the section of interpersonal skills, character was rated as the most important skill by the industry professionals while for the educators, Teamwork was critical. These results have important implications for educators who are interested in improving and developing their programs to best support student needs in a changing fashion industry. The study further suggests that such research should be frequently replicated so that curricula can be maintained in accord with the pace of industry change and improved constantly.

Keywords: Technical Competencies, Fashion Design Education, Industry Expectations, Curriculum Alignment, Skill Development.

P.DI-3

Reimagining History Education: The Power of Memes in Engaging Post-Millennial Learners

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Today, rapid technological advancements have completely revolutionized the very nature of how human beings consume and engage with available content, with memes now forming one of the most popular means of expression while online. In their original concept, they were humorously oriented, but today, they have evolved into one of the important media for disseminating critical knowledge, making them one of the most interesting tools for educational purposes. This research seeks to explain the possibility of history education, more especially for Pakistan Studies students at the undergraduate program in Faisalabad as one of the applications of the meme as a learning medium. This research aims at: (1) the examination of students' feelings toward learning history using memes, (2) the determination of parameters that will help in creating effective learning for history, and (3) the choice of content that can be a part of the syllabus for learning history. This research uses the qualitative analysis method and is based on the case study developed by Robert K. Yin. Data was collected through in-depth interviews, participant observation and documentation analysed according to the Creswell model. The sample population of this study was 10 students of Pakistan Studies courses from semesters 3, 5 and 7 taken through purposeful sampling. The results indicated that with their inherent humour and reach, memes can indeed serve as an attractive trigger for students to then seek more insights related to historical themes. By infusing the essence of memes into the teaching process, educators can then discuss history lessons in a manner that appeals to post-millennial learners and is somewhat entertaining for them. It still maintains the communication and understanding of the essential historical facts but then, catered to post-millennial learners. This is an innovation that holds great promise for the education of history.

Keywords: Memes in Education, History Learning, Post-Millennial Engagement, Qualitative Case Study, Pakistan Studies.

P.DI-4

Teacher Education: Utilizing Video Documentation for Self-Reflection in Graphic and Multimedia Design

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Compared with experienced teachers, novice graphic and multimedia design teachers tend to lack the pedagogical knowledge, confidence, and proficiency that enables them to deliver the curriculum effectively. Normally, new entrants to the teaching profession do not receive formal training or even mentorship to acquire these critical skills. One such strategy is self-reflective practice for the novice teachers. Several recent educational scholars have already combined reflection with video class recording as a developmental tool for pre-service teachers. However, the use of this approach has not been widely adopted in graphic and multimedia design studies. As a result, the research foundation on the influence of video-based reflection with teachers in this area is minimal. This study traces the development of three novice graphic and multimedia design teachers as they integrate written reflection with video-based reflection as a means of preparing for professional practice. The study, therefore, seeks to determine whether video self-reflection proves to be useful in the process of achieving maximum skill development and increasing the confidence levels of new design educators. Additionally, there was a set of interviews conducted with five expert design teachers to establish the attributes of effective educators and how these experts incorporate the act of reflection within their teaching. These expert teachers were recruited from a wide variety of teaching arenas that included local studios, universities, and the professional design environment. This process of the research reflected how three novice design teachers could be empowered to analyse personal and pedagogical problems with credible empirical evidence, leading to an improvement in teaching knowledge and heightened self-esteem. The research concludes that video-based self-reflection is a valuable and positive tool for helping new graphic and multimedia design teachers evolve into effective educators.

Keywords: Video Self-Reflection, Graphic and Multimedia Design Education, Teacher Development, Pedagogical Reflection.

P.DI-5

Improving the Performance of Students through Technology Integration in History of Art and Culture: A Study of Art and Design Students

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The increasing rate of technology in the teaching and learning environment for two decades, combined with an adoption rate of 1:1 device in education sector, makes it a critical need for scholars to investigate how technology can affect the performance of students, especially in specialized courses like History of Art and Culture. This work focuses on students studying art and design, who are highly challenging but at the same time offer opportunities for effective integration of technology. However, overall application of technology in learning has been general, and lecturers in these fields grapple with factors like teacher bias, other barriers, low professional development, and poor support to use technology effectively. The consequences could be critical gaps between conceptual decision-making processes about technology adoption in pedagogic scenarios and, on the other hand, implementation in classroom reality, which eventually damages student performance. This study uses a mixed-method approach to make the relationships between teachers, students, administrators, and technology operational within a History of Art and Culture course. Hence, these results show that where it is integrated well, technology boosts student performance with time to practice through remote connections, engagement at high levels, and learning that is personalized and self-paced. However, it also underscored the need for better data collection and analysis to inform more effective decision-making on technology integration. The implications of this study give important insight into how existing gaps that negatively affect student outcomes can be reduced and provide a framework for maximizing the utilization of technology in art and design education toward improving learning environments.

Keywords: Technology Integration, Student Performance, Art and Design Education, History of Art and Culture.

P.DI-6

Immersivity: An Interdisciplinary Approach to Spaces

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In the realm of architecture, the traditional ways of design have been firmly established in spaces and made the norms. These include homogeneity, lack of user-centered approach, rigidity, priority on aesthetics, and material application. The strategies of space designing have been limited and create the boundaries for innovation. An important aspect of the discussion in this study is that many interior spaces look similar because of follow the same traditional ways of designing. It focuses on the issue of typical homogeneous spaces lacking diversity and innovation. Uniform materials, resistant to technological integration. The methodology follows to explore and adapt new techniques and new elements in learning centers. This study explores the ability and tendency to break the monotony of spaces by integrating technology into design. Experimenting with design and creating spaces that are multifunctional challenge the norms and expand the boundaries as well as the possibilities in design. Unconventional design in interior spaces embraces innovative concepts, it will foster the innovation and creation of design that captures the imagination of people. That's why fostering innovation is essential for interior spaces. Some institutions like the California Academy of Sciences are embracing unconventional designs interactive & multimedia displays, exhibitions, engage audiences in learning centers that support the diverse learning styles and needs of students. Integrating technology, projection or interactive displays to create immersive and unconventional experiences. The aim is to provide a learning center of natural sciences that pushes the boundaries of conventional design and creates an environment that resonates and revolutionizes confined spaces by creating captivating and immersive experiences. The strategy used for design is blending technology education, entertainment and interactivity for a mesmerizing experience. It will attract people who are interested in natural sciences and want to acquire knowledge.

Keywords: Immersive, Interdisciplinary Approach, User-centered approach, Strategies of space designing, Integrating technology

P.DI-7

Orchestration of Spatial Stimuli and Exploring the Role of Embodiment in Interior Spaces Through Experiential Design

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Time spent surrounded by nature has been proven to not only reduce stress but also promote physical activity while enhancing creativity. However, through biophilic design, bringing nature elements into built-up areas. The adoption of biophilia ensures a higher degree of respect for nature, so it calls forth conservation as well as sustainability. Thus, by recognizing the significance of our connection to nature and by promoting it, conditions can be created that are good both for ourselves as human beings and for the whole ecosystem. This study explores biophilia, underscoring the global significance of this concept in promoting a healthier environment and enhancing human well-being, regardless of the specific location. Sustainable biophilic design can help reduce residents' stress by presenting an image of relaxation and promoting health through contact with nature. Materials can be used such as reclaimed wood, bamboo, or recycled materials to follow biophilic design and contribute to the future. It could be related to health and can also be made an educational center as well as it could be installed in residential spaces and hospitals. The audience targeted can be medical patients recovering from trauma or surgery as they need more attention in healing. Principals of biophilic healing design ranging from using natural light, plants, and natural materials to providing exterior views and patios with greenery also all assist in good recovery of patients. Individuals who have contact with nature-like environments experience much less stress, anxiety, and pain and have improved mood, cognitive capability, and general well-being. The value of biophilia in promoting the health and well-being of people is highlighted in the importance of architecture and urban planning. This study discusses the theoretical underpinning, empirical evidence, and practical implications of biophilia healing design; the highlighted importance being promoting human health and improving the quality of the built environment.

Keywords: Biophilic design, Human well-being, Healing design, Theoretical underpinning

P.DI-8

A Multi-Sensory Design for Speech and Hearing Impairment

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Multisensory architecture is the language of action between the human and the built environment that involves all five senses. This study investigates the role of multisensory user experience in the building design. Only by acknowledging the sensory nature of perception can it be hoped to explain various environmental or atmospheric relationships such as those between lighting color, thermal comfort, sound and experienced safety in a shared environment. There has been evidence of the growing understanding of the multisensory nature of the human mind that has emerged from the field of cognitive research. It aims to get a better understanding of the space relatable and perceivable disabilities. The study looks at the space to know how sensory-impaired disabilities can be facilitated. These interactions were achieved by manifesting a common language in which this space engages and experimenting in a meaningful three-dimensional space. Hearing and mute-impaired people have reinvented communication in the light and color space for effective communication and to evolve a space that is comfortable and effective. The five key concepts—sensory reach; space and proximity, mobility, and proximity, light and color and acoustics—are used to create the notion of deaf space. This study recognizes the multi-sensory nature of perception that one can hope to integrate in several surprising cross-model environmental and atmospheric interactions such as lighting color and thermal comfort between the perceived indemnities of public spaces. This study interplays the dynamic of an interactive space that can be structured in such a way as to filter manipulate or diffuse light to create an array of conditions in which both light and shadow become part of the architecture itself. The strong connection between the built environment and emotions is developed through experiencing the space via multi-sensory phenomenon; a logical approach utilized in interior spaces for hearing and mute-impaired people.

Keywords: Multisensory architecture, Built environment, Atmospheric relationships, Reinvented communication, Cognitive research

P.DI-9

Impact of Selective Mutism on Child's Academic, Social, and Emotional Development

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Selective mutism is a social communication anxiety disorder characterized by a consistent inability to speak in certain social situations, such as school. It primarily affects children and can continue into adulthood if not treated. This condition can significantly impact a child's academic, social, and emotional development. School children with selective mutism may refuse or have extreme difficulty speaking in classroom settings, even if they can speak comfortably in other environments. This can interfere with classroom participation, hinder academic progress, and lead to feelings of isolation and frustration for the child. Teachers and peers may struggle to understand the condition, leading to increased social anxiety and difficulty forming relationships. **Lali** is a Persian word which means," silence. This work is based on " selective mutism'. Selective mutism is when a "person or child can't speak in certain situations like in a gathering. Poor relationship with society is the cause, so there is no wish to do so.

Keywords: Selective mutism, Social communication, Inability to speak, Social situations, Emotional development

P.DI-10

Exploring the Phenomenological Dimensions of Interior Spaces

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Dead surfaces and meaningless spaces in our surroundings suggest a lack of consideration for the sensory and experiential aspects of the built environment. This research explores the role of embodiment in interior spaces, the study of movement and interaction; it also explores how our bodily experiences and interactions within interior spaces shape our phenomenological identity. Sensory factors like lighting, music, scent, acoustics and materials can set the atmosphere in social spaces, influencing the behavior and mood of individuals. Place identity is a multi-dimensional concept encompassing the personal and collective aspects of how people relate to their environments. It delves into the role of materials and their sensory qualities in shaping our perception and experience of interior spaces and highlighting the importance of materiality in design. Sensing beyond physical entities in spatial experience deepens meaning. Promenade art, also known as "promenading." refers to a style of artwork or an artistic practice that encourages viewers to physically move through and engage with the art or environment. This term is often associated with immersive and site-specific installations that invite people to explore and interact with the artwork as they move through a defined space. It includes spatial engagement and temporal experience. The goal is to create environments that enhance the quality of life, productivity, and overall satisfaction of those who occupy or engage with the space and human senses and create a spiritual center that evokes strong emotional responses in a varied manner. The target audience includes individuals trying to find spiritual growth and enlightenment, as well as those looking for a sense of community and belonging. These centers also often appeal to individuals interested in mindfulness, meditation, and self-care. This spiritual center put forward classes and workshops on topics like yoga, meditation, mindfulness, personal growth, environments they inhabit, light and acoustic, materiality in design behavior and mood of individuals and holistic health.

Keywords: Phenomenological identity, Spiritual center, Emotional responses

P.DI-11

Empathy in Design: A Harmonious Space Fostering Unity, Well-being, and Respect Between People and Animals

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Neglectful, violent, and insecure circumstances give birth to the absence of empathy. Continuous exposure to suffering and psychological burdens can lead to reduced empathetic understanding or expression. Human needs constantly change as a result of the dynamic nature of life, therefore it's essential to design spaces that are not only about aesthetics or functionality but also address their emotional needs. This can be addressed and emotional experience can be greatly enhanced with empathetic design. This study explores user's emotional and mental health as additional influencing factors. The need for an empathetic approach to animals' space to be catered to because they are voiceless and depend on humans. They can't argue or advocate their rights or express their feelings and sufferings. Especially stray animals face trauma, loneliness, pain, and harsh environments and should not be treated in such a way as they are also live and social creatures, and they deserve empathy, love, and interaction with other animals and humans. This study aims to provide a stress-free environment and to create a sense of togetherness and safety for animals with the hope of adoption into better homes for them and create an empathetic design towards animals which can lead to saving animals' lives from death. Designated spaces for pets and strays involve a blend of hospitality and animal care considerations. It cares for sick, injured, or neglected stray animals and has specialized treatment rooms, and recovery spaces with surgical facilities. It may include safe, quiet, and private spots for animals where they can rest and escape from human interaction if needed. This space operates with dual missions; to provide a unique experience for its customers and to facilitate the adoption of animals. The empathy and affinity towards animals do not mean to lessen the empathy towards humans.

Keywords: Empathetic approach, Insecure circumstances, Psychological burdens, Aesthetics, Social creatures

P.DI-12

Urban Heat Mitigation Through Natural Means: A Systematic Review of Low-Technology Vegetation Strategies

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Globally, urban heat islands create serious problems for energy consumption, public health, and overall quality of life. As cities continue to expand and densify, the need for effective, sustainable, and economically viable cooling strategies has become paramount. The escalating impacts of climate change, coupled with rapid urbanization, have thrust the issue of urban heat mitigation into the forefront of urban planning and environmental management. While high-tech solutions often garner attention, this review argues for a return to nature-inspired, low-technology approaches that harness the inherent cooling properties of vegetation. This study focuses on the effectiveness, practicality, and obstacles associated with rapidly urbanizing low-tech, vegetation-based techniques for reducing urban heat. This research conducts a critical analysis of the literature on four main areas: Firstly, the installation of water-efficient green spaces that offer significant cooling benefits; Secondly, the use of ground covers to lower soil temperature and evaporation; Third is the creation of microclimate zones through strategic plant selection and placement; and fourth covers the effects of residential development encroaching on peri-urban cultivation lands. According to our research, there are sustainable and affordable methods for lowering temperatures in urban areas when using these natural alternatives. However, the absence of integrated urban planning and conflicting land-use priorities frequently make it difficult to implement them successfully. We provide a framework for integrating these tactics into policies for urban development, highlighting the necessity of interdisciplinary cooperation between landscape architects, urban planners, and policymakers. This analysis emphasizes the critical need for balanced urban growth that protects vital green spaces while underlining the potential of low-tech, vegetation-based alternatives in developing resilient, cooler urban settings.

Keywords: Water-Efficient Landscaping, Microclimates, Vegetation Techniques, Urban Heat Islands, Climate Resilience

P.DI-13

Exploring the Use of Virtual Reality in Enhancing Art History Education for Fashion Design Students

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Present work leads to the embedding of interactive media, specifically Virtual Reality (VR) and 3D-generated artifacts, in teaching the History of Art to Fashion Design students. This research employs resources such as the *Smart History* platform, which incorporates the 3D-generated visualization of historical artifacts to examine the effect of VR on student understanding, engagement, and retention of historical knowledge in the context of design education. The study was targeted at the investigation of the use of VR technology to enable learning in art history, among first-semester Fashion Design students, and the educational worth of immersing students in digital renderings of ancient artifacts. Based on teaching a History of Art course with the help of VR-manufactured artifacts, a questionnaire inquired into the experience and understanding of the historical context and significance of artifacts using VR among 45 first-semester students in Fashion Design. The questionnaire also aimed to measure the emotional and cultural response of students to artifacts to female sculptures, for example, Venus of Willendorf. Results findings showed that 78% of the respondents considered VR and 3D-generated images as helpful in acquiring an understanding and memorizing the historical, material, and cultural dimensions of the artifacts. However, 36% confessed to their discomfort with some representations or statues of females specifically, due to cultural or personal offensiveness. The results would support theories, like the one in art and social science by Marshall McLuhan, that assume new forms of media, VR in this instance, greatly change the perception and understanding of content. This study points to the tremendous potential of VR to revolutionize art education into more involving experiential learning environments. At the same time, it raises issues of cultural sensitivity in integrating new technologies into a curriculum where representations might be historically unacceptable in terms of contemporary sensibility.

Keywords: Virtual Reality, 3D-generated artifacts, Art History, Fashion Design education.

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Reasons for Females to Do Job

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This study is concerned with "Reasons for Females to do Job". The data and information from female respondents working in different fields of life was collected. A cross-sectional sample of 200 female respondents was gathered from females working in different fields of the profession including; education, office work, medical, engineering, banking, designing, beautician, sales and marketing, labor, etc. The present study was conducted in the central city of Pakistan i.e., Multan during February 2022 and March 2022. A cross-sectional and statistical analysis was conducted to evaluate that what are the reasons for females to do jobs and the psychological perception of working women about the fulfillment of their home responsibilities. From 200 female respondents; 89 were single, 88 were married, 15 were divorced and 8 were widowed. A non-random convenience sampling technique is used for data collection. The age of respondents varies from 19 to 70 years. The retrospective design for the collection of relevant data was used. The data set was obtained through a self-administered questionnaire about the social issues of females doing the job, the sense of supporting one's family and vice versa, the working environment for women and the marriage prospects of working women, the impact of the job on women's status and her husband's self-esteem and the necessity of job for women. It is concluded that 37.5% of females do their job due to their own choice 37% due to financial need and 56% of working women find it difficult to carry out home responsibilities because of work while 41.5% don't. It was also observed that 72% of women are satisfied that they got the right job according to their qualifications.

Keywords: Career decision, Family influence, Self-efficacy, Convenience sampling

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