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RESEARCH OUTLOOK

Compiled by:
Muhammad Rafiq Awan
Sohail Aslam
Sehrish Shoukat & Wazzuha Amina

Learning Resource Center
University of Management and Technology, Lahore

UMT Research Outlook
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Compiled by: Muhammad Rafiq Awan
Sohail Aslam
Sehrish Shoukat
Wazzuha Amina

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School of Science (SSC)

Department of Chemistry

Research Articles

1. **Shahid, S., Khan, S. A., Ahmad, W., Fatima, U.,** & Knawal, S. (2018). Size-dependent Bacterial Growth Inhibition and Antibacterial Activity of Ag-doped ZnO Nanoparticles under Different Atmospheric Conditions. *Indian Journal of Pharmaceutical Sciences*, 80(1), 173-180.**(Sammia Shahid (Chemistry/SSC) Shakeel Ahmad Khan, W. Ahmad, Urooj Fatima) JCR Listed (IF: 0.738)**

    Abstract: Silver is commonly used antibacterial material, and showed improved results when doped to less expensive ZnO nanoparticles. Chemical reduction method with zinc acetate as host and silver nitrate as dopant precursor was used. The surface area of particles was enhanced by calcination in different atmospheric conditions. Antibacterial activity of synthesized nanoparticles was evaluated against different Gramnegative and Gram-positive bacterial strains. Minimum inhibitory (6 to 21 mM) and minimum bactericidal concentrations (23 to 47 mM) indicated that antibacterial activity of nanoparticles was increased by silver doping and calcination in oxygen atmosphere. The X-ray diffraction, scanning electron microscopy and energy dispersive X-ray spectroscopic data further confirmed the hypothesis. Present study confirmed that oxygen treated silver-doped zinc oxide nanoparticles could have pharmacological applications as alternative for antibiotics and disinfectants.

    Keywords: *calcination, minimum inhibitory concentration, minimum bactericidal concentration, oxygen atmosphere, silver doping*.

2. **Khan, S. A., Shahid, S., Jabin, S.,** Zaman, S., & Sarwar, M. N. (2018). Synthesis and characterization of un-doped and copperdoped zinc oxide nanoparticles for their optical and antibacterial studies. *Digest Journal of Nanomaterials & Biostructures (DJNB),* 13(1), 285-297.**(Shakeel Ahmad Khan(Chemistry/SSC)Sammia Shahid, Shaista Jabin) JCR Listed (IF: 0.673)**

    Abstract: In the present study, synthesis, characterization and antibacterial properties of un-doped and Cu-doped ZnO nanoparticles (NAPs) were explored and also have been investigated the effect of changing the dopant precursor material [$Cu(NO3)2$ to $Cu(NO3)2.3H2O$] on the surface morphology and the antibacterial properties of Cu-doped ZnO NAPs. The undoped ZnO NAPs, Cu-doped ZnO NAPs (M1 NAPs, $Cu(NO3)2$) and (M2 NAPs, $Cu(NO3)2.3H2O$) were fabricated through co-precipitation method. The synthesized NAPs were characterized by different spectroscopic and analytical techniques such as X-Ray Diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDAX) and Ultraviolet-visible (UV-Vis) spectroscopy. The antibacterialactivity of synthesized NAPs was carried out by agar diffusion method against different bacterial strains. Results from XRD, SEM, EDAX and UV-Vis examines confirmed the successful synthesis, crystalline nature and hexagonal wurzite structure of un-doped and M1 NAPs and M2 NAPs with the average grain size of 15.63 nm and 20.18 nm and 28.94 nm; and band gap energy of 3.68, 2.76 eV and 2.10 eV respectively. The synthesized Cudoped ZnO NAPs (M2 NAPs) were disclosed the remarkable and extraordinary antibacterial activity against E. coli, and B. subtilis, with the zone of inhibitions of 31 ± 0.4 mm and 27 ± 0.6 mm, respectively. Better and improved antibacterial propensity was also demonstrated by M1 NAPs than un-doped ZnO NAPs and standard drug. Results thus obtained corroborate and suggest the applications of un-doped ZnO NAPs and Cu-doped ZnO NAPs as antibacterial agents.

    Keywords: *synthesis, cu-doped zno naps, characterization, optical, antibacterialactivity*.

3. **Javed, M.,** Abbas, S. M., Hussain, S., Siddiq, M., Han, D., & Niu, L. (2018). Amino-functionalized silica

anchored to multiwall carbon nanotubes as hybrid electrode material for supercapacitors. *Materials Science for Energy Technologies, 1*(1), 70-76. doi: https://doi.org/10.1016/j.mset.2018.03.002.**(Mohsin Javed (Chemistry/SSC) (Not HEC Recognized)**

Abstract: Silica particles (SiO2) have been prepared by using sol-gel synthesis technique and are amino functionalized by treating with (3-Aminopropyl)triethoxysilane followed by composite formation using acidfunctionalized multiwall carbon nanotubes (MWCNTs). The synthesized materials are characterized using morphological and structural techniques like SEM, TEM, XRD, TGA, and FTIR. The MWCNTs with large active surface area and good conductivity present several sites for the growth of spherical SiO2 particles of 200 nm diameter. The composite electrode is studied for supercapacitor application between 0.2 to +0.8 V and the electrochemical studies of sample electrodes have been done using cyclic voltammetry, galvanostatic charge-discharge and electrochemical impedance analysis. The specific capacitance, power density and energy density have been compared at various current rates. The MWCNTs electrode exhibit max specific capacitance of 128.4 F g1 with a power density of 1000 W kg1 and energy density of 17.8 Wh kg1 at 2 A g1 compared to 11.8 F g1 , 1.64 Wh kg1 and 1000 W kg1 , respectively for SiO2/ MWCNTs electrode at the same current rate. High charge propagation is observed for MWCNTs electrode due to conducting and mesoporous nature along with good resilience. Apparently, the MWCNTs electrode displays lower internal resistance with higher capacitive performance compared to SiO2/MWCNTs composite electrode. It has been observed that the power density of electrodes is strongly dependent on current density and reaches up to 1000 W kg1 for SiO2/MWCNTs composite as current density is increased up to 2 A g1

Keywords:*multiwall, carbon, nanotubes, functionalization, sio2, supercapacitor*.

4. **Khan, S. A., Shahid, S.**, Kanwal, S., & Hussain, G. (2018). Synthesis characterization and antibacterial activity of Cr (III), Co (III), Fe (II), Cu (II), Ni (III) complexes of 4-(2-(((2-hydroxy-5-nitrophenyl) diazenyl) (phenyl) methylene) hydrazinyl) benzene sulfonic acid based formazan dyes and their applications on leather. *Dyes and Pigments*, 148, 31-43. doi:https://doi.org/10.1016/j.dyepig.2017.08.058. **(Shakeel Ahmad Khan (Chemistry/SSC), Sammia Shahid)JCR Listed (IF: 3.767)**

Abstract: A novel series of un-metallized and metal complexes formazan dye (12–17) have been synthesized in an aqueous system, without using Buffers, with cost-effectiveness and improved fastness properties. The synthetic methodology involved the synthesis of 4-(2-(((2-hydroxy-5-nitrophenyl) diazenyl) (phenyl) methylene) hydrazinyl) benzene sulfonic acid followed by diazotization of 4-nitroamisnophenol which further coupled with coupler reagent i.e. 4-[(2Z)-2-benzylidenehydrazinyl] benzene sulfonic acid. Multichromic metal complexes of 4-(2-(((2-hydroxy-5-nitrophenyl) diazenyl) (phenyl) methylene) hydrazinyl) benzene sulfonic acid (1:1 and 2:1) were synthesized with the salts of Chromium, Iron, Cobalt, Copper and Nickel. Newly synthesized metal complexes were characterized by Ultraviolet–visible (UV–Vis), Fourier transforms infrared (FT-IR), Proton nuclear magnetic resonance (1H NMR), C13-nuclear magnetic resonance (13C NMR), powder X-ray crystallography (XRD) and elemental analysis. Their performance as colorant material for different fastness properties like light fastness, wash fastness, perspiration fastness were evaluated on leather fabric and were shown to possess good fastness properties 3–5, 4–5, 3–5, and 4–5 respectively. The synthesized formazan dyes were also demonstrated the high percentage value of exhaustion and fixation on leather ranging from 91–97% and 90–98% respectively. The synthesized un-metallized and metal complex formazan dyes were ranged in color from Blue, violet, Green, Brown to Red. Antibacterial activity of synthesized formazan dyes was determined in solution by agar well diffusion method and on leather using the dyed leather fabric with synthesized dyes as model system. Maximum antibacterial activity in solution with ZOIs (19 ± 0.05 mm, 25 ± 0.07 mm, 23 ± 0.09 mm, 27 ± 0.03 mm) and significant % reduction in bacterial growth on leather (56 ± 0.03%, 65 ± 0.07%, 70 ± 0.05%, and 72 ± 0.08%) was demonstrated by chromium complex (15) against E. coli, S. aureus, Klebsiella and B. subtilis respectively.

5. **Munir, T**., Munawar, K. S., & **Mohyuddin, A.** (2018). An Overview of the Antibacterial Implications of Lansium domesticum. _Journal of Basic and Applied Sciences_, 14, 206-209. **(Tabassum Munir (Chemistry/SSC), Ayesha Mohyuddin)(Not HEC Recognized)**

Abstract: Lansium domesticum belongs to the family Meliaceae and is admired for its fruit in southern Asia.The family Meliaceae is known as novel bioactive compounds that are usually used in folk remedy as a drug for the treatment of diarrhea. The leaf and bark mixture of L. domesticum cv. duku exhibited antibacterial activity towards Bacillus subtile,Staphylococcus aureus, and Echerichia coli. Phytochemical screening of fruit waste of L. domesticum showed the presence of 3β -hydroxyonocera-8, 21α hydroxyonocera-8, 14-dien-21-one and 14-dien-3-one, lansic acid. The seeds contain tetranortriterpenoids. The bark contains active compounds namely onoceradienedione, lansiolic acid A, isoonoceratriene and 3-keto lansiolic acid. The methanolic extract of the bark of L. domesticum cv kokossan showed major antibacterial efficacy against Escherichia coli and. Bacillus subtilis The ethyl acetate extract exhibited an antibacterialefficacy with an inhibit zone respectively of 14 and 12.5 mm towards E. coli and B. cereus. Silver nanoparticles have a future in an antimicrobial role. The silver nanoparticles of L. domesticum are spherical in shape with a size from10-30 nm.

6. **Munawar, K. S., Haroon, S. M., Hussain, S. A., & Raza, H.** (2018). Schiff Bases: Multipurpose Pharmacophores with Extensive Biological Applications. _Journal of Basic and Applied Sciences, 14,_ 217-229.**(Khurram Shahzad Munawar(Chemistry/SSC), Shah Muhammad Haroon,Syed Ammar Hussain, Hamid Raza)(Not HEC Recognized)**

Abstract: Schiff bases are substances prepared generally by the condensation reaction of aldehydes or ketones withamines. They may have substituted aliphatic or aromatic side chains, and hence show extensive biological activities. It isreported that these molecules play an important role in the synthesis of various drugs. This paper focus on the biologicalactivities of Schiff bases of various types and hence makes them important precursors in designing drugs for medicaltreatment. The biological applications of Schiff bases can be extended from antimicrobial, plant growth regulator,antioxidant, enzymatic, anticancer, anti-inflammatory, anti-malarial, antiviral, neuroprotective, analgesic, anti-convulsantto neurotoxic activities. They also serve as a dominant class of ligands with a variety of binding sites for coordination withmetals.

7. **Arif, M., Raza, H., & Afzal, M. S.** (2018). Alarming Situation of Breast Cancer in Women of Lahore, Pakistan from 1984 to 2018. _Breast Cancer-Basic and Clinical Research_, 12, 1. doi: 10.1177/1178223418816093 (**Muhammad Arif (Chemistry/SSC), Hamid Raza, Muhammad Sohail Afzal)(ISI Web of Science)(Letter)**

Abstract: _Not found_

8. Bin Yousaf, A., Imran, M., **Farooq, M.,** & Kasak, P. (2018). Synergistic effect of Co-Ni co-bridging with MoS2 nanosheets for enhanced electrocatalytic hydrogen evolution reactions. _Rsc Advances_, 8(7), 3374-3380. doi: 10.1039/c7ra12692a.**(Muhammad Farooq (Chemistry/SSC)JCR Listed (IF: 2.936)**

Abstract: The depletion of fossil fuels and associated environmental problems have drawn our attention to renewable energy resources in order to meet the global energy demand. Electrocatalytic hydrogen evolution has beenconsidered a potential energy solution due of its high energy density and environment friendly technology.Herein, have successfully synthesized a noble-metal-free Co–Ni/MoS2 nanocomposite for enhancedelectrocatalytic hydrogen evolution. The nanocomposite has been well characterized using

HRTEM,elemental mapping, XRD, and XPS analysis. The as-synthesized nanocomposite exhibits a much smalleronset potential and better current density than those of Co–MoS2, Ni–MoS2 and MoS2, with a Tafel valueof 49 mV dec 1, which is comparable to that of a commercial Pt/C catalyst. The synergistic effect andinterfacial interaction of Co–Ni bimetallic nanoparticles enhances the intrinsic modulation in theelectronic structure resulting in an improved HER performance. Moreover, the electrochemicalimpedance spectroscopic results suggest smaller resistance values for the Co–Ni/MoS2 nanocomposite,compared to those for the charge transfer of bare nanosheets, which increase the faradaic process andin turn enhance the HER kinetics for a better performance. Our as-synthesized Co–Ni/MoS2nanocomposite holds great potential for the future synthesis of noble-metal-free catalysts.

Keywords:_metal dichalcogenide nanosheets, lithium-ion batteries, active edgesites, molybdenum sulfides, catalytic-activity, alkaline-solution, facile synthesis, efficientnanoparticles, hydrodesulfurization_**.**

Abstract: Hydrogenation and cross-coupling reactions are of great importance for industrial applications and noble metal based catalysts are filling the void since the last few decades. However, the high cost of noble metals and poor recycling performance provides an opportunity for chemists to look for alternate options. Herein, we present the use of Lanthanum hydroxide as support for loading ultra-low amount of Pd for hydrogenation and cross-coupling reactions. Lanthanum hydroxide having controlled morphologies comprises exposed crystallographic facets which interact with small sized Pd NPs and shows versatile and effective catalytic performance. The reduction of 4-NP over Pd/La(OH)3 was achieved within very short time (45s) with a rate constant of 60×10^{-3} s^{-1}. The hydrogenation of styrene was also accomplished within 1 hour with much high TOF value (3260 h^{-1}). Moreover, the Suzuki cross-couplings of iodobenzene and phenyl boronic acid into biphenyl completed within 35 min with a TOF value of 389 h^{-1}. The strong interfacial electronic communication regulates electron density of catalytic sites and lowers energy for adsorption of reactant and subsequently conversion into products. Moreover, abundant hydroxyl groups on the surface of La(OH)3, large surface area, mono-dispersity and ultra-small size of Pd NPs also favors the efficient conversion of reactants.

Keywords: _cross-coupling reactions, supported palladium, partial oxidation, la2o3 catalyst, nanoparticles methane, 4-nitrophenol reduction, la(oh)(3) oxides._

Abstract: Depletion of fossil fuels and associated environmental issues has drawn attention of researchers to renewable energy resources and photocatalytic hydrogen production is considered to be safe and applicable method to meet future energy demand. Herein, we have used α-Bi2O3 nanorods for loading CZS (Cd0.5Zn0.5S) to form a heterostructure for photocatalytic H2 production. The α-Bi2O3/CZS heterostructure was characterized through TEM, Elemental Mapping, XRD and XPS analysis. The α-Bi2O3/CZS heterostructure shows photocatalytic H2 production rate of 254.1 μmol h^{-1} with apparent quantum yield of 6.8% (λ = 420 nm). The enhanced photocatalytic performance was supported by transient photocurrent response curves and electrochemical impedance spectroscopy (EIS) results which suggest the efficient charge separation and electron mobility in α-Bi2O3/CZS heterostructure. The intimate contact formed between α-Bi2O3 nanorods and CZS nanoparticles responsible for the efficient flow of electrons following a Z-scheme pattern resulting in higher photocatalytic H2 production. Moreover, the as-synthesized α-Bi2O3/CZS heterostructure shows

negligible loss of activity after 4 consecutive recycling cycles. Our findings open new possibilities for the design of heterostructure based photocatalysts.

Keywords: *bismuth oxide, photocatalysis, hydrogen productionheterostructurezinc-cadmium sulphide*.

11. Iqbal, A., Khan, Z. A., Shahzad, S. A., Usman, M., **Khan, S. A.,** Fauq, A. H., . . . Sajid, M. A. (2018). Synthesis of E-stilbene azomethines as potent antimicrobial and antioxidant agents. *Turkish Journal of Chemistry, 42*(6), 1518-1533. doi: 10.3906/kim-1801-104.**(Shakeel Ahmad Khan(Chemistry/SSC)**JCR Listed (IF: 1.377)

Abstract: A series of new extensively conjugated E-stilbene azomethines (5a-5h) were synthesized and screened for their antioxidant and antimicrobial activity. The compounds were tested against bacterial (Escherichia coli, Staphylococcus aureus, Klebsiella pneumoniae, and Bacillus subtilis) and fungal strains (Aspergillus niger, A. flavus, and Trichoderma harzianum) using the agar well diffusion method. Among the tested compounds, N'-(4-nitrobenzylidene)2-((E)-styryl)benzohydrazide (5g) was found to possess potent antimicrobial activity higher than some drugs with significant activity reported in the literature, e.g., cefradine and terbinafine hydrochloride. Additionally, compounds 5a-5h were also evaluated for antioxidant potential using DPPH free radical scavenging and ferric thiocyanate (FTC) assays. Among these, N'-(4-hydroxybenzylidene)-2-((E)-styryl)benzohydrazide (5e) exhibited significant antioxidant potential by both assays. Compound 5e demonstrated higher DPPH free radical scavenging activity (IC50 = 22 +/- 0.19 mu g/mL) than the standard, butylated hydroxytoluene (BHT; IC50 = 28 +/- 0.10 mu g/mL). A similar trend was observed for compound 5e in FTC assay, which exhibited 86 +/- 0.19% inhibition, whereas the BHT control showed 81 +/- 0.21% inhibition of linoleic acid peroxidase. The structure elucidation of the synthesized compounds was carried out by UV-Vis, FT-IR, H-1 NMR, C-13 NMR, and elemental analysis and mass spectrometry. These results suggest possible use of these compounds for the rational design of new antimicrobial and antioxidant agents.

Keywords: *E -stilbenes, azomethine analogues, mizoroki–heck reaction, antimicrobial activity, antioxidant activity.*

12. Iqbal, A., Lee, S. H., Siddiqi, H. M., Park, O. O., &**Akhter, T.** (2018). Enhanced Dielectric Constant, Ultralow Dielectric Loss, and High-Strength Imide-Functionalized Graphene Oxide/Hyperbranched Polyimide Nanocomposites. *Journal of Physical Chemistry C, 122*(12), 6555-6565. doi: 10.1021/acs.jpcc.8b00493. **(Toheed Akhter (Chemistry/SSC) JCR Listed (IF: 4.484)**

Abstract: We achieved for the first time the formation of a charge-transfer complex (CTC) between a novel hyperbranched polyimide (PI) and oligo-imide-functionalized graphene oxide (FGO), aiming for enhancing the dielectric properties of resulting PI–FGO nanocomposites. This novel hyperbranched PI was derived from a new diamine N1,N1'-(4,4'-oxybis(4,1-phenylene))bis(N1-(4-aminophenyl)benzene-1,4-diamine). The imide moieties were integrated on amine-FGO via a step-by-step condensation and thermal imidization approach. This FGO exhibited excellent compatibility with hyperbranched PI because of the formation of a CTC between two domains. In viscoelastic measurements, the dynamic storage modulus and glass-transition temperature of flexible PI–FGO nanocomposites increased linearly with increasing FGO contents. The synthesized nanocomposites revealed high mechanical properties with a tensile strength as high as 1.122 GPa. Thermogravimetric analysis demonstrates that these nanocomposite films exhibit high thermal stability up to 550 °C. Remarkably, the dielectric constant increases up to 42.47 at 8 wt % FGO loading with a dielectric loss as low as 0.0018 while maintaining the breakdown strength as high as 147.3 ± 4.5 MV/m.

Keywords: *in-situ polymerization, composite films, energy-storage, mechanical-properties, carbon nanotubes, hybrid, oxide, phenylenediamin, supercapacitors, permittivity.*

13. **Javed, M.,** Abbas, S. M., Siddiq, M., Han, D., & Niu, L. (2018). Mesoporous silica wrapped with graphene oxide-conducting PANI nanowires as a novel hybrid electrode for supercapacitor. *Journal of Physics and Chemistry of Solids, 113*, 220-228. doi: 10.1016/j.jpcs.2017.10.037. **(Mohsin Javed (Chemistry/SSC) JCR Listed (IF: 2.207)**

Abstract: A high charge-carrier transport is an important aim in the synthesis of nanostructures for an effective supercapacitor. This article describes a methodology to prepare mesoporous silica nanoparticles (MSNs) wrapped with graphene oxide (GO) together with conducting polyaniline (PANI) wires. The morphology and chemical structure of the prepared samples have been tested by transmission electron microscopy (TEM), high-resolution TEM (HRTEM), and X-ray diffraction (XRD), whereas the stability and electrostatic interaction of the structures have been verified by thermogravimetric analysis (TGA) and Fourier-transform infrared (FT-IR) spectroscopy, respectively. The supercapacitive behaviour of these nanocomposites has been analysed by cyclic voltammetry (CV), charge–discharge tests, and electrochemical impedance spectroscopy (EIS). Compared with pristine MSNs and PANI, the 20%-GO@MSNs/PANI nanocomposite had the highest specific capacitance, reaching 412 F g−1. The nanocomposite structure maximizes the synergy between mesoporous metal oxide, conducting PANI, and GO, yielding a significantly enhanced specific capacitance, rapid charge–discharge rates, and good cycling stability of the resulting device. The wrapping with GO prevents the structural breakdown and acts as a highly conductive pathway by bridging the individual particles, whereas the MSNs nanoparticles greatly enlarge the specific surface area to facilitate ion transport and charge transfer throughout the cycling performance of supercapacitor. The approach adopted in this article can be applied for preparing similar novel functional materials in future for electrochemical applications.

Key words: *PANIGraphene, silicasupercapacitor, electrode.*

14. **Khalid, A., Shahid, S., Khan, S. A.**, Kanwal, S., Yaqoob, A., **Rasool, Z. G.**, & Rizwan, K. (2018). Antioxidant activity and hepatoprotective effect of Cichorium intybus (Kasni) seed extract against carbon tetrachloride-induced liver toxicity in rats. *Tropical Journal of Pharmaceutical Research*, 17(8), 1531-1538. doi: 10.4314/tjpr.v17i8.10. **(Amna Khalid (Chemistry/SSC),Sammia Shahid,Shakeel Ahmad Khan, Zahid Ghulam Rasool)JCR Listed (IF: 0.444)**

Abstract: Purpose: To assess the antioxidant and hepatoprotective activity of the aqueous-methanol extract of Cichorium intybus seeds (C. intybus) against carbon tetrachloride (CCl4)-induced liver toxicity in albino Wistar rats.
Method: The seed extract of C. intybus was prepared in aqueous methanol (20:80) via Soxhlet solvent extraction process. CCl4 (0.8 mL/kg) was administered to induce hepatic damage in Wistar rats. The seed extract (100, 250 and 500 mg/kg doses) and a 25 mg/kg dose of silymarin (as standard drug) were administered orally to separate groups of albino Wistar rats for 14 days. Blood samples from the rats were analyzed for biochemical markers for hepatic injury. The tissue samples of the rats were subjected to histopathological studies as well as analyzed for liver antioxidants.
Results: The results for biochemical markers revealed that the rats treated with the extract (500 mg/kg dose) showed a maximum elevation of catalase (48.90 μmole of H2O2 consumed/min/mg protein), glutothione peroxidase (22.1 mg GSH consumed/min/mg protein), superoxide dismutase (14.2 units/min/mg protein), and a reduction in glutathione (18.1 μmole of GSH/mg protein). Serum biochemical parameters including serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), alkaline phosphate (ALKP), and direct bilirubin were significantly (p < 0.01) increased in the treated groups. Oral administration of different doses of C. intybus seed extract significantly (p < 0.01) protected the hepatic cells from impairment. The biochemical markers and hematological parameters were also normal in extract-treated rats in contrast to the standard (silymarin) and control groups.
Conclusion: The results show that C. intybus plant is potential a good natural source of natural hepatoprotective and antioxidants agents.

Keywords: *cichorium intybus, antioxidant, hepatoprotective biomarkers, silymarin, hematological parameters.*

15. **Khan, S. A., Ahmad, W., Munawar, K. S.**, & Kanwal, S. (2018). Synthesis, Spectroscopic Characterization and Biological Evaluation of Ni(II), Cu(II) and Zn(II) Complexes of Diphenyldithiocarbamate. *Indian Journal of Pharmaceutical Sciences, 80*(3), 480-488. doi: 10.4172/pharmaceutical-sciences.1000381.**(Shakeel Ahmad Khan (Chemistry/SSC), W. Ahmad, K. S. Munawar)**JCR Listed (IF: 0.738)

Abstract: Ni(II), Cu(II) and Zn(II) complexes of diphenyldithiocarbamate have been synthesized with the aim of developing antioxidants, potential antibacterial and antifungal agents. Synthesized metal complexes were characterized by magnetic susceptibility, elemental analysis; conductivity measurements, mass spectra, infrared, ultra violet/visible and nuclear magnetic resonance verified the chemical composition of products. Magnetic susceptibility and spectroscopic studies suggested the predicted geometry of the diphenyldithiocarbamate complexes as octahedral geometry of Ni(II) complex distortion square-planer geometry distorted towards tetrahedral for Cu(II) and Zn(II) complexes. Synthesized metal complexes exhibited remarkable antioxidant potential as compared to standard. Zn(II) complex of diphenyldithiocarbamate exhibited IC50 of 31.45±0.31 µM while the standard, butylated hydroxytoluene exhibited IC50 of 44.67±0.45 µM antioxidant activity. Synthesized metal complexes showed very good antibacterial and antifungal potential against Rhodococcuss, Actinomyces viscosus, Bacillus subtilis, Escherichia coli and the fungi, Aspergillus niger, Aspergillus flavus, Candida and Acetomyceta. It's concluded that synthesized metal complexes showed better antioxidant, antibacterial and antifungal potential as compared to diphenyldithiocarbamate as well as the standard and might turn out to be a valuable treatment of numerous kinds of diseases.

Keywords:*diphenyldithiocarbamate (DPDTC), spectroscopic studies, antioxidant, antibacterial, antifungal activities.*

16. **Khan, S. A.**, Kanwal, S., Rizwan, K., &**Shahid, S.** (2018). Enhanced antimicrobial, antioxidant, in vivo antitumor and in vitro anticancer effects against breast cancer cell line by green synthesized un-doped SnO2 and Co-doped SnO2 nanoparticles from Clerodendrum inerme. *Microbial Pathogenesis, 125*, 366-384. doi: 10.1016/j.micpath.2018.09.041. **(Shakeel Ahmad Khan(Chemistry/SSC), Sammia Shahid)**JCR Listed (IF: 2.332)

Abstract: A novel approach was employed for the synthesis of un-doped tinoxide and Cobalt-doped tinoxide (Co-doped SnO2) nanoparticles (NAPs) by using aqueous extract of Clerodendrum inerme with the help of eco-friendly superficial solution combustion method. Synthesized NAPs were characterized by different spectroscopic techniques and results from XRD, TEM, SEM, EDX and UV–Vis examines confirmed the successful synthesis, crystalline nature and spherical structure of un-doped SnO2 and Co-doped SnO2 NAPs with the average grain size of 30 and 40 nm; and band gap energy of 3.68 and 2.76 eV respectively. Antimicrobial propensity of the synthesized NAPs was determined by agar well assay, SEM, TEM and confocal laser scanning microscopic analysis against various bacterial and fungal strains. Synthesized Co-doped SnO2 NAPs were unveiled the extraordinary antibacterial and antifungal activities against E. coli, B. subtilis, A. niger, A. flavus, and C. albicans with the zone of inhibitions of 30 ± 0.08 mm and 26 ± 0.06 mm, 17 ± 0.04 mm, 23 ± 0.08 mm and 26 ± 0.06 respectively which were also evidenced from SEM, TEM and confocal laser scanning microscopy. In addition, green synthesized Co-doped SnO2 NAPs were demonstrated the substantial antioxidant activity by scavenging DPPH, significant in vitro anticancer and in vivo antitumor activity on breast carcinoma cells (MCF-7) and Ehrlich ascites tumor cell lines respectively than standard. The hemolytic activity disclosed low cytotoxicity of fabricated NAPs (0.89 ± 0.05%) at 5 mg/mL, which was indicated their biocompatibility potential. Hence, the multi-purpose properties of synthesized NAPs presented in the current study can be further deliberated for pharmaceutical and nanomedicine applications.

Keywords:*green synthesis, co-doped, sno2 naps, antimicrobial, antioxidant, anticancer, antitumor activities.*

17. **Khan, S. A.,** Noreen, F., Kanwal, S., Iqbal, A., & Hussain, G. (2018). Green synthesis of ZnO and Cu-doped ZnO nanoparticles from leaf extracts of Abutilon indicum, Clerodendrum infortunatum, Clerodendrum inerme and

investigation of their biological and photocatalytic activities. *Materials Science & Engineering C-Materials for Biological Applications, 82*, 46-59. doi: 10.1016/j.msec.2017.08.071. **(Shakeel Ahmad Khan (Chemistry/SSC)** **JCR Listed (IF: 5.080)**

Abstract: In the present study, green synthesis and determination of the antioxidant, antibacterial, antifungal, anticancer and photocatalytic properties of the resultant Cu-doped zinc oxide nanoparticles (NAPs) were carried out. A superficial method (solution combustion method) was employed for the synthesis of un-doped ZnO NAPs from aqueous extract of *Abutilon indicum*, and synthesis of Cu-doped ZnO NAPs from aqueous extracts of *Clerodendrum infortunatum* (M1 NAPs) and *Clerodendrum inerme* (M2 NAPs). The synthesized un-doped ZnO, M1 and M2 NAPs were characterized by different spectroscopic techniques like Ultraviolet-visible (UV–Vis), Fourier Transform-Infrared (FT-IR), X-ray diffraction (XRD), energy-dispersive X-ray spectroscopy (EDX) and scanning electron microscopy (SEM). The antibacterial and antifungal activities of M1 and M2 NAPs were determined by agar diffusion method, while their antioxidant properties were assessed through DPPH radical scavenging and ferric thiocyanate (FTC) and assays. Under sunlight irradiation, photocatalytic disintegration potential of M1 and M2 NAPs were determined by the degradation of Acid Black 234 dye. Results from FT-IR, XRD, EDX and SEM confirmed successful synthesis, crystalline nature, and spheroid-to-rod-like shapes of un-doped ZnO, M1 and M2 NAPs, with grain sizes of 16.72 nm, 17.49 nm and 20.73 nm; and band gap energies of 3.37 eV, 3.36 eV and 3.31 eV, respectively. The NAPs were good catalysts for effective degradation of Acid Black 234. They also exhibited remarkable antioxidant and anticancer activities. Significant antibacterial activity was shown by M2 NAPs against *E. coli*, *S. aureus*, *Klebsiella and B. subtilis*, with zones of inhibition (ZOIs) of 13 ± 0.09, 14 ± 0.01, 18 ± 0.07 and 20 ± 0.10, respectively. Significant antifungal potential was also produced by M2 NAPs at 5 mg with ZOIs of 17 ± 0.07 and 24 ± 0.08 against *A. niger* and *T. harzianum*, respectively. These results indicate that aqueous extracts of *A. indicum*, *C. infortunatum* and *C. inerme* are effective reducing agents for green synthesis of un-doped ZnO, and Cu-doped ZnO NAPs with significant antimicrobial, antioxidant, and antifungal potential. Thus they are good candidates for future therapeutic applications.

Keywords:*green synthesis, Cu-dopedZnO, NAPsCharacterization, antioxidan, antibacterial, antifungal, photocatalytic properties.*

18. Mahmood, N., Rasool, N., Ikram, H. M., **Hashmi, M. A.,** Mahmood, T., Zubair, M., . . . Rashid, U. (2018). Synthesis of 3,4-Biaryl-2,5-Dichlorothiophene through Suzuki Cross-Coupling and Theoretical Exploration of Their Potential Applications as Nonlinear Optical Materials. *Symmetry-Basel, 10*(12), 11. doi: 10.3390/sym10120766.**(Muhammad Ali Hashmi (Chemistry/SSC)****JCR Listed (IF: 1.256)**

Abstract: We report herein the efficient one-pot synthesis of 3,4-biaryl-2,5-dichlorothiophene derivatives (2a–2i) via a palladium-catalyzed Suzuki cross-coupling reaction. A series of thiophene derivatives were synthesized, starting from 3,4-dibromo-2,5-dichlorothiophene (**1**) and various arylboronic acids using Pd(PPh3)4 and K3PO4 with moderate to good yields. For further insights about the structure and property relationship, density functional theory (DFT) calculations were performed. A relaxed potential energy surface (PES) scan was performed to locate the minimum energy structure. A frontier molecular orbitals analysis was performed to explain the reactivity of all synthesized derivatives. As the synthesized derivatives had extended conjugations, therefore the first hyperpolarizability (βo) was calculated to investigate their potential as non-linear optical (NLO) materials and significant βo values were found for the 2b and 2gderivatives.

Keywords:*suzuki cross-coupling reaction; thiophene; Pd (PPh3)4; NLO; PES; density functional theory.*

19. **Haroon, S. M., Shahid, S., Hussain, S. A., & Raza, H.** (2018). Comparative Study of Antioxidant Activity of Flower of Aloe vera and Leaf Extract of Aloe ferox. *Journal of Basic and Applied Sciences, 14*, 191-196.**(Shah Muhammad Haroon (Chemistry/SSC) Sammia Shahid, Syed Ammar Hussain, Hamid Raza)(Not HEC Recognized)**

Abstract: Great attention has been focused on medicinal plants and phytoconstituents due to their free radicals scavenging tendency. The present study investigates the comparative antioxidant ability of aqueous extracts of flower of Aloe vera and leaf of Aloe ferox. Antioxidant activity was assessed by using the DPPH, FRAP and ABTS+ free-radical method. The IC50 values of aqueous extracts of flower of the A. vera and leaf of A. ferox in DPPH assay were 406.04 and 517.01 µg/ml, in ABTS+ radical scavenging assay were 44.72 and 173.05 µg/ml, EC1 in FRAP assay were 0.28 and 0.51 (mg/ml) respectively. Results of the present study showed that antioxidant capacity of whole leaf of Aloe ferox Mill was significantly higher than Aloe vera flowers.

Keywords:*aloe vera, aloe ferox, antioxidant activity, DPPH, phytoconstituents.*

20. **Shahid, S., & Fatima, U.** (2018). Pharmacological Activities of Carica papaya Linn. *Journal of Basic and Applied Sciences, 14*, 210-216.**(Sammia Shahid (Chemistry/SSC), Urooj Fatima)(Not HEC Recognized)**
Abstract: Carica papaya is a tropical fruit, present in orange red to yellow orange color. The whole plant including fruit, leaves, roots, peel, bark, seed and pulp served as medicine. It is rich in minerals, carotenoids, vitamins, alkaloids, enzymes, lycopene, and flavonoids that provide the papaya with special importance. It is used as a remedy for the treatment of many skin infections, anti fungal, anti viral infections. Its milky juice extracted and dried is used as medicine for digestive disorders and as toothpaste. Carica papaya helps in the treatment of different types of cancer, kidney infections, nervous disorders, etc. Now a days papaya is known as a nutraceutical fruit because of its multifaceted properties. The most enhanced properties of papaya are anti-fungal, anti-fertility, uretonic, anti-hypertensive, hypolipidemic, dengue fever, diuretic, anti-helmintic, wound healing, antibacterial and antitumor activities. This review summarizes the magical pharmacological benefits of Carica papaya.

Keywords:*Carica papaya, papain, wound healing, chymopapain, neutraceutical.*

21. **Zahoor, S., Shahid, S. & Fatima, U.** (2018). Review of Pharmacological Activities of Vetiveria zizanoide (Linn) Nash. *Journal of Basic and Applied Sciences, 14*, 235-238.**(Saroosh Zahoor (Chemistry/SSC) Sammia Shahid, Urooj Fatima)(Not HEC Recognized)**
Abstract: Vetiveria zizanioides (Linn) Nash is a perennial magical grass of family poaceae commonly known as Khas which is highly valued grass due to its adventitious root system. It is widely distributed in the Pakistan. It is cultivated in all provinces of Pakistan due to its great economic importance. This grass grows plain ascending up to 1200m. Mostly roots stem and leaves were used for treatment of different diseases by ancestors. Adventitious roots contain essential oil which used for multipurpose such as perfumery and in pharmacological industry. Vetiver oil contains approximately 150 compounds, including sesquiterpenoide, hydrocarbons. Phytochemical analysis of leaves shows the presence of flavonoides, saponins, tannins and phenols. Various tribes of India used this tuft grass for commercial purposes. Khas serve as broom, for cooling, roof of huts and as medicine for different diseases such as sunstroke, ulcer, fever, epilepsy and in skin diseases. In this study we summaries the magical pharmacological activities of Vetiveria zizanioides such as anti inflammatory, antibacterial, antifungal, and anti malarial, anti tubercular, anti hyperglycemic, anti hepatoprotective and antioxidant activity.

Keywords:*pharmacological activities, khas, perfume, traditional medicine, biodiversity.*

22. Tahir, N. I., Hussain, S., **Javed, M.,** Rehman, H., Shahzady, T. G., Parveen, B., & Ali, K. G. (2018). Nature of aflatoxins: Their extraction, analysis, and control. *Journal of Food Safety, 38*(6), 7. doi:10.1111/jfs.12561.**(Mohsin Javed (Chemistry/SSC) JCR Listed (IF: 1.275) (Review)**
Abstract: Aflatoxins gain entry into food products when proper drying, storage, and transport conditions are not applied. They comprise of closely related compounds for example, aflatoxins B1, B2, G1, G2, M1, and M2. The order of toxicity among aflatoxis is B1 > G1 > B2 > G2. In developing countries, the serious illness and

deaths are common due to acute aflatoxicosis and human children are more prone to their attack. Chronic aflatoxicosis affects on animal nutrition status. Aflatoxins are commonly extracted from foodstuffs by liquid–liquid extraction, supercritical fluid extraction, and solid phase extraction. They are analyzed by thin layer chromatography, high-performance liquid chromatography (HPLC), HPLC-mass spectrometry and UV-Visible spectroscopy. They demonstrate high stability within food or feed stuffs and can be removed by physical, chemical, and biological means. Physical approaches use heat, sunlight, UV light, gamma rays, or adsorption phenomenon while chemical methods involve various fungicides, herbal plant extracts, oxidizing/hydrolytic/chlorinating agents, or clay. Biological approaches involve either probiotic and yeast mixtures or atoxigenic fungi. A proper detoxification procedure ensures the nutritional value of food/feed stuffs and does not generate new carcinogenic, mutagenic, or toxic substances. Consideration of hygienic precautions and technical assistance, implementation of regulatory initiatives, and stricter quality control measures are all important for their control.

Keywords: *contamination, detoxification, preharvest, exposure, mycotoxins, toxicology, countries, fusarium, foods, milk.*

23. Hassana, A. U., **Mohyuddinb, A.,** & Alic, S. (2018). Preparation of Rechargeable Battery from Poultry Waste. *Pakistan Journal of Scientific and Industrial Research Series A: Physical Sciences, 61*(2), 80.**(Ayesha Mohyuddin (Chemistry/SSC)** **(SJR)**
Abstract: Present research involves an investigation of utilisation of poultry waste to prepare a rechargeable battery. The alkaline solution of poultry waste was employed as the cathodic material with the pharmaceutical grade oxytocin purchased from a local medical store as an anodic material. Power of rechargeable battery was investigated by using a change in several parameters such as hydration and dehydration of salt bridge,the concentration of oxidising and reducing agents, charging voltage and time of charging. Obtained results have confirmed that concentration of oxidising and reducing agents is the key factor for battery. Optimised conditions provided the voltage of the battery up to 8300 millivolts.
Keywords: *poultry waste, oxytocin, salt bridge, voltage.*

24. **Muhammad Haroon, S.,** Shahid, S., & Ashraf, F. (2018). Adsorption Capacity of Low Cost Activated Carbon For Removal of Copper Ions From Aqueous Media. *Scientific Inquiry and review, 2*(3), 41-48.**(Shah Muhammad Haroon (Chemistry/SSC),Sammia Shahid, Fakhra Ashraf)**(UMT Journal)
Abstract: The ability of low cost activated carbon based on tamarind stone for the removal of copper ion from water was explored. Tamarind stone was converted into activated carbon by lean air carbonization and chemically activated by barium chloride. The factors affecting on adsorption process i-e particle size, concentration, and pH were investigated. Maximum adsorption i-e 64% of copper ions occurs at 100 mg/L initial concentration by 0.1g of activated carbon having 149μ particle size. The adsorption of coppr(II) ions was higher at higher pH value i-e 21 mg/L. Adsorption was found to be increased with increase in temperature due to endothermic nature .The potential of the prepared activated carbon for removal of copper ions from aqueous media was satisfactory.
Keywords: *low cost adsorbent, activated carbon, copper ion, water purification, agricultural waste.*

25. Saleem. S., Ali. W., **Afzal. M.S.,** (2018). Status of Drinking Water Quality and its Contaminationin Pakistan. *Journal of Enviromemntal Research,2*(1),6**.(Muhammad Sohail Afzal (Chemistry/SSC)**ISI Web of Science(Short Communication)
Abstract: *Not Found*

26. **Hussain, W., Ali,** M., Sohail Afzal**, M., & Rasool, N.** Penta-1,4-Diene-3-One Oxime Derivatives Strongly

Inhibit the Replicase Domain of Tobacco Mosaic Virus: Elucidation Through Molecular Docking and Density Functional Theory Mechanistic Computations. *Journal ofAntivirals & Antiretrovirals, 10*(3). doi: 10.4172/1948-5964.1000177**.(Muhammad Sohail Afzal(Chemistry/SSC)**JCR Listed (IF: 1.27)

Abstract: Tobacco mosaic virus (TMV) is one of the major concerns to the farmers as it infects several crops of economic importance such as tomato. The mechanism of viral infection in host initiates on the entry of TMV in the host cell and production of a capping enzyme i.e. RNA polymerase. Replication of virus produces multiple mRNAs which further encodes multiple proteins including coat proteins, movement proteins and an RNA-dependent RNA polymerase (RdRp). In the present study, TMV replicase domain has been targeted using a set of novel penta-1,4-diene-3-one oxime derivatives bearing a pyridine moiety. To further assess the reactivity of these compounds against TMV, molecular orbital energy descriptors were calculated using Density Functional Theory (DFT) correlations. The pharmacokinetics and pharmacological properties have also been analysed as the crop yields are to be consumed by the humans. Results revealed that among the 16 derivatives of penta-1,4-diene-3-one oxime, compound C, J, O and P showed the highest inhibitory potential. Reactivity of these compounds was also high, however, only compound C showed effective pharmacokinetics and pharmacological properties. Based on these results, it is concluded that compound C can be used as a potent inhibitor against TMV and the yields produced by a crop will be safe to be consumed by humans.

Keywords:*TMV, Replicase domain, Penta-1,4-diene-3-one oxime derivatives, Molecular docking, DFT.*

27. Rehman, A., Hussain, S., **Javed, M.,** Ali, Z., Rehman, H., Shahzady, T. G., & Zahra, A. (2018). Chemical Composition and Remedial Perspectives of Hippophae Rhamnoides Linn. *Postepy Biologii Komorki, 45*(3), 199-209.**(Mohsin Javed (Chemistry/SSC)**JCR Listed (IF: 0.147)

Abstract: Hippophae Rhamnoides Linn (Sea buckthorn)is athorny nitrogen fixing deciduous shrub. Itfinds a lot of importancedue to its very rich vitamins A, B-1, B-12, C, E, K, and P; carotenoids, lycopene, phytosterols and flavonoids. Itstherapeutic value is owed to the presence of potent antioxidants. SBT reduces level of stress hormones and increase hypoxic tolerance in animals demonstrating its anti-stress andadaptogenic activity. Sea-buckthorn oil plays a greater role in the proper functioning of the human body and gives healthy and beautiful look to the skin due to the presence of valuable nutrients in it. SBT oil finds very important applications in cosmetic products and is frequently employed for the cure of rapidly aging, flaky or dry skin due to a balanced composition of fatty acids and vitamins. Sea-buckthorn oil also has skin regeneration and repair properties due to the presence of unique unsaturated fatty acids, such as gamma-linolenic acid (omega-6) and palmitooleic acid (omega-7). This ancient plant contains powerful and healing synergies. In this review we discusses on traditional uses, photochemistry and pharmacological data of sea buckthorn.

Keywords: *hippophae, pharmacological, cosmetics.*

28. Contis, E. T., Ashiq, U., Massey, S., **Shahid, S.,**& Verma, A. (2018). Responsible Conduct in Chemical Safety and Security Practices in South Asia. In E. T. Contis, D. J. Phillips, A. A. Campbell, B. D. Miller & L. Brown (Eds.), *Responsible Conduct in Chemistry Research and Practice: Global Perspectives* (Vol. 1288, pp. 157-170).**(Sammia Shahid (Chemistry/SSC)** ISI Web of Science (Book Chapter)

Abstract: Comprehensive training in chemical safety and security is a worldwide need. The ability to bring representatives from all fields in the chemical enterprise together to learn and to share best practices is worthy and timely. Many universities in South Asia are striving to network to teach their students these best practices in chemical safety and security. Examples of workshops instituted through the Global Chemists Code of Ethics (GCCE) initiative (https://www.opcw.org/news/article/a-new-opcw-report-brings-chemical-safety-and-security-bestpractices-to-[your](https://www.opcw.org/)fingertips/),(https://www.opcw.org/fileadmin/OPCW/ICA/ICB/OPCW_Report_on_Needs_and_Best_Prac

tices_on_Chemical_Safety_and_Security_Management V3-2_1.2.pdf), (http://www.iccss.eu0 hosted by the American Chemical Society (ACS) through the Office of International Activities (OIA) and the International Activities Committee (IAC) and funded by the U.S. Department of State's Chemical Security Program (www.csp-state.net/), (www.csp-state.net/grants-funding/) will be described. These facilitators were trained either at the first GCCE workshop in Kuala Lumpur in April 2016 or at the last GCCE workshop in Melbourne, Australia in July 2017. The instituted workshops were conducted at universities in India and Pakistan.

Conference Papers

1. **Khan, H., Javed, M., & Shahid, S.** (2018). *Synthesis, Spectral Characterization and Photocatalytic Applications of Graphene Oxide Nanocomposite with Copper Doped Zinc Oxide*. Paper presented at the ICSEEEU 2018: International Conference on Sustainable Energy Engineering and Energy Utilization, Bangkok, Thailand. https://waset.org/pdf/books/?id=81655&pageNumber=198.**(Humaira Khan(Chemistry/SSC),Mohsin Javed, Sammia Shahid)**

Abstract: The reinforced photocatalytic activity of graphene oxide (GO) along with composites of ZnO nanoparticles and copper-doped ZnO nanoparticles were studied by synthesizing ZnO and copper- doped ZnO nanoparticles by co-precipitation method. Zinc acetate and copper acetate were used as precursors, whereas graphene oxide was prepared from pre-oxidized graphite in the presence of H_2O_2.The supernatant was collected carefully and showed high-quality single-layer characterized by FTIR (Fourier Transform Infrared Spectroscopy), TEM (Transmission Electron Microscopy), SEM (Scanning Electron Microscopy), XRD (X-ray Diffraction Analysis), EDS (Energy Dispersive Spectrometry). The degradation of methylene blue as standard pollutant under UV-Visible irradiation gave results for photocatalytic activity of dopants. It could be concluded that shrinking of optical band caused by composites of Cu-dopped nanoparticles with GO enhances the photocatalytic activity.

Keywords: *degradation, graphene oxide, photocatalysis, ZnO nanoparticles and copper-doped ZnO nanoparticles.*

2. **Shahid, S.,** & Sajjad, R. (2018). *Comparative Study of Hepatoprotective Activity of Abutilon Indicum Three Distinct Types of Liver Damage*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

3. Jameel, S., & **Shahid, S.** (2018). *Comparative study of anti-ulcer activity of Moringa oleifera (Moringaceae) root, bark, leaves, fruits and seeds*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

4. Asghar, N., & **Shahid, S.** (2018). *A comparative review of characteristics of Gold Nanoparticles, synthesized by aqueous extracts of different plants*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

5. Asghar, N., & **Shahid, S.** (2018). *A comparative review of characteristics of Gold Nanoparticles, synthesized by aqueous extracts of different plants*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

6. Arshad, U., & **Shahid, S.** (2018). *Comparative study of hypoglycemic activity of specie from Cassia occidentalis (Coesalpiniacea)*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

7. Arshad, U., & **Shahid, S.** (2018). *Comparative study of hypoglycemic activity of specie from Cassia occidentalis (Coesalpiniacea)*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

8. **Shahid, S.,** Zahid, A., & Zahid Mukhtar, M. (2018). *Anthelmintic activity of three different species, from daisy family Asteraceae (Artemisia): A comparative study*. Paper presented at the Three-day International Conference on "Chemical & Pharmaceutical Sciences: Recent Approaches in Research & Applications" on 17-19th January 2018, FCCU, Lahore. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

9. Khan, H., **Shahid, S.,** & Javed, M. (2018). *Synthesis, Spectral Characterization and Photocatalytic Applications of Gaphene oxide Nanocomposite with Copper Doped Zinc Oxide*. Paper presented at the 6th International Conference on Nano and Materials Science (ICNMS 2018- January 15-17)" at Florida Polytechnic University, USA. **(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

10. **Shahid, S.**, & Nazir, M. (2018). *Febrication and Charactrization of Ni Nano Roads* Paper presented at the 6th International Conference on Nano and Materials Science (ICNMS 2018- January 15-17)" at Florida Polytechnic University, USA.**(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

11. **Shahid, S.,** & Taj, S. (2018). *Antidiabetic Activity of Extracts of Pistachia Khinjuk on Alloxan Monohydrate induced Diabetic Mice*. Paper presented at the 2nd International Conference on Functional Materials and Chemical Engineering, (ICFMCE- 20-22 November 2018)" at Khalifa University of Science and Technology, Abu Dhabi, UAE.**(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

12. M.Z.Rasheed, Fatima, U., & **Shahid, S.** (2018). *Metal Complexes in Cancer Therapy, A review of platinum and Gold based anticancer drugs*. Paper presented at the 6th International Conference on Education Science Beyond Classroom, March 15 to 17, 2018, University of Education, Lahore.**(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

13. Zia, Urooj, F., **Shahid, S.** & Khan, H. (2018). *Study of Antibacterial Activity of Zizipus Sativa*. Paper Presented at the 6th International Conference on Education Science Beyond Classroom, March 15 to 17, 2018, University of Education, Lahore.**(Sammia Shahid (Chemistry/SSC)**
Abstract: *Not found*

Department of Physics

Research Articles

1. **Ahmad, I., &** Khawaja, E. E. (2018). Passive cooling of surfaces. *Scientific Inquiry and Review (SIR), 2*(1), 10-15. **(Imtiaz Ahmad (Physics/SSC)) (UMT journal)**

Abstract: Radiative cooling of surfaces without applying an energy source has been suggested in the literature. The basis for radiative cooling is the infrared transmittance of the atmosphere. The spectral transparency (i.e. low absorption) of the atmosphere in the wavelength range of 8 to 13 μm is generally termed the atmospheric window. If the humidity and cloudiness are low, then the downward thermal radiation from the atmosphere in the spectral region of the atmospheric window are expected to be low. A temperature between 15 oC and 25 oC below ambient temperature has been achieved as a result of radiative cooling. Spectrally selective radiating material, which is defined as a material with high emittance in the spectral region of the atmospheric window and high reflectance in the rest of the spectral range, can be used as an essential means in a sky radiator for passive cooling of the material. Silicon monoxide film on highly reflective substrate (aluminum coated glass) was used in the present work. It was found that the temperature of the thin film surface was about 12 oC lower than that of ambient temperature under suitable condition of radiative cooling. Cooling is expected to be more efficient in performance if it is carried out in desert places.

Keywords: *thin films, transmittance, radiative cooling, silicon monoxide.*

2. Abbas, S. A., Rashid, M., Faridi, M. A., **Saddique, M. B.,** Mahmood, A., & Ramay, S. M. (2018). Systematic study of the elastic, optoelectronic, and thermoelectric behavior of MRh2O4 (M = Zn, Cd) based on first principles calculations. *Journal of Physics and Chemistry of Solids*, 113, 157-163. doi: https://doi.org/10.1016/j.jpcs.2017.10.020. **(Muhammad Bilal Siddique (Physics/SSC) JCR Listed (IF: 2.207)**

Abstract: In the present study, we performed first principles total energy calculations to explore the electronic, elastic, optical, and thermoelectric behavior of MRh2O4(M = Zn, Cd) spinel oxides. We employed Perdew–Burke–Ernzerhof-sol as well as the modified Becke and Johnson potential to compute the elastic, optoelectronic, and thermoelectric behavior of MRh2O4(M = Zn, Cd). The optical behavior was investigated by calculating the complex dielectric constant, refractive index, optical reflectivity, absorption coefficient, and optical conductivity. All of the optical parameters indicated a shift to lower energies as the atomic size increased from Zn to Cd, thereby suggesting potential applications of the spinel oxides in optoelectronic device. Moreover, the thermoelectric properties of MRh2O4(M = Zn, Cd) spinel oxides were computed in terms of the electrical conductivity (σ), Seebeck coefficient (S), thermal conductivity (k), and power factor (σS^2) using the BoltzTraP code.

Keywords: *density functional theory, dielectric constant, full-potential linearized augmented plane wave method, renewable energy source, spinel oxide, thermoelectric parameter.*

3. Erum, N., & **Iqbal, M. A**. (2018). The effect of pressure variation on the elasticity and thermodynamic properties of CaLiF3 for low birefringent lens materials. *Chinese Journal of Physics, 56*(4), 1353-1361. doi: 10.1016/j.cjph.2018.05.013.**(Muhammad Azhar Iqbal (Physics/SSC)JCR Listed (IF: 1.051)**

Abstract: In this study, the Full-Potential Linearized Augmented Plane Wave (FP-LAPW) method is employed to calculate the effect of pressure variation (0–50 GPa) on the electronic structure, elastic parameters, mechanical durability, and thermodynamic aspects of calcium based CaLiF3 in combination with the Quasi-harmonic Debye model where the phonon effects are considered. A prominent decrease in the value of the lattice constant and the bond lengths is observed with an increase in pressure. The significant influence of pressure on a wide range of elastic parameters and their related mechanical properties has been discussed in detail to utilize this material in low birefringence lens fabrication technology. The transition from brittle to

ductile behavior is also observed with an increase in pressure. Moreover, a successful prediction of the important thermodynamicaspects, such as the volume expansion coefficient (α), Debye temperature (θD), and heat capacities (Cp and Cv), is also done in wide pressure and temperature ranges.

4. Faridi, M. A., Tariq, S., **Jamil, M. I.,** Batool, A., **Nadeem, S.,** & Amin, A. (2018). Pressure induced band-gap tuning in KNbO3 for piezoelectric applications: Quantum DFT-GGA approach. *Chinese Journal of Physics, 56*(4), 1481-1487. doi: 10.1016/j.cjph.2018.06.003.**(M. Imran Jamil (Physics/SSC), Sohail Nadeem)JCR Listed (IF: 1.051)**

Abstract: Under pressure KNbO3 has been studied for its structural, electronic and mechanical properties by using state of the art density functional theory. Elastic stability criterion and structural optimizations show stable cubic phase, up to 150 GPa, of the studied compound. Moreover the compound undergoes brittle (indirect band-gap) phase transformation to ductile (direct bandgap) phase transformation while retaining its cubic phase. Anisotropy is observed to decrease with pressure which results in an increase in the value of piezoelectric coefficient and thermal conductivity. The electronic properties reveal that anti-ferromagnetic nature remains invariant with increase in pressure. But Cauchy pressure explains that the majority of covalent bonds in unit cell are shifted towards ionic bonding at higher pressures. Our results are predictions for applications of KNbO3 in high pressure optoelectronic devices and sensors.

5. Imran, A., Jiang, J., Eric, D., Zahid, M. N., Yousaf, M., & **Shah, Z. H.** (2018). Optical properties of InAs/GaAs quantum dot superlattice structures. *Results in Physics, 9*, 297-302. doi:https://doi.org/10.1016/j.rinp.2018.02.016.**(Zaheer Hussain Shah (Physics/SSC)JCR Listed (IF:2.147)**

Abstract: Quantum dot (QD) structure has potential applications in modern highly efficient optoelectronic devices due to their band-tuning. The device dimensions have been miniatured with increased efficiencies by virtue of this discovery. In this research, we have presented modified analytical and simulation results of InAs/GaAs QD superlattice (QDSL). We have applied tight binding model for the investigation of ground state energies using timeindependent Schrödinger equation (SE) with effective mass approximation. It has been investigated that the electron energies are confined due to wave function delocalization in closely coupled QD structures. The minimum ground state energy can be obtained by increasing the periodicity and decreasing the barrier layer thickness. We have calculated electronics and optical properties which includes ground state energies, transition energies, density of states (DOS), absorption coefficient and refractive index, which can be tuned by structure modification. In our results, the minimum ground state energy of QDSL is achieved to be 0.25 eV with a maximum period of 10 QDs. The minimum band to band and band to continuum transition energies are 63 meV and 130 meV with 2 nm barrier layer thickness respectively. The absorption coefficient of our proposed QDSL model is found to be maximum 1.2 104 cm1 and can be used for highly sensitive infrared detector and high efficiency solar cells.

6. Erum, N., & **Iqbal, M. A.** (2018). Effect of hydrostatic pressure on physical properties of strontium based fluoroperovskites for novel applications. *Materials Research Express, 5*(2), 025904.**(Muhammad Azhar Iqbal (Physics/SSC) JCR Listed (IF: 1.151)**

Abstract: Density functional theory (DFT) is employed to calculate the effect of pressure variation on electronic structure, elastic parameters, mechanical durability, and thermodynamic aspects of SrRbF3, in combination with Quasi-harmonic Debye model. The pressure effects are determined in the range of 0–25 GPa, in which cubic stability of SrRbF3 fluoroperovskite remains valid. Significant influence of compression on wide range of elastic parameters and related mechanical properties has been discussed, to utilize this

material in low birefringence lens fabrication technology. Apart of linear dependence on elastic coefficients, transition from brittle to ductile behavior is also observed at elevated pressure ranges. Moreover, successful prediction of important thermodynamic aspects such as volume expansion coefficient (α), Debye temperature (ϑ D), heat capacities (Cp and Cv) are also done within wide pressure and temperature ranges.

Keywords: *pressure variation study, structural phase transition, thermodynamic study.*

7. Gilani, S. M. S., Tariq, S., **Jamil, M. I.,** Tahir, B., & Faridi, M. A. (2018). Elucidating DFT study on structural, electronic, thermal and elastic properties of SrTcO3 by using GGA and mBJ approach. *Chinese Journal of Physics, 56*(1), 308-314. doi: 10.1016/j.cjph.2018.01.002.**(M. Imran Jamil (Physics/SSC) JCR Listed (IF: 1.051)**

Abstract: Generalized gradient approximation and Modified Becke and Johnson (mBJ) potential scheme, within density functional theory, has been implemented to evaluate the structural, electronic and thermo-elastic attributes of SrTcO3. The structural stability of the very compound has been probed from tolerance factor, elastic stability criterion and ground state optimizations. In the study of electronic properties, formation of band-gap has been resolved by using density of states and from electron spin density contour plots. It is for the first time that mechanical and thermo-dynamical properties have been studied in terms of elastic constants, melting temperature, enthalpy of formation and Debye temperature. Our results have shown that SrTcO3 exhibit a stable ductile nature that makes it a convincing candidate for high temperature electronic applications.

Keywords: *density functionaltheory, modified becke and johnson potential, strontium technate.*

8. Imran, M., Ikram, M., Shahzadi, A., Dilpazir, S., **Khan, H.,** Shahzadi, I., . . . Huang, Y. (2018). High-performance solution-based CdS-conjugated hybrid polymer solar cells. *Rsc Advances, 8*(32), 18051-18058. doi: 10.1039/c8ra01813h. **(H. Khan (Physics/SSC) JCR Listed (IF: 2.936)**

Abstract: In this study, hybrid BHJ – bulk heterojunction polymer solar cells were fabricated by incorporating CdS quantum dots (QDs) in a blend of P3HT (donor) and PCBM (acceptor) using dichlorobenzene and chlorobenzene as solvents. CdS QDs at various ratios were mixed in a fixed amount of the P3HT and PCBM blend. The prepared samples have been characterized by a variety of techniques such as $I–V$ and EQE measurements, atomic force microscopy (AFM), scanning electron microscopy (SEM) and ultraviolet-visible (UV-vis) spectroscopy. The mixing of QDs in the polymer blends improved the PCE – power conversion efficiency of the solar cells under standard light conditions. The improved PCE from 2.95 to 4.41% is mostly due to the increase in the fill factor (FF) and short-circuit current (J_{sc}) of the devices with an optimum amount of CdS in the P3HT:PCBM blend. The increase in J_{sc} possibly originated from the formation of a percolation network of CdS. The conjugation of QDs has increased the absorption of the active layers in the visible region. These results well matched as reported, conjugation of CdS in the perovskite active layer increased the absorption and PCE of the devices relative to those of the perovskite films. This increment in parameters is attributed to the decrease in charge recombinations that improved the performance of the doped device.

Keywords: *photovoltaic cells, quantum dots, thin-films, zno, nanocrystalline, temperature, fabrication, dependenc, efficiency, property.*

9. Noor, N. A., **Saddique, M. B.,** Ul Haq, B., Laref, A., & Rashid, M. (2018). Investigations of half-metallic ferromagnetism and thermoelectric properties of cubic XCrO3 (X = Ca, Sr, Ba) compounds via first-principles approaches. *Physics Letters A, 42-43*, 3095-3102. doi: 10.1016/j.physleta.2018.07.045.**(M. Bilal Saddique (Physics/SSC) JCR Listed (IF: 1.863)**

Abstract: In this paper, the physical aspects of the cubic phase XCrO3 (X = Ca, Sr, Ba) perovskites are studied by employing full-potential linearized augmented plane wave plus local orbital (FP-LAPW + lo) method. These compounds have been found stable in ferromagnetic (FM) phase since they possess lower energy in FM phase compared to non-FM phase and their stability is also confirmed by calculating the enthalpyof formation (H). The electronic structures of these compounds are analyzed with Trans and Blaha

modified Becke–Johnson potential (TB-mBJ) for both spin up and spin down channels, which indicate their half-metallic characters. Analysis of density of states (DOS) shows major contributions of O-2p states in the valence band and Cr 3d-state in conduction band. A comparative analysis of crystal field effect (Ecrystal) and the exchange energies (direct x(d) and indirect x(pd)) tells about the main part of electronic spin in ferromagnetic character. The calculated magnetic moments make these compounds favorable for spintronic applications. In the end, thermoelectric parameters are computed for 200 K–800 K temperature range to explore potential of these compounds for applications in renewable energy devices.

Keywords: *density functional theory (DFT), FP-LAPW + lo, half-metallic characteristic, exchange mechanism and thermo-electric properties.*

10. Sabir, B., **Noor, N. A.,** Rashid, M., Din, F. U., Ramay, S. M., & Mahmood, A. (2018). Bandgap engineering to tune the optical properties of Be x Mg1-xX (X = S, Se, Te) alloys. *Chinese Physics B, 27*(1), 9. doi: 10.1088/1674-1056/27/1/016101.**(Naveed Ahmed Noor (Physics/SSC)** **JCR Listed (IF: 1.321)**

Abstact: Structural, electronic, and optical properties of alloys Be x Mg1−x X (X = S, Se, Te) in the assortment 0 < x < 1 were theoretically reported for the first time in zinc-blende (ZB) phase. The calculations were carried out by using full-potential linearized augmented plane wave plus local orbitals (FP-LAPW+lo) formalism contained by the framework of density functional theory (DFT). Wu–Cohen (WC) generalized gradient approximation (GGA), based on optimization energy, has been applied to calculate these theoretical results. In addition, we used Becke and Johnson (mBJ-GGA) potential, modified form of GGA functional, to calculate electronic structural properties up to a high precision degree. The alloys were composed with the concentrations x = 0.25, 0.5, and 0.75 in pursuance of 'special quasi-random structures' (SQS) approach of Zunger for the restoration of disorder around the observed site of alloys in the first few shells. The structural parameters have been predicted by minimizing the total energy in correspondence of unit cell volume. Our alloys established direct band gap at different concentrations that make their importance in optically active materials. Furthermore, density of states was discussed in terms of the contribution of Be and Mg s and chalcogen (S, Se, and Te) s and p states and observed charge density helped us to investigate the bonding nature. By taking into consideration of immense importance in optoelectronics of these materials, the complex dielectric function was calculated for incident photon energy in the range 0–15 eV.

Keywords:*bexMg1−xX (X = S, Se, Te) alloys, zinc-blende (ZB) phase, density functional theory (DFT), electronic and optical properties.*

11. Tariq, S., **Jamil, M. I.,** Sharif, A., Ramay, S. M., Ahmad, H., Qamar, N. u., & Tahir, B. (2018). Exploring structural, electronic and thermo-elastic properties of metallic AMoO(3) (A = Pb, Ba, Sr) molybdates. *Applied Physics A-Materials Science & Processing, 124*(1), 8. doi: 10.1007/s00339-017-1452-x).**(M. Imran Jamil (Physics/SSC)** **JCR Listed (IF: 1.604)**

Abstract: The structural, electronic and thermodynamic properties of AMoO3 (A = Pb, Ba and Sr) molybdates have been investigated by deploying density functional theory. Computed elastic constants and corresponding properties is the first comparative report on AMoO3.The elastic properties match well with the available literature. Results have shown that the studied compounds exhibit stable anti-ferromagnetic, ductile cubic phase along with metallic attributes. Electron spin density contours and DOS were used to shed light on surface morphology of metal-oxide-metal type of mixed bonding. By analyzing enthalpy of formations for AMoO3, SrMoO3 has found to be the most stable than Pb and Ba molybdates. Our results are predictions for future experimentations to develop electronic devices based on studied compounds.

Keywords:*density functional theory, molybdates elastic properties, thermal properties.*

12. Tariq, S., Saad, S., **Jamil, M. I.,** Gilani, S. M. S., Ramay, S. M., & Mahmood, A. (2018). Ab initio study on half-

metallic, electronic and thermodynamic attributes of LaFeO3. *European Physical Journal Plus, 133*(3), 10. doi: 10.1140/epjp/i2018-11908-1.**(M. Imran Jamil (Physics/SSC) JCR Listed (IF: 2.240)**

Abstract: By using the density functional theory (DFT) the systematic study of the structural, electronic and thermodynamic properties of lanthanum ferrite (LaFeO3) has been conducted. The elastic stability

criterion and structural tolerance factor reveal that LaFeO3 exists in the cubic phase and is found to be stable under the ambient conditions. In electronic properties, the optical spectrum of the compound has been found to fall in the range of 488 to 688 nm which has been calculated from the electronic band gap values by using the PBE-GGA and mBJ-GGA techniques. The light between 488 to 688 nm would cause the valence electrons to jump in the conduction band showing the photoconductivity. The pronounced halfmetallic character has been discussed by using the projected electronic density of states. The ferromagnetic response has been observed which may be attributed to the Fe-O bonding situation. The compound exhibits ductile, indirect band gap and half-metallic traits in the bulk phase. We expect the compound to be felicitous for the novel spintronic applications.

13. **Ali, S.,** Rashid, M., Hassan, M., Noor, N. A., Mahmood, Q., Laref, A., & Haq, B. U. (2018). Ab-initio study of electronic, magnetic and thermoelectric behaviors of LiV2O4 and LiCr2O4 using modified Becke-Johson (mBJ) potential. *Physica B-Condensed Matter, 537*, 329-335. doi: 10.1016/j.physb.2018.02.039.**(Saima Ali (Physics/SSC) JCR Listed (IF: 1.453)**

Abstract: Owing to the large energy storage capacity and higher working voltage, the spinel oxides LiV2O4 and LiCr2O4, have remained under intense research attention for utilization as electrode materials in lithium-ion batteries. In this study, we explore the half-metallic nature and thermoelectric response in both LiV2O4 and LiCr2O4 spinel oxides using ab-initio density functional theory (DFT) based computations. The ground-state energies of these compounds have been studied at the optimized structural parameters in the ferromagnetic phase. In order to obtain a correct picture of the electronic structure and magnetic properties, the modified Becke-Johnson (mBJ) potential is applied to compute the electronic structures. The half-metallic behavior is confirmed by the spin-polarized electronic band structures and density of state plots. The magnetic nature is elucidated by computing the John-Teller energy, direct and indirect exchange and crystal field splitting energies. Our computations indicate strong hybridization decreasing the V/Cr site magnetic moments and increasing magnetic momenta at the nonmagnetic atomic sites. We also present the computed parameters significant for expressing the thermoelectric response, which are electrical conductivity, thermal conductivity, See-beck coefficient and power factor. The computed properties are of immense interest owing to the potential spintronics and Li-ion battery applications of the studied spinel materials.

14. Amin, B., Majid, F., **Saddique, M. B.,** Ul Haq, B., Laref, A., Alrebdi, T. A., & Rashid, M. (2018). Physical properties of half-metallic AMnO(3) (A = Mg, Ca) oxides via ab initio calculations. *Computational Materials Science, 146*, 248-254. doi: 10.1016/j.commatsci.2018.01.033. **(M.Bilal Saddique (Physics/SSC) JCR Listed (IF: 2.530)**

Abstract: In this paper, the physical properties of AMnO(3)(A = Mg, Ca) have been explored by means of density functional theory based computational approaches. The calculations for structural, electronic, magnetic and thermoelectric properties have been performed by adopting the full-potential linearized-augmented-pl us-local-orbital (FP-LAPW+lo) method employed in WIEN2k code, whereas the thermoelectric properties have been determined by applying Boltzmann transport theory in BoltzTraP code. The half-metallic ferromagnetism has been enquired by the analysis of spin polarized band structures and density of states. The nature and origin of ferromagnetism has been illustrated in terms of crystal field energies,

exchange energies and concerned exchange constants. Additionally, the diminution of magnetic moment from Mn sites and occurrence of small magnetic moments on Mg/Ca and oxygen and interstitials sites yields to negative values of indirect exchange energy Dx(pd) and strong hybridization. Lastly, the thermoelectric behavior of AMnO(3) has been elucidated by the explanation of electrical conductivity, thermal conductivity, Seebeck coefficient, power factor and thermal efficiency. The assessment of magnetic and thermoelectric properties of AMnO(3) suggests that these compounds are greatly appropriate for spintronic and thermoelectric applications. (C) 2018 Elsevier B.V. All rights reserved.

Keywords: *half-metallic oxides, modified becke and johnson potential (mbj), exchange mechanism, john teller distortion (jtd), thermal efficiency.*

15. Maqsood, S., Rashid, M., Din, F. U., **Saddique, M. B.,** & Laref, A. (2018). Theoretical Investigation of Half-Metallic Oxides XFeO3 (X = Sr, Ba) via Modified Becke-Johnson Potential Scheme. *Journal of Electronic Materials, 47*(3), 2032-2041. doi: 10.1007/s11664-017-6008-5.**(M. Bilal Saddique (Physics/SSC)**JCR Listed (IF: 1.566)

Abstract: The cubic XFeO3 (X = Sr, Ba) perovskite oxides are studied for their thermodynamic stability in the ferromagnetic phase by using density functional theory calculations. We also explore the elastic properties of these compounds in terms of elastic constants C ij, bulk modulus B, shear modulus G, anisotropy factor A, Poisson's ratio v and the B/G ratio. The electronic properties are examined to elucidate the magnetic order, and the thermoelectric properties of XFeO3 (X = Sr, Ba) materials are also presented. The modified Becke–Johnson local density approximation scheme has been used to compute the electronic band structure and density of states, which show that these materials are half-metallic ferromagnetic. We study the magnetic properties by computing the crystal field energy (ΔCF), John–Teller energy (ΔJT) and the exchange splitting energies Δx(d) and Δx(pd). Our results indicate that strong hybridization causes a decrease in the magnetic moment of Fe, which then produces permanent magnetic moments in the nonmagnetic sites.

Keywords:*cubic XFeO3 (X = Sr, Ba) oxides ab initio calculations, half-metallic, ferromagnetic compounds, exchange mechanism, thermoelectric properties.*

Department of Life Sciences

Research Articles

1. Khan, M. Y., Riaz, R., Malik, S. A., **Ali, M., & Afzal, M. S.** (2018). Association of CTLA-4 polymorphisms and autoimmune type-1 diabetes mellitus susceptibility in Pakistani population. *Turkish Journal of Biochemistry***. (Muhammad Ali (Life Sciences/SSC), Muhammad Sohail Afzal) JCR Listed (IF: 0.248) (Letter)**
Abstract: *Not found*

Keywords:*cytotoxic T-lymphocyte antigen-4 (CTLA-4), Polymorphism; rs231775A>G, rs5742909C>T, Type 1 diabetes, Pakistan.*

2. **Afzal, M. S.,** Zahoor, S., **Kabir, M., Munir, S.,**& Ahmed, H. (2018). Recurrence of chikungunya outbreak; an upcoming problem for Pakistan. *Future Virology, 13*(5), 309-311. doi: 10.2217/fvl-2017-0118.**(Muhammad Sohail Afzal (Life Sciences/SSC), Mahvish Kabir, Sania Munir) JCR Listed (IF:1.121)**
Abstract: In Pakistan, the initial outbreak of chikungunya was reported in November–December 2016 in the city of Karachi. A total 1740 people were brought to hospital between December 2016 and March 2017 [1]. Recurrence of infection was observed again with thousands of cases in April 2017. It is proposed that due to the upcoming rainy season and poor senatory system of the city, reemergence of the Aedes aegypti (A. aegypti) borne viral disease will be highly predictable. During the recent outbreak, the highest numbers of cases were reported from Malir followed by Ibrahim Hyderi, Kemari, Bin Qsim, Kemari and Lyari [2]. In April 2017, a large number of confirmed and suspected cases were reported from the city. According to the Health Department of Sindh, from April 2017 to 5 May 2017, a total of 212 chikungunya cases were confirmed by testing acute-phase samples for presence of viral RNA and convalescent-phase samples for the presence of antibodies. Out of these reported cases, the highest number of patients (131) arrived at Ibrahim Hyderi Hospital, followed by 81 infected patients from Malir and Kemari, whereas only nine were reported from Saudabad [3]. The situation is alarming, considering that 21,000 suspected patients were tested for chikungunya or given symptomatic treatment at hospitals in the city [4]. On 4 May 2017, the WHO shared its findings to the provincial Government that five out of six city districts of Karachi were disease-infested. As a result, it was highly recommended to the Government to take 'radical' measures to safeguard the city from the increasing incidence of chikungunya [5].

Keywords:*chikungunya virus, epidemiology, high risk groups, outbreak, Pakistan, prevention.*

3. **Rasool, N.,** Iftikhar, S., **Amir, A.,** & Hussain, W. (2018). Structural and quantum mechanical computations to elucidate the altered binding mechanism of metal and drug with pyrazinamidase from Mycobacterium tuberculosis due to mutagenicity. *Journal of Molecular Graphics and Modelling, 80*, 126-131. doi: https://doi.org/10.1016/j.jmgm.2017.12.011.**(Nouman Rasool (Life Sciences/SSC), Anam Amir)JCR Listed (IF: 1.885)**
Abstract: Pyrazinamide is known to be the most effective treatment against tuberculosis disease and is known to have bacteriostatic action. By targeting the bacterial spores, this drug reduces the chances for the progression of the infection in organisms. In recent years, increased instances of the drug resistance of bacterial strains are reported. Pyrazinamidase, activator for pyrazinamide, leads to resistance against the drug due to mutagenicity across the world. The present study aimed at the quantum mechanistic analysis of mutations in pyrazinamidase to gain insights into the mechanism of this enzyme. Quantum mechanical calculations were performed to analyse the effect of mutations at the metal coordination site using ORCA software program. Moreover, conformational changes in PZase binding cavity has also been analysed due to mutations of binding pocket residues using CASTp server. In order to elucidate the behaviour of the mutant pyrazinamidase, docking of PZA in the binding pocket of PZase was performed using AutoDock Vina. Analysis of results revealed that iron showed weak binding with the metal coordination site of the mutant proteins

due to alteration in electron transfer mechanism. The binding cavity of the mutant PZase has undergone major conformational changes as the volume of pocket increased due to bulky R-chains of mutated amino acids. These conformational changes lead to weak binding of the drug at binding cavity of PZase and reduce the drug activation mechanism leading to increased drug resistance in the bacterial strains.

4. **Zaid, M., & Afzal, M. S.** (2018). HIV outbreak in Pakistan. *Lancet Infectious Diseases, 18*(6), 601. doi: https://doi.org/10.1016/S1473-3099(18)30281-0.**(Muhammad Zaid(Life Sciences/SSC), Muhammad Sohail Afzal)JCR Listed (IF: 25.148) (Letter)**
Abstract: *Not found*

5. Khan, A., Naz, K., Ahmed, H., Simsek, S., **Afzal, M. S.,** Haider, W., . . . Yayi, G. (2018). Knowledge, attitudes and practices related to cystic echinococcosis endemicity in Pakistan. *Infectious Diseases of Poverty, 7*(1), 4. doi: 10.1186/s40249-017-0383-2. **(Muhammad Sohail Afzal (Life Sciences/SSC)JCR Listed(IF:2.708)**
Abstract: Cystic echinococcosis (CE) is a human and animal health problem in many endemic areas worldwide. It is considered a neglected zoonotic disease caused by the larval form (hydatid cyst) of Echinococcus spp. tapeworm. There are limited studies on echinococcosis in Pakistan.
Keywords:_cystic echinococcosis, people, knowledge, awareness, practice, risk, Pakistan._

6. Jamal, M., Andleeb, S., Jalil, F., Imran, M., Nawaz, M. A., Hussain, T., . . . **Ali, M.**(2018). Isolation, characterization and efficacy of phage MJ2 against biofilm forming multi-drug resistant Enterobacter cloacae. *Folia microbiologica*, 1-11. doi: 10.1007/s12223-018-0636-x.**(Muhammad Ali (Life Sciences/SSC), Sadeeq-ur-Rahman)JCR Listed (IF: 1.311)**
Abstract: Biofilm is involved in a variety of infections, playing a critical role in the chronicity of infections. An Enterobacter cloaca is a biofilm-forming and multi-drug-resistant (MDR) nosocomial pathogen leading to significant morbidity and mortality. This study aimed at isolation of a bacteriophage against MDR clinical strain of E. cloacae and its efficacy against bacterial planktonic cells and biofilm. A bacteriophage MJ2 was successfully isolated from wastewater and was characterized. The phage exhibited a wide range of thermal and pH stability and demonstrated considerable adsorption to host bacteria in the presence of $CaCl_2$ or $MgCl_2$. Transmission electron microscopy (TEM) showed MJ2 head as approximately 62 and 54 nm width and length, respectively. It had a short non-contractile tail and was characterized as a member of the family Podoviridae [order Caudovirales]. The phage MJ2 was found to possess 11 structural proteins (12–150 kDa) and a double-stranded DNA genome with an approximate size of 40 kb. The log-phase growth of E. cloacae both in biofilm and suspension was significantly reduced by the phage. The E. cloacae biofilm was formed under different conditions to evaluate the efficacy of MJ2 phage. Variable reduction pattern of E. cloacae biofilm was observed while treating it for 4 h with MJ2, i.e., biofilm under static conditions. The renewed media with intervals of 24, 72, and 120 h showed biomass decline of 2.8-, 3-, and 3.5-log, respectively. Whereas, the bacterial biofilm formed with dynamic conditions with refreshing media after 24, 72, and 120 h demonstrated decline in growth at 2.5-, 2.6-, and 3.3-log, respectively. It was, therefore, concluded that phage MJ2 possessed considerable inhibitory effects on MDR E. cloacae both in planktonic and biofilm forms.

7. **Ali, M.,** Anwar, S., Shuja, M. N., Tripathi, R. K., & Singh, J. (2018). The genus Luteovirus from infection to disease. *European Journal of Plant Pathology*, 151(4), 841-860. doi: 10.1007/s10658-018-1425-8. **(Muhammad Ali (Life Sciences/SSC) JCR Listed (IF: 1.466) (Review)**
Abstract: Luteoviruses are economically important plant viruses. Specifically, barley yellow dwarf virus is epiphytotic to almost all small-grain cereal growing areas. The disease cycle is complex. This luteovirus has evolved several intelligent mechanisms to communicate with both plant and phloem-feeding insect-vector

aphid. Environmental cues influence disease severity, aphid infestation and viral load. Within an aphid, virus circulates persistently in a non-propagative manner and is transmitted selectively to the host plants. Selection of viruses within aphids has a role in virus isolate prevalence over a specific area. In the host-plant system, the virus has to release its single sense-strand RNA genome (approx. 5.6 to 6 kb), translate and subsequently replicate its genome using its own replicase and host machinery. This review summarizes our current understanding of disease epidemiology and reviews the current literature encompassing viral infectivity, economic impact and control measures.

Keywords:*barley yellow dwarf virus, groel, small grain cereal, insect vector, cap-independent translation.*

8. Khan, A., **Zahoor, S.,** Ahmed, H., Malik, U., Bute, R. A., Muzam, M. S., . . . **Afzal, M. S.** (2018). A Retrospective Analysis on the Cystic Echinococcosis Cases Occured in Northeastern Punjab Province, Pakistan. *Korean Journal of Parasitology, 56*(4), 385-390. doi: 10.3347/kjp.2018.56.4.385.**(Saroosh Zahoor(LifeSciences/SSC),Muhammad Sohail Afzal)**JCR Listed (IF: 1.207)

Abstract: A retrospective study was performed to report the case occurrence of cystic echinococcosis (CE) in three hospitals of north-eastern region in Punjab Province, Pakistan. We reviewed retrospectively the clinical records of patients in 4 hospitals which were diagnosed with CE during 2012–2017. A total of 198 cases, 82 (41.4%) male and 116 (58.6%) females were detected as CE. The most Highest incidence was revealed in.... 21–30 years-old group (24.2%) followed by 41–50 (22.7%), 31–40 (16.2%), 11–20 (13.6%), 51–60 (8.1%), below 10 (5.5%), over 71 (5.1%) and 61–70 year-old group (4.5%). CE was detected in various organs of infected individuals. However, most of CE cases were detected in the liver (47.4%) and lung (18.6%). The present study indicated that CE is more or less prevalent in surveyed areas and one of the most important public health problems in Punjab Province, Pakistan.

Keywords:*cystic echinococcosis, epidemiology, human, Punjab, Pakistan.*

9. **Rasool, N.,** Jalal, A., **Amjad, A., & Hussain, W.** (2018). Probing the Pharmacological Parameters, Molecular Docking and Quantum Computations of Plant Derived Compounds Exhibiting Strong Inhibitory Potential Against NS5 from Zika Virus. *Brazilian Archives of Biology and Technology, 61*, 20. doi: 10.1590/1678-4324-2018180004.**(Nouman Rasool (Life Sciences/SSC),Adnan Amjad, Waqar Hussain)** JCR Listed (IF: 0.676)

Abstract: Zika virus (ZIKV) is known for microcephaly and neurological disease in humans and the nonstructural proteins of ZIKV play a fundamental role in the viral replication. Among the seven nonstructural proteins, NS5 is the most conserved and largest protein. Two major functional domains of NS5 i.e. methyltransferase (MTase) and RNA-dependent RNA polymerase (RdRp) are imperative for the virus life cycle and survival. The present study explicates the inhibitory action of phytochemicals from medicinal plants against NS5 from ZIKV, leading to the identification of potential inhibitors. The crystal structure of the protein is retrieved from RCSB protein data bank. A total of 2035 phytochemicals from 505 various medicinal plants are analysed for their pharmacological properties and pharmacokinetics. Compounds having effective drug-likeness are docked against the protein and further analysed using density functional theory approach. Among the 2035 phytochemicals, 13 are selected as potential inhibitors against MTase having high binding affinities and 17 compounds are selected for RdRp. HOMO and LUMO energies are calculated for the docked compounds within and outside binding pockets of MTase and RdRp, adapting the B3LYP hybrid exchange-correlation functional with def2-SV(P) basis set. Physicochemical properties such as ionization energy, electronic chemical potential, electronegativity, electron affinity, molecular softness, molecular hardness and electrophilicity index have also been analysed for selected phytochemicals. Based upon the results, it is concluded that the selected phytochemicals are highly competent to impede the replication of the virus by inhibiting the ZIKV-NS5.

Keywords:*ZIKV-NS5, phytochemicals, molecular docking, DFT calculations.*

10. **Wahid, B.**, Waqar, M., **Rasool, N.,** Rehman, Z., Saeed, J., Wasim, M., . . . Idrees, M. (2018). Recent trends in molecular epidemiology of Hepatitis C virus in Mardan, KPK Pakistan. *Infection Genetics and Evolution, 66*, 66-71. doi: 10.1016/j.meegid.2018.09.003.**(Braira Wahid (Life Sciences/SSC),Nouman Rasool)****JCR Listed (IF: 2.545)**

Abstract: To determine the genotypic distribution of HCV, frequency of risk factors involved in its transmission and correlation of genotype with viral load in Mardan population which is the second largest city of Khyber Pakhtunkhwa (KPK), Pakistan. Blood samples of 1140 were collected from different regions of Mardan and major proportion of recruited patients was internally displaced people (IDPs), refugees, and slum dwellers. Complete patient's history was analyzed to assess the possible risks involved in HCV transmission. Viral genotype was determined by PCR (polymerase chain reaction) whereas; HCV RNA was measured by qRT-PCR. Data was analyzed using SPSS statistical software. Our results indicate 3a as the most abundant subtype in Mardan population followed by 3b, 2a, 2b, 4a, untypeable, mixed, 1a, and 1b. In contrast to previous findings, genotype 1 was the least prevalent genotype and the overall prevalence of HCV in Mardan population was significantly higher in females (n = 687, 60.2%) than males (n = 453, 39.7%). Significant difference between-genotypes and gender was observed in genotype 1 (p < .034) and genotype 3 (p < .004). The mean age was 44 (SD ± 9.51). The most frequently found mixed genotype was 3a + 1b and mixed genotype was more prevalent in males. The proportion of middle-aged people (41–49 years) was higher whereas, older and younger people were least infected with HCV. This is the first study that showed substantial correlation of genotype 3 with low and intermediate viral load in Mardan population. Moreover, high and extremely high viral load was associated with other genotypes. Our findings showed that most of the patients who experienced high and extremely high viremia in their blood were males and belonged to Takhat Bhai and Mardaan regions. There were significant difference in the prevalence of HCV genotype 3a (p = .001) and genotype 3b (p = .005) in different regions of Mardan. Pre-treatment viral load is significantly high (p 0.001) in tehsil Mardan patients infected with HCV genotype 3 as compared to other genotypes. Unsafe medical practices such as medical and dental surgeries, intravenous drug use, and blood transfusions were the main risk factors for HCV transmission in Mardan, KPK Pakistan. This study gives clear insights into the epidemiological status of HCV in Mardan population. Genotype 3 is correlated with low and intermediate viral load whereas high viral loads were revealed among patients infected with genotypes other than genotype 3. In the absence of better data and robust epidemiological information, this detailed analysis of HCV genotypes with special reference to risk factors, pretreatment viral load, gender, and age will provide the baseline data for development of optimal HCV eradication and preventive strategies.

Keywords:*HCV, viral load, genotypes, risk factorsq, PCR, Mardan, Pakistan.*

11. **Zafar, A., Imran, M., Zahoor, S., Shah, Z. H., Ali, M., & Afzal, M. S.** (2018). Prevalence and Treatment of Untypable HCV Variants in Different Districts of Punjab, Pakistan. *Viral Immunology, 31*(6), 426-432. doi: 10.1089/vim.2017.0167.**(Ayesha Zafar (Life Sciences/SSC),Muhammad Imran,Zaheer Hussain Shah, Muhammad Ali, Muhammad Sohail Afzal)****JCR Listed (IF: 1.531)**

Abstract: In Pakistan, around 11 million people are infected with, at least, six circulating genotypes and subtypes of hepatitis C virus (HCV). The viral burden is still on rise. HCV genotype determination is necessary to devise appropriate antiviral therapy. Previous reports highlight the prevalence circulating untypable (in diagnostic perspectives) HCV subtype in local Pakistani patients. Present study was designed to investigate the epidemiological distribution of genotypes in different districts of Punjab, Pakistan and focuses on prevalence of diagnostically untypable subtype and its possible antiviral therapy. A total of 8,353 HCV patients were included through 2011 to 2016 for determination of HCV prevalent genotypes in the local community. HCV genotyping was carried out using Ohno et al. method, and five cases of diagnostically untypable patients were treated with interferon-based antiviral regimen to find the possible treatment strategy. Of the 8,353 patients, the genotype 3a (n = 6,650, 79.6%) was most significantly prevalent

throughout the study period followed by undetermined genotype that is, untypable (n = 1,377, 16.5%). The presence of untypable variants suggested that there are some novels or quasi species prevailing among HCV patients in local community. Five HCV patients infected with untypable genotype had been treated effectively with interferon alpha plus ribavirin therapy for 24 weeks at standard doses and achieved sustained virological response. This study highlighted an important aspect of HCV treatment for local Pakistani HCV patients. Untypable HCV variants could be treated with interferon-based antiviral regimens such as 3a genotype. The study raises the need of characterization of diagnostically untypable HCV variant. On the basis of these results, it can be proposed that until the availability of pangenotypic direct-acting antiviral for HCV treatment in Pakistan, interferon-based antiviral regimens will be of choice for majority of patients infected with 3a or untypable genotypes.

Keywords:*HCV, genotyping, diagnostically untypable HCV variants, epidemiology treatment, Pakistan.*

12. **Zaid, M.,** & Hasnain, S. (2018). Plasma lipid abnormalities in Pakistani population: trends, associated factors, and clinical implications. *Brazilian Journal of Medical and Biological Research, 51*(9), 9. doi: 10.1590/1414-431x20187239.**(M.Zaid (Life Sciences/SSC)JCR Listed (IF: 1.492)**

Abstract: Previous studies have reported increased prevalence of coronary heart disease (CHD) in Indians and South Asian settlers in North America. This increased burden of CHD among South Asians is mainly caused by dyslipidemia. To the best of our knowledge, none of the previous works has studied the patterns and prevalence of dyslipidemia in the Pakistani population. The present work aimed to study the plasma lipid trends and abnormalities in a population-based sample of urban and rural Pakistanis. The study included 238 participants (108 males,130 females). Plasma lipid profiles of the participants were determined using standard protocols. We observed that 63% of the study population displayed irregularities in at least one major lipid-fraction including total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), or triglycerides (TG). The most common form of isolated-dyslipidemia was low HDL-C (17.3%) followed by high TG (11.2%). Several overlaps between high TC, LDL-C, TG and low HDL-C were also noted. Gender, urbanization, and occupational class were all observed to have an impact on lipid profiles. Briefly, male, urban, and blue-collar participants displayed higher prevalence of dyslipidemia compared to female, rural, and white-collar participants, respectively. In comparison to normal subjects, dyslipidemic subjects displayed significantly higher values for different anthropometric variables including body mass index (BMI), body fat percentage, and waist circumference. The present work provides a comprehensive estimation of the prevalence of dyslipidemia and CHD risk in the Pakistani population. This information will be helpful for better healthcare planning and resource allocation in Pakistan.

Keywords:*plasma lipids, dyslipidemia, coronary heart disease.*

13. **Khaliq, A., Ahmad, I., & Afzal, M. S**. (2018). HCV Treatment with Sofosbuvir in Pakistan; Current Scenario and Future Perspective. *Journal of Gastroenterology and Hepatology Research, 7*(2), 2578-2580.**(Ayesha Khaliq (Life Sciences/SSC), Imtiaz Ahmad, Muhammad Sohail Afzal) ISI Web of Science**

Abstract: Hepatitis C Virus (HCV) is a global problem with around 1.75 million new infections yearly. With approximate 70% chronicity rate about 399,000 people die each year from hepatitis C. Pakistan is endemic for this infection with 5-8% prevalence in general population. There are several HCV genotypes and antiviral therapies are genotype dependent. In Pakistan genotype 3a is dominant followed by diagnostically untypable HCV variants. Previously interferon based antiviral regimens were the only choice for HCV treatment in Pakistan. Recently sofosbuvir is introduced in Pakistan on heavily discount. Although sofosbuvir showed very good sustained virological response (SVR) globally but due to different ethnicity and genetic makeup, it is important to analyse the drug efficacy in Pakistan. Available limited data showed that overall SVR/rapid virological response (RVR) is very good. The current data is very limited and it is highly needed to have studies reporting the sofosbuvir treatment response from different ethnic groups from the whole country.

14. **Mateen, R. M.,** Tariq, A., &**Rasool, N.** (2018). Forensic science in Pakistan; present and future. *Egyptian Journal of Forensic Sciences, 8*(1), 45. doi: 10.1186/s41935-018-0077-3.**(Rana Muhammad Mateen(Life Sciences/SSC),Nouman Rasool)(SJR) (Letter)**
Abstract: *Not found*

15. Arif, I., Siddiqi, A. R., Ahmed, H., Afzal, M. I., Umer, M., **Afzal, M. S**., . . . Shaheen, S. (2018). A computational structural analysis of functional attributes of hypodermin A and B proteins: A way forward for vaccine development. *Pakistan Journal of Pharmaceutical Sciences, 31*(6).**(Muhammad Sohail Afzal (Life Sciences/SSC) JCR Listed (IF: 0.804)**

Abstract: Hypodermosis is a parasitic disease of cattle. The pathogenicity of the disease is attributed to Hypodermin proteins (Hypodermin A, Hypodermin B and Hypodermin C). Studies suggest that Hypodermin proteins may be defined as Serine proteases and collagenases. The structure of both proteases Hypodermin A and Hypodermin B were modeled using the Swiss-model server followed by its validation using Procheck, Errat and Verify-3D. Afterwards, both Hypodermin A and Hypodermin B were docked against collagen in order to study its interaction with respective Hypodermin proteins. The structure of both Hypodermin A and Hypodermin B showed more bent towards hydrophobic nature as more beta sheets were present in them. Both structures were also superimposed to check out similarities and differences present between them. Serine, Aspartic acid, Histidine, Glutamic acid and Lysine are found as interacting residues that are involved in hydrogen bonding with collagen. The interactions are found in the active domain region of Hypodermin proteins. The interacting residues were present in the active region of the hypodermin proteins thus validating the docking studies. This study may help in the drug development against hypodermosis with least side effects.
Keywords:*hypodermosis, hypodermin A, hypodermin B, collagen, modeling, docking.*

16. **Raza, A.,** Saleem, M., & **Afzal, M. S.** (2018). The First Report of Hepatitis B Virus Prevalence in Skardu, Gilgit Baltistan: A Neglected Area of Pakistan. *Jundishapur Journal Microbiology, 11(*9), e62352. doi: 10.5812/jjm.62352.**(Ali Raza (Life Sciences/SSC),Muhammad Sohail Afzal)(SJR) (Letter)**
Abstract: *Not found*
Keywords:*hepatitis b virus, epidemiology, blood donors, vaccination, Pakistan.*

17. **Wahid, B.,** Saleem, K., **Rasool, N.,** Rafique, S., Ali, A., Waqar, M., & Idrees, M. (2018). Tattooing trend: major cause of HCV transmission among youngsters. *Infectious Diseases, 50*(11-12), 871-873. doi: 10.1080/23744235.2018.1518586.**(Braira Wahid (Life Sciences/SSC),Nouman Rasool) JCR Listed (IF: 1.932) (Letter)**
Abstract: *Not found*

18. Jamal, M., Bukhari, S. M. A. U. S., Andleeb, S., **Ali, M.,** Raza, S., Nawaz, M. A., . . . Shah, S. S. A. (2019). Bacteriophages: an overview of the control strategies against multiple bacterial infections in different fields. *Journal of Basic Microbiology, 59*(2), 123-133. doi: doi:10.1002/jobm.201800412.**(Muhammad Ali (Life Sciences/SSC) JCR Listed (IF: 1.580)**

Abstract: Bacteriophages (phages/viruses) need host bacteria to replicate and propagate. Primarily, a bacteriophage contains a head/capsid to encapsidate the genetic material. Some phages contain tails. Phages encode endolysins to hydrolyze bacterial cell wall. The two main classes of phages are lytic or virulent and lysogenic or temperate. In comparison with antibiotics, to deal with bacterial infections, phage therapy is thought to be more effective. In 1921, the use of phages against bacterial infections was first demonstrated. Later on, in humans, phage therapy was used to treat skin infections caused by Pseudomonas species. Furthermore, phages were successfully employed against infections in animals – calves, lambs, and pigs

infected with Escherichia coli. In agriculture, for instance, phages have successfully been used e.g., Apple blossom infection, caused by Erwinia amylovora, was effectively catered with the use of bacteriophages. Bacteriophages were also used to control E. coli, Salmonella, Listeria, and Campylobacter contamination in food. Comparatively, phage display is a recently discovered technology, whereby, bacteriophages play a significant role. This review is an effort to collect almost recent and relevant information regarding applications and complications associated with the use of bacteriophages.

Keywords:*bacteriophage, endolysins, lysogenic, lytic, phage therapy.*

19. **Rasool, N.**, Ashraf, A., Waseem, M., Hussain, W., & Mahmood, S. Computational exploration of antiviral activity of phytochemicals against NS2B/NS3 proteases from dengue virus. *Turkish Journal of Biochemistry*. DOI : 10.1515/tjb-2018-0002.**(Nouman Rasool (Life Sciences/SSC)JCR Listed (IF: 0.248)**

Abstract: Background: Dengue fever has emerged as a serious threat in Pakistan in the last few years with high morbidity rates and substantial mortality. In the present study, NS2B/NS3 protease from four dengue virus (DENV) serotypes has been targeted using 2350 phytochemicals from various medicinal plants. Material and methods: The phytochemicals were subjected to docking against NS2B/NS3 proteases using AutoDock Vina focusing the binding site, and the binding energies were determined to screen the effectively docked phytochemicals. Pharmacological properties were also analyzed for all the phytochemicals using PreADMET web server. Results: Binding affinities ranged from −4.0 to −9.8 kcal/mol and a threshold of −9.0 kcal/mol was applied for screening compounds. A total of 18 phytochemicals are screened for passing all evaluation criteria of a drug in which three were for DENV1-NS2B/NS3, five for DENV2-NS2B/NS3, six for DENV3-NS2B/NS3 and four for DENV4-NS2B/NS3. Erycristagallin and Osajin from Erythrina variegate, PapraineA from Fumaria indica and Aloe-Emodin from Aloe vera are the most potent inhibitors of NS2B/NS3 protease from DENV1, DENV2, DENV3 and DENV4, having binding affinities of −9.6 kcal/ mol, −9.6 kcal/mol, −9.6 kcal/mol and −9.2 kcal/mol, respectively. Conclusion: The effective drug-like properties of all 18 phytochemicals demonstrate the inhibition potential against dengue virus replication in human beings.

Keywords:*Dengue virus, NS2B/NS3, Phytochemicals, Molecular docking, ADMET, Virtual screening.*

20. Butt, A. H., **Rasool, N**., & Khan, Y. D. (2018). Predicting membrane proteins and their types by extracting various sequence features into Chou's general PseAAC. *Molecular Biology Reports, 45*(6), 2295-2306. DOI: 10.1007/s11033-018-4391-5.**(Nouman Rasool (Life Sciences/SSC)JCR Listed (IF: 1.889)**

Abstract: For many biological functions membrane proteins (MPs) are considered crucial. Due to this nature of MPs, many pharmaceutical agents have reflected them as attractive targets. It bears indispensable importance that MPs are predicted with accurate measures using effective and efficient computational models (CMs). Annotation of MPs using in vitro analytical techniques is time-consuming and expensive; and in some cases, it can prove to be intractable. Due to this scenario, automated prediction and annotation of MPs through CM based techniques have appeared to be useful. Based on the use of computational intelligence and statistical moments based feature set, an MP prediction framework is proposed. Furthermore, the previously used dataset has been enhanced by incorporating new MPs from the latest release of UniProtKB. Rigorous experimentation proves that the use of statistical moments with a multilayer neural network, trained using back-propagation based prediction techniques allows more thorough results.

Keywords:*dengue membrane proteins, amino acids, neural networks jackknife tests, confusion matrix mathew's correlation coefficient.*

21. Hussain, W., Qaddir, I., Mahmood, S., & **Rasool, N.** (2018). In silico targeting of non-structural 4B protein from dengue virus 4 with spiropyrazolopyridone: study of molecular dynamics simulation, ADMET and virtual screening. *VirusDisease, 29*(2), 147-156.**(Nouman Rasool (Life Sciences/SSC)JCR Listed (IF: 0.364)**

Abstract: Dengue fever is one of the most prevalent disease in tropical and sub-tropical regions of the world. According to the World Health Organisation (WHO), approximately 3.5 billion people have been affected

with dengue fever. Four serotypes of dengue virus (DENV) i.e. DENV1, DENV2, DENV3 and DENV4 have up to 65% genetic variations among themselves. dengue virus 4 (DENV4) was first reported from Amazonas, Brazil and is spreading perilously due to lack of awareness of preventive measures, as it is the least targeted serotype. In this study, non-structural protein 4B of dengue virus 4 (DENV4-NS4B) is computationally characterised and simulations are performed including solvation, energy minimizations and neutralisation for the refinement of predicted model of the protein. The spiropyrazolopyridone is considered as an effective drug against NS4B of DENV2, therefore, a total of 91 different analogues of spiropyrazolopyridone are used to analyse their inhibitory action against DENV4-NS4B. These compounds are docked at the binding site with various binding affinities, representing their efficacy to block the binding pocket of the protein. Pharmacological and pharmacokinetic assessment performed on these inhibitors shows that these are suitable candidates to be used as a drug against the dengue fever. Among all these 91 compounds, Analogue-I and Analogue-II are analysed to be the most effective inhibitor having potential to be used as drugs against dengue virus.

Keywords: *dengue virus 4, non-structural protein 4b, denv4-ns4b, molecular dynamics simulation, spiropyrazolopyridone ADMET, virtual screening.*

22. Raza, T., Andleeb, S., Ullah, S. R., Jamal, M., Mehmood, K., &**Ali, M.** (2018). Isolation and Characterization of a Phage to Control Vancomycin Resistant Enterococcus faecium. *Open Life Sciences, 13*(1), 553-560. doi: 10.1515/biol-2018-0066.**(Muhammad Ali (Life Sciences/SSC)** **JCR Listed (IF: 0.764)**

Abstract: Enterococcus faecium, is an important nosocomial pathogen with increased incidence of multidrug resistance (MDR) - specifically Vancomycin resistance. E. faecium constitutes the normal microbiota of the human intestine as well as exists in the hospitals and sewage, thus making the microorganism difficult to eliminate. Phage therapy has gained attention for controlling bacterial MDR infections and contaminations. We have successfully isolated from waste water and characterized a lytic bacteriophage STH1 capable of targeting Vancomycin resistant Enterococcus faecium (VREF) with high specificity. The phage was isolated from sewage water of a hospital at district Dera Ismail Khan, Pakistan. Initial characterization showed that magnesium and calcium ions significantly increased phage adsorption to the host. One step growth experiment showed a latent period of 18 min with burst size of 334 virions per cell. Optimal temperature and pH of the phage was 37 degrees C and 7.0, respectively. Phage application to host strain grown in milk and water (treated and untreated) showed that the phage efficiently controlled bacterial growth. The study suggests that the phage STH1 can serve as potential control agent for E. faecium infections in medical facilities and in other environmental contaminations.

Keywords: *enterococcus faecium, phage therapy, vancomycin resistance*

Department of Mathematics

Research Articles

1. **Faizi, S., Rashid, T.,** Sałabun, W., **Zafar, S.,** & Wątróbski, J. (2018). Decision Making with Uncertainty Using Hesitant Fuzzy Sets. *International Journal of Fuzzy Systems, 20*(1), 93-103. doi: 10.1007/s40815-017-0313-2.**(Shahzad Faizi (Mathematics /SSC), Tabasam Rashid, Sohail Zafar)** JCR Listed (IF: 2.396)

Abstract: Actual existing multi-criteria decision-making (MCDM) methods yield results that may be questionable and unreliable. These methods very often ignore the issue of uncertainty and rank reversal paradox, which are fundamental and important challenges of MCDM methods. In response to these challenges, the Characteristic Objects Method (COMET) was developed. Despite it being immune to the rank reversal paradox, classical COMET is not designed for uncertain, decisional problems. In this paper, we propose to extend COMET using hesitant fuzzy set (HFS) theory. Hesitant fuzzy set theory is a powerful tool to express the uncertainty that derives from an expert comparing characteristic objects and identifying membership functions for each criterion domain. We present the theoretical foundations and principles of COMET, and we provide an illustrative example to show how COMET handles uncertain decision problems both practically and effectively.

2. **Rashid, T., Faizi, S.**, Xu, Z., & **Zafar, S.** (2018). ELECTRE-Based Outranking Method for Multi-criteria Decision Making Using Hesitant Intuitionistic Fuzzy Linguistic Term Sets. *International Journal of Fuzzy Systems, 20*(1), 78-92. doi: 10.1007/s40815-017-0297-y.**(Tabasam Rashid (Mathematics /SSC), Shahzad Faizi, Sohail Zafar)** JCR Listed (IF: 2.396)

Abstract: An outranking method is developed within the environment of hesitant intuitionistic fuzzy linguistic term sets (HIFLTSs), where the membership degree and the non-membership degree of the element are subsets of linguistic term set. The directional Hausdorff distance, which uses HIFLTSs, is proposed, and the dominance relations are subsequently defined using this distance. Moreover, some interesting characteristics of the proposed directional Hausdorff distance are further discussed in detail. In this context, a collective decision matrix is obtained in the form of hesitant intuitionistic fuzzy linguistic elements and analyzes the collective data by using proposed ELECTRE-based outranking method. The linguistic scale functions are employed in this paper to conduct the transformation between qualitative information and quantitative data. Furthermore, based on the proposed method, we also investigate the ranking of the alternatives based on a new proposed definition of HIFLTS. The feasibility and applicability of the proposed method are illustrated with an example, and a comparative analysis is performed with other approaches to validate the effectiveness of the proposed methodology.

3. **Mardan, S. A.**, **Noureen, I.,** Azam, M., **Rehman, M. A.,** &**Hussan, M.** (2018). New classes of anisotropic models with generalized polytropic equation of state. *The European Physical Journal C, 78*(6), 516. doi: 10.1140/epjc/s10052-018-5992-9.**(Syed Ali Mardan Azmi (Mathematics /SSC), Ifra Noureen, Muhammad Aziz ur Rehman, M. Hussain)** JCR Listed (IF: 5.172)

Abstract: In this paper, we investigate the gravitational behavior of compact objects with the help of generalized polytropic equation of state in isotropic coordinates. We found three exact solutions of Einstein field equations by taking into account the different values of polytropic index with spherically symmetric anisotropic inner fluid distribution. We have regained the masses of PSR   J1614−2230 , Vela X-1, Vela 4U,

PSR J1903+327 and 4U 1820-30. Speed of sound has been used to analyze the stability of models. The comprehensive analysis indicates that all the models are physically viable and well behaved.

4. Rani, S., Jawad, A., Nawaz, T., & **Manzoor, R.** (2018). Thermodynamics in modified Brans–Dicke gravity with entropy corrections. *The European Physical Journal C, 78*(1), 58. doi: 10.1140/epjc/s10052-018-5539-0. **(Rubab Manzoor (Mathematics /SSC) JCR Listed (IF: 5.172)**

Abstract: In this paper, we investigate the thermodynamics in the frame-work of recently proposed theory called modified Brans–Dicke gravity (Kofinas et al. in Class Quantum Gravity 33:15, 2016). For this purpose, we develop the generalized second law of thermodynamics by assuming usual entropy as well as its corrected forms (logarithmic and power law corrected) on the apparent and event horizons. In order to analyzed the clear view of thermodynamic law, the power law forms of scalar field and scale factor is being assumed. We evaluate the results graphically and found that generalized second law of thermodynamics holds in most of the cases.

5. Raheem, A., Baig, A. Q., & **Javaid, M.** (2018). On (a, d) -EAT labeling of subdivision of K1, r. *Journal of Information and Optimization Sciences, 39*(3), 643-650. doi: 10.1080/02522667.2017.1406625.**(Muhammad Javaid (Mathematics /SSC) (Not HEC Recognized)**

Abstract: A labeling is a mapping which gives the numbers as labels to the vertices and edges of a graph. In this paper, we investigate the class of the subdivided star $\Gamma \cong G(n, n + 1, m, m + 1, 2m + 1, n5,…, np)$ as a super (a, d)-EAT graphs for all possible values of d, m and n.
Keywords:*Super (a, d)-EAT labeling, star, subdivision of stars.*

6. Safdar, R., Imran, M., Tahir M., Sadiq, N., & Asjad, M. I. (2018). MHD Flow of Burgers' Fluid under the Effect of Pressure Gradient through a Porous Material Pipe. *Journal of Mathematics, Punjab University, 50*(3), 73-91.**(Muhammad Imran Asjad (Mathematics /SSC) (SJR)**

Abstract: In this research article, we will find the velocity for time dependentpressure gradient which may increases, decreases or pulsate withrespect to time. The MHD flow of a Burgers' fluid with porous medium in circular channel is take into account for the study. We derived the governingequation for the analytical solutions of this problem. The solutionfor the velocity field are give in the form of Bessel and modified Besselfunction of zero order by using the modified Darcy's law and the resistance of the porous medium. The behaviour of other physical, magneticand permeability parameters is observed by assuming constant value ofpressure gradient. The graphical depict and possible special cases are alsodiscussed.
Keywords: *burgers' fluids, porous medium, velocity field, pressure gradient, bessel function.*

7. **Asjad, M. I., Miraj, F.,** Khan, I., & Tlili, I. (2018). MHD fractional Jeffrey's fluid flow in the presence of thermo diffusion, thermal radiation effects with first order chemical reaction and uniform heat flux. *Results in Physics, 10*, 10-17. doi: https://doi.org/10.1016/j.rinp.2018.04.008.**(Muhammad Imran Asjad (Mathematics /SSC), Fizza Miraj)JCR Listed (IF: 2.147)**

Abstract: Exact analysis is about the natural convection flow of non-Newtonian Jeffrey fluid with the Caputo-Fabrizio fractional derivative of non-singular kernel has been discussed in this work. The Laplace transform method is used to obtain the solutions of dimensionless temperature, concentration and velocity fields with non-integer order derivative. Moreover, in the mathematical modelling of the problem, the additional effects like Soret effect, MHD, heat sink, radiations, chemical reaction, porous medium and uniform heat flux are also considered. Our results are reduced to the known solutions in the existing literature for viscous fluid. Finally, we have plotted some graphical illustration to see the physical insight of the studied problem for different flow parameters and found that fluid velocity can be enhanced with the Caputo-Fabrizo approach by increasing the value of non-integer order parameter while skin friction coefficient decreases.
Keywords: *fractional jeffrey's fluid, heat flux, mhd, heat and mass transfer, soret effect, chemical reaction.*

8. **Kashif, A., Bashir, H., & Zahid, Z.** (2018). On Soft BCK-Modules. *Punjab University Journalof Mathematics, 50*(1), 67-78.**(Agha Kashif (Mathematics /SSC), Humera Bashir, Zohaib Zahid)**HEC X CAT

Abstract: In the current work, the Molodtsov's idea of soft sets [14] is applied on the theory of BCK-modules [1]. The aim here, is to introduce the notion of soft BCK-modules and discuss its basic properties. In this regard, three theorems for soft BCK-modules isomorphism are developed. The notion of soft X–exactness of BCK-modules is introduced and its relation with soft X–isomorphism is studied. A transitivity between two soft X–exact sequences is also established.

Keywords: *soft Set, BCK-module, Soft BCK-module, soft BCK-homorphism.*

9. **Kirmani, S. K. N., & Jamil, R. N.** (2018). Optimization of Complex Geometry Using Tenth Order Partial Differential Equation. *Scientific Inquiry and Review (SIR), 2*(2).**(Syed Khawar Nadeem Kirmani (Mathematics /SSC), Raja Noshad Jamil)**UMT Journal

Abstract: This paper presents an efficient and intuitive technique of shape parameterization for design optimization using a partial differential equation (PDE) of order ten. It shows how the choice of two introduced parameters can enable one to parameterize complex geometries. With the use of PDE based formulation, it is shown in this paper how the shape can be defined and manipulated on the basis of parameterization and the boundary value approaches by which complex shapes can be created. Further the boundary conditions which are used in it are a boundary and an intermediate curves for defining the shape. This technique allows complex shapes to be parameterized intuitively using a very small set of design parameters. Hence, Practical design optimization of problems becomes more achievable by applying PDE based approach of shape parameterization by incorporating standard numerical optimization techniques [1,2].

Keywords:*PDE surfaces, smoothness, continuity, ten boundary curves.*

10. **Malik, F., Saeed, N., Zafar, S., & Zahid, Z.** (2018). Extremal Prism like Graphs with Respect to the F-Index. *Journal of Mathematics (ISSN 1016-2526), 50*(3), 31-37.**(Fakhra Malik (Mathematics /SSC), Naeem Saeed, Sohail Zafar, Zohaib Zahid)**HEC X CAT

Abstract: In this paper, we determine the extremal graphs with respect to the F-index among the classes of connected prism like graphs.

Keywords:*topological indices, forgotten index, prism graph.*

11. Zafar, A. A., **Riaz, M. B., & Asjad, M. I.** (2018). Unsteady Rotational Flow of Fractional Maxwell Fluid in a Cylinder Subject to Shear Stress on the Boundary. *Journal of Mathematics (ISSN 1016-2526), 50*(2), 21-32. **(Muhammad Bilal Riaz (Mathematics /SSC), Muhammad Imran Asjad)**HEC X CAT

Abstract: In this article the rotational flow of some fractional Maxwell fluid is studied. An infinite straight circular cylinder is filled with the fluid and its motion is generated by a time dependent torsion, applied to the surface of the cylinder. As novelty, the dimensionless governing equation related to the non-trivial shear tension is used and the first exact solutions analogous to a ramped shear stress on the surface are obtained using integral transforms. The obtained results allow us to provide solution for ordinary Maxwell fluid performing similar motion. In addition, the effect of non-integer order paerameter on shear stress and velocity profiles is analyzed by graphical interpretations using Mathcad software.

Keywords:*Maxwell fluid, Caputo derivatives, Velocity field, Shear stress, Circular cylinder.*

12. Husin, M. N., Farahani, M. R., **Asif, F., Zahid, Z., & Zafar, S.** (2018). On topological properties of plane graphs by using line operator on their subdivisions. *Advances and applications in discrete mathematics, 19*(4), 479-490. **(Fatima Asif (Mathematics /SSC), Zohaib Zahid, Sohail Zafar)**ISI Web of Science

Abstract: In this paper, we give theoretical results for some topological indices such as fourth atom-bond connectivity index ABC (G) 4 and fifth geometric-arithmetic connectivity index GA (G) 5 of line graph of subdivision of some plane graphs.

Keywords: *topological indices, line graph, convex polytopes.*

13. **Asjad, M. I., Riaz, M. B.,** Shah, N. A., & Zafar, A. A. (2018). Boundary layer flow of MHD generalized Maxwell fluid over an exponentially accelerated infinite vertical surface with slip and Newtonian heating at the boundary. *Results in Physics, 8*, 1061-106.doi: https://doi.org/10.1016/j.rinp.2018.01.036.**(Muhammad imran Asjad (Mathematics /SSC),Muhammad Bilal Riaz)**JCR Listed(IF:2.147)

Abstract: The aim of this article is to investigate the unsteady natural convection flow of Maxwell fluid with fractional derivative over an exponentially accelerated infinite vertical plate. Moreover, slip condition, radiation, MHD and Newtonian heating effects are also considered. A modern definition of fractional derivative operator recently introduced by Caputo and Fabrizio has been used to formulate the fractional model. Semi analytical solutions of the dimensionless problem are obtained by employing Stehfest's and Tzou's algorithms in order to find the inverse Laplace transforms for temperature and velocity fields. Temperature and rate of heat transfer for non-integer and integer order derivatives are computed and reduced to some known solutions from the literature. Finally, in order to get insight of the physical significance of the considered problem regarding velocity and Nusselt number, some graphical illustrations are made using Mathcad software. As a result, in comparison between Maxwell and viscous fluid (fractional and ordinary) we found that viscous (fractional and ordinary) fluids are swiftest than Maxwell (fractional and ordinary) fluids

Keywords: *free convection slip maxwell , fluidNewtonian, heating exponentially, accelerated plate caputo-fabrizio fractional, derivatives stehfest's and tzou's algorithms.*

14. **Riaz, M. B.,** & Zafar, A. A. (2018). Exact solutions for the blood flow through a circular tube under the influence of a magnetic field using fractional Caputo-Fabrizio derivatives. *Mathematical Modelling of Natural Phenomena, 13*(1), 8.**(Muhammad Bilal Riaz (Mathematics /SSC)** JCR Listed (IF: 1.101)

Abstract: In this work, we study the flow of both blood and magnetic particles using CaputoFabrizio fractional derivative model approach. The fluid flow through a circular cylinder is influenced by an external magnetic field which is perpendicular to the circular tube and an oscillating pressure gradient. Integral transforms are used to find solutions for the blood and magnetic particle velocities. Comparison of profiles of velocities for different values of α, the impact of physical variables on the dynamics of fluid and magnetic parameters are highlighted graphically

Keywords: *Bio fluid, transverse magnetic field, caputo-fabrizio, fractional derivative, integral transforms.*

15. Bashir, Z., **Rashid, T.,** & Iqbal, M. (2018). Hesitant Probabilistic Fuzzy Preference Relations in Decision Making. *Mathematical Problems in Engineering*, 24. doi: 10.1155/2018/5383487.**(Tabasam Rashid (Mathematics /SSC)** JCR Listed (IF: 1.145)

Abstract: Preference of an alternative over another alternative is a useful way to express the opinion of decisionmaker. In the process of group decisionmaking, preference relations are used in preferencemodelling of the alternatives under given criteria.The probability is an important tool to deal with uncertainty; in many scenarios of decision making probabilities of different events affect the decision making process directly. In order to deal with this issue, in this paper, hesitant probabilistic fuzzy preference relation (HPFPR) is defined. Furthermore, consistency of HPFPR and consensus among decision makers are studied in the hesitant probabilistic fuzzy environment. In this respect, many novel algorithms are developed to achieve consistency of HPFPRs and reasonable consensus between decision makers and a final algorithm is proposed comprehending all other algorithms, presenting a complete decision support model for group decision making. Lastly, we present a case study with complete illustration of the proposed model and discussed the effects of probabilities on decision making validating the importance of the introduction of probability in hesitant fuzzy preference relation.

16. Bashir, Z., **Rashid, T.,** Watrobski, J., Salabun, W., & Malik, A. (2018). Hesitant Probabilistic Multiplicative Preference Relations in Group Decision Making. *Applied Sciences-Basel*, 8(3), 31. doi: 10.3390/app8030398. **(Tabasam Rashid (Mathematics /SSC) JCR Listed (IF: 1.689)**

Abstract: The preference of one alternative over another is a useful way to express the opinion of the decision-maker. In the process of group decision-making, preference relations are used in preference modeling of the alternatives under given criteria. The probability is an important tool to deal with uncertainty and, in many scenarios of decision-making problems, the probabilities of different events affect the decision-making process directly. In order to deal with this issue, the hesitant probabilistic multiplicative preference relation (HPMPR) is defined in this paper. Furthermore, consistency of the HPMPR and consensus among decision makers are studied here. In this respect, many algorithms are developed to achieve consistency of HPMPRs, reasonable consensus between decision-makers and a final algorithm is proposed comprehending all other algorithms, presenting a complete decision support model for group decision-making. Lastly, we present a case study with complete illustration of the proposed model and discuss the effects of probabilities on decision-making validating the importance of the introduction of probability in hesitant multiplicative preference relations.

Keywords: *decision support system, hesitant fuzzy sets, multi-criteria group decision-making, hesitant multiplicative set, hesitant probabilistic multiplicative set.*

17. Zafar, A. A., **Riaz, M. B.,** Shah, N. A., & **Asjad, M. I.** (2018). Influence of non-integer-order derivatives on unsteady unidirectional motions of an Oldroyd-B fluid with generalized boundary conditions. *The European physical journal plus, 133*(3), 127. doi: 10.1140/epjp/i2018-11981-4. **(Muhammad Bilal Riaz (Mathematics /SSC) Muhammad Imran Asjad)JCR Listed (IF: 2.240)**

Abstract: The objective of this article is to study some unsteady Couette flows of an Oldroyd-B fluid with non-integer derivatives. The fluid fills an annular region of two infinite co-axial circular cylinders. Flows are due to the motion of the outer cylinder, that rotates about its axis with an arbitrary time-dependent velocity while the inner cylinder is held fixed. Closed form solutions of dimensionless velocity field and tangential tension are obtained by means of the finite Hankel transform and the theory of Laplace transform for fractional calculus. Several results in the literature including the rotational flows through an infinite cylinder can be obtained as limiting cases of our general solutions. Finally, the control of the fractional framework on the dynamics of fluid is analyzed by numerical simulations and graphical illustrations.

18. Bashir, Z., **Rashid, T., & Zafar, S.** (2018). Maximization based topologies and their relation with Gmma-convergence of intuitionistic fuzzy sets. *Journal of Intelligent & Fuzzy Systems, 34*(1), 537-545. **(Tabasam Rashid (Mathematics /SSC), Sohail Zafar)JCR Listed (IF: 1.426)**

Abstract: In variational analysis,-convergence proved its importance because almost all other convergences can be expressed as -convergence. The discussion about maximization and minimization is also fundamental in variational analysis. In this paper, we define three topologies τ−M, τ+ M, τM on the collection of intuitionistic fuzzy sets based on maxima operator. Furthermore, convergences in these topologies are proved to be compatible with −, +, convergences when intuitionistic fuzzy sets are upper semicontinuous with locally compact Hausdroff domain.

Keywords: *convergence, intuitionistic fuzzy set, maxima operator, locally compact topology.*

19. Raza, Z., **Kashif, A.,** & Anwar, I. (2018). On algebraic characterization of SSC of the Jahangir's graph. *Open Mathematics*, 16(1), 250. doi: 10.1515/math-2018-0025. **(Agha Kashif (Mathematics /SSC) JCR Listed(IF:0.831)**

Abstract: In this paper, some algebraic and combinatorial characterizations of the spanning simplicial complex $\Delta s(\mathcal{J}n,m)$ of the Jahangir's graph $\mathcal{J}n,m$ are explored. We show that $\Delta s(\mathcal{J}n,m)$ is pure, present the formula for f-vectors associated to it and hence deduce a recipe for computing the Hilbert series of the Face

ring k[Δs($\mathcal{J}$n,m)]. Finally, we show that the face ring of Δs($\mathcal{J}$n,m) is Cohen-Macaulay and give some open scopes of the current work.

Keywords: *simplicial complexes, spanning trees, face ring, hilbert series, f-vectors, cohen macaulay.*

20. L iu, J.-B., Zhao, J., Wang, S., **Javaid, M.,** & Cao, J. (2018). On the Topological Properties of the Certain Neural Networks. *Journal of Artificial Intelligence and Soft Computing Research, 8*(4), 257-268.**(Muhammad Javaid (Mathematics /SSC) (SJR)**

Abstract: A topological index is a numeric quantity associated with a network or a graph that characterizes its whole structural properties. In [Javaid and Cao, Neural Computing and Applications, DOI 10.1007/s00521-017-2972-1], the various degree-based topological indicesfor the probabilistic neural networks are studied. We extend this study by considering the calculations of the other topological indices, and derive the analytical closed formulas for these new topological indices of the probabilistic neural network. Moreover, a comparative study using computer-based graphs has been carried out first time to clarify the nature of the computed topological descriptors for the probabilistic neural networks. Our results extend some known conclusions.

Keywords:*neural network, topological indices, Graph theory.*

21. Alolaiyan, H., **Saleem, N.,** & Abbas, M. (2018). A natural selection of a graphic contraction transformation in fuzzy metric spaces. *Journal of Nonlinear Sciences and Applications, 11*(2), 218--227. doi: 10.22436/jnsa.011.02.04.**(Muhammad Imran Asjad (Mathematics /SSC)(SJR)**

Abstract: In this paper, we study sufficient conditions to find a vertex \(v\) of a graph such that \(Tv\) is a terminal vertex of a path which starts from \(v,\) where \(T\) is a self graphic contraction transformation defined on the set of vertices. Some examples are presented to support the results proved herein. Our results widen the scope of various results in the existing literature.

Keywords: *graphic contraction, fuzzy metric space, natural selection.*

22. Zubair, M., Azmat, H., & **Noureen, I.** (2018). Anisotropic stellar filaments evolving under expansion-free condition in f(R,T) gravity. *International Journal of Modern Physics D, 27*(04), 1850047. doi: 10.1142/s0218271818500475.**(Ifra Noureen (Mathematics /SSC)JCR Listed(IF:2.171)**

Abstract: In this paper, we have analyzed the role of a viable f(R, T) model, i.e. f(R, T) = R + αR2 + γRn + λT, while exploring the unstable regions of cylindrically symmetric gravitational source, where, R and T correspond to the Ricci invariant and trace of energy momentum tensor, respectively. The matter distribution is considered to be anisotropic and gravitating system evolves under zero expansion condition. The collapse equation of cylindrical star has been obtained by applying perturbation scheme on modified field equations and conservation equations. Dynamical instability has been discussed in N and pN regimes, stability constraints have also been developed. We found that adiabatic index Γ is meaningless for the discussion of stability of gravitating sources carryingexpansion-free condition, and stability variations are determined by physical properties of the fluid.

Keywords:*gravitational collapse, f(R, T) gravity, dynamical equations, instability range, zero expansion.*

23. **Ahmad, M.,** Hussain, M., **Saeed, M.,** & Farooq, A. (2018). On topological invariants of subdivided Hex-Derived network SHDN 1(n). *Journal of Mathematical Analysis, 9*(3), 97-109.**(Maqsood Ahmad (Mathematics /SSC), Muhammad Saeed)ISI Web of Science**

Abstract: A non-empirical numeric parameter that realize features of molecular graph Gamma of chemical compound is called topological index (structure descriptor) and remain invariant under symmetry properties of Gamma. In studies like QSAR/QSPR, topological indices of chemical graph are extremely useful for researchers to carry out regression analysis for better understanding of the complexity of molecules, physico-chemical and biological properties of corresponding chemical compound. In this research article, closed form

formulas of certain structure descriptors of vital importance, namely, atom-bond connectivity ABC (Gamma) index, fourth version of ABC denoted by ABC(4)(Gamma), geometric arithmetic GA (Gamma) index and fifth version of GA denoted by GA(5)(Gamma) of subdivided Hex-derived network SHDN1(n) are computed. In addition, first, second, modified and augmented Zagreb indices, inverse and general Randic indices, symmetric division deg, harmonic and inverse sum indices of SHDN1(n) are computed using latest technique of algebraic polynomials.

Keywords: *bourgain spaces, kdv equation, local smoothing effect.*

24. **Ahmed, N.,** Rafiq, M., **Rehman, M. A.,** Ali, M., & Ahmad, M. O. (2018). Numerical Modeling of SEIR Measles Dynamics with Diffusion. *Communications in Mathematics and Applications, 9*(3), 315-326. doi: 10.26713/cma.v9i3.794.**(Nauman Ahmed (Mathematics /SSC), M. A. Rehman)**ISI Web of Science

Abstract: A novel unconditionally positive finite difference (FD) scheme is developed to solve numerically SEIR measles epidemic model with diffusion. In population dynamics, positivity of subpopulations is an essential requirement. The proposed FD scheme preserves the positivity of the solution of the model. The consistency and unconditional stability is proved. The proposed FD scheme is explicit in nature which is an extra feature of this scheme. Comparisons are also made with forward Euler explicit FD scheme and Crank Nicolson implicit FD scheme. Simulations of a numerical test are also presented to verify all the attributes of the proposed scheme.

Keywords: *SEIR Measles epidemic model with diffusion, finite difference scheme, positivity, consistency, stability.*

25. **Ali, J., Saeed, M.,** Rafiq, M., & **Iqbal, S.** (2018). Numerical treatment of nonlinear model of virus propagation in computer networks: an innovative evolutionary Pade approximation scheme. *Advances in Difference Equations*, 18. doi: 10.1186/s13662-018-1672-1.**(Javaid Ali (Mathematics /SSC), Muhammad Saeed, Shaukat Iqbal)**JCR Listed (IF:1.066)

Abstract: This work proposes a novel mesh free evolutionary Padé approximation (EPA) framework for obtaining closed form numerical solution of a nonlinear dynamical continuous model of virus propagation in computer networks. The proposed computational architecture of EPA scheme assimilates a Padé approximation to transform the underlying nonlinear model to an equivalent optimization problem. Initial conditions, dynamical positivity and boundedness are dealt with as problem constraints and are handled through penalty function approach. Differential evolution is employed to obtain closed form numerical solution of the model by solving the developed optimization problem. The numerical results of EPA are compared with finite difference schemes like fourth order Runge–Kutta (RK-4), ODE45 and Euler methods. Contrary to these standard methods, the proposed EPA scheme is independent of the choice of step lengths and unconditionally converges to true steady state points. An error analysis based on residuals witnesses that the convergence speed of EPA is higher than a globally convergent non-standard finite difference (NSFD) scheme for smaller as well as larger time steps.

Keywords: *nonlinear model, evolutionary computing, pade approximation, optimization, evolutionary computing, padé approximation, optimization.*

26. Ali, M., **Khan, H.,** Son, L. H., Smarandache, F., & Kandasamy, W. B. V. (2018). New Soft Set Based Class of Linear Algebraic Codes. *Symmetry-Basel, 10*(10), 10. doi: 10.3390/sym10100510. **(Huma Khan (Mathematics /SSC))**JCR Listed (IF:1.256)

Abstract: In this paper, we design and develop a new class of linear algebraic codes defined as soft linear algebraic codes using soft sets. The advantage of using these codes is that they have the ability to transmit m-distinct messages to m-set of receivers simultaneously. The methods of generating and decoding these new classes of soft linear algebraic codes have been developed. The notion of soft canonical generator

matrix, soft canonical parity check matrix, and soft syndrome are defined to aid in construction and decoding of these codes. Error detection and correction of these codes are developed and illustrated by an example.

Keywords:*linear algebraic code, soft set theory, soft linear algebraic code, soft communication, soft syndrome, soft codewords, soft generator matrix.*

27. Azmat, H., Zubair, M., & **Noureen, I.** (2018). Dynamics of shearing viscous fluids in f(R, T) gravity. *International Journal of Modern Physics D, 27*(1), 23. doi: 10.1142/s0218271817501814.**(Ifra Noureen (Mathematics /SSC)**JCR Listed (IF:2.171)

Abstract: In this paper, we have analyzed the dynamical stability of shearing viscous anisotropic fluid with cylindrical symmetry in f(R,T) theory. We have chosen two viable f(R,T) models for dynamical analysis, and explored their nature and role for stable stellar configuration. Modified field equations and corresponding dynamical equations have been constructed, perturbation approach is adopted to deal with complexity of these equations. With the help of perturbed dynamical equations, the evolution equation has been established to analyze the role of shear viscosity and pressure anisotropy on dynamics of cylindrical system. The adiabatic index Γ is used to investigate the instabilities appearing in Newtonian (N) and post-Newtonian (pN) approximations. Some conditions are found for material variables that are required to meet the stability criterion. We compare the outcomes of our analysis with the results of various models available in literature to reach at more comprehensive conclusion.

Key words:*collapse f(R, T) gravity, covariant divergence, dark source, constituents, adiabatic index.*

28. Bashir, Z., **Rashid, T.,** & Xu, Z. (2018). Hesitant fuzzy preference relation based on alpha-normalization with self confidence in decision making. *Journal of Intelligent & Fuzzy Systems,* 35(3), 3421-3435. doi: 10.3233/jifs-17380.**(Tabasam Rashid (Mathematics /SSC)**JCR Listed (IF:1.426)

Abstract: Preference relations are very useful to express decision makers' preferences over alternatives in the process of group decision-making. The multiple self confidence levels also exist in preference relations due to different knowledge levels, expertise, cultural and educational backgrounds of decision makers. In this study, the hesitant fuzzy preference relation with self confidence and hesitant multiplicative preference relation with self confidence are defined by taking multiple self confidence levels into consideration in the form of a linguistic term set. Latter on, priority weight vectors are derived from linear programming models, and then, to avoid heterogenous hesitant preference relation effects, a collective priority weight vector is derived by using ordered weighted average operator for group decision making. Finally, some practical case studies are done to illustrate the proposed model, and a comparative analysis is carried out to show how self confidence levels influence the group decision-making results.

Keywords:*hesitant fuzzy sets, hesitant fuzzy preference relation, hesitant multiplicative preference relation, priority weights, group decision making.*

29. Beg, I., **Rashid, T., & Jamil, R. N.** (2018). Human attitude analysis based on fuzzy soft differential equations with Bonferroni mean. *Computational & Applied Mathematics, 37*(3), 2632-2647. doi: 10.1007/s40314-017-0469-2. **(Tabasam Rashid (Mathematics /SSC) Raja Noshad Jamil)**JCR Listed (IF: 0.863)

Abstract: In this paper, we model a system of fuzzy soft differential equations to analyze the behavior over the time of an individual depending on their companion's actions under any particular situation against some decision. The Bonferroni mean (BM) is a very useful tool for group decision-making problems when arguments are interrelated to each other as Bonferroni mean can capture the interrelationship of the individual arguments. Using this ability of BM, we define Bonferroni fuzzy soft matrix (BFSM) and weighted Bonferroni fuzzy soft matrix (WBFSM) for data representation. WBFSM is a decision matrix and provide the optimum fuzzy soft constant (OFSC) which is the key element of fuzzy soft differential equation. By utilizing the OFSC, we develop a system of fuzzy soft differential equations to study a dynamical process with nonlinear uncertain and vague data. Second, we present a novel efficient technique for analyzing the future

attitude of people due to their present decisions. To illustrate the practicality and feasibility of proposed technique an illustrative example is also discussed with the help of phase portrait and line graphs.

Keywords: *bonferroni mean, fuzzy soft sets, human attitude, soft matrix ,soft sets.*

30. Chaudhry, N. A., **Saeed, M., Ali, J., Tabassum, M. F., & Luqman, M.** (2018). Adaptive Hooke-Jeeves-evolutionary algorithm for linear equality constrained problems. *International Journal of Advanced and Applied Sciences, 5*(8), 122-130. doi: 10.21833/ijaas.2018.08.015.**(Muhammad Saeed (Mathematics /SSC)Javaid Ali, Muhammad Farhan Tabassum, Muhammad Luqman)**ISI Web of Science

Abstract: This paper proposes a novel hybrid algorithm called Genetic Algorithm based Simplex Adaptive Hooke and Jeeves (GA-SAHJ) method for solving equality constrained non-linear optimization problems. The proposed hybrid technique uses Genetic Algorithm (GA) as the global optimizer and a modified Hooke and Jeeves method for further refinements of the current solution within the landscape of a feasible region. The convergence proof of the modified approach is also provided. The effectiveness of the proposed GA-SAHJ method is demonstrated by applying it on six test instances each involving at least one equality constraint. The results witness that the proposed hybrid approach is capable of producing highly accurate and fully feasible solutions of the considered problems.

Keywords:*derivative free methods, hooke-jeeves method, genetic algorithm, hybrid method.*

31. **Dayan, F.,** Ahmad, B., **Zulqarnain, M., Ali, U.,** Ahmad, Y., & Zia, T. J. (2018). On some topological indices of triangular silicate and triangular oxide networks. *International Journal of Pharmaceutical Sciences and Research, 9*(10), 4326-4331. doi: 10.13040/ijpsr.0975-8232.9(10).4326-31.**(Fazal Dayan (Mathematics /SSC)Muhammad Zulqarnain, Umar Ali)** (Not HEC Recognized)

Abstract: A topological index is a numeric quantity from the structural graph of a molecule. It has become a very useful tool in the prediction of pharmacological, toxicological and physico - chemical properties of a compound. In this paper, we have computed some topological indices of triangular silicate TsL (n) and triangular oxide TOL (n) networks.

Keywords: *topological index, triangular oxide network, triangular silicate network, harrary index, wiener index, forgotten index.*

32. **Faizi, S., Rashid, T., & Zafar, S.** (2018). A Multicriteria Decision-Making Approach Based on Fuzzy AHP with Intuitionistic 2-Tuple Linguistic Sets. *Advances in Fuzzy Systems, 12*. doi: 10.1155/2018/5789192.**(Shahzad Faizi (Mathematics /SSC), Tabasam Rashid, Sohail Zafar)**ISI Web of Science

Abstract: In themodern literature related to linguistic decision-making, the 2-tuple linguistic representation model and its useful applications in various fields have been extensively studied and used during the last decade. Recently, some usefulmulticriteria decision-making (MCDM) methods have been introduced based on fuzzy analytic hierarchy process (AHP) for 2-tuple linguistic representation model. By keeping in mind the importance of this linguistic model, in this paper, we introduce a fuzzy AHP methodology for intuitionistic 2-tuple linguistic sets (I2TLSs) which is a useful extension of the 2-tuple linguistic representation model.This study is comprised of four stages. In the first stage, we define some operational laws for I2TL elements (I2TLEs) and prove some related important properties. In the second stage, intuitionistic 2-tuple linguistic preference relation (I2TLPR) and multiplicative I2TLPR are defined using I2TLSs. In the 3rd stage, a transformation mechanism is introduced which can transform an I2TLPR to corresponding intuitionistic preference relation (IPR) and vice versa. In the fourth stage, an approach is proposed for checking the consistency of an I2TLPR and presented a method to repair the inconsistent one by using the proposed transformationmechanism.Finally, a numerical example is given and comparative analysis is carried out with the TOPSIS method to verify the validity of the proposed method.

Keywords:*preference relations, representation model, term sets, aggregation, operators, consistency measures, information consensus words.*

33. **Faizi, S., Rashid, T., & Zafar, S.** (2018). Additive consistency-based approach for group decision making with hesitant 2-tuple linguistic preference relations. *Journal of Intelligent & Fuzzy Systems, 35*(4), 4657-4672. doi: 10.3233/jifs-172152.**(Shahzad Faizi (Mathematics /SSC),Tabasam Rashid, Sohail Zafar)JCR Listed (IF: 1.426)**

Abstract: This paper develops an hesitant 2-tuple linguistic preference relation (H2TLPR) in which the pairwise comparisons are represented by hesitant 2-tuple linguistic sets (H2TLSs) and then, uses the additive consistency concept for linguistic fuzzy preference relations to give an additive consistency definition for H2TLPRs. Two iterative optimization methods, namely, feedback optimization method (FOM) and automatic optimization method (AOM) are proposed to obtain a solution with a desired consistency index of H2TLPR. In the FOM, the decision makers (DMs) are suggested to give their new preference values in a specific range. If the DMs/experts are unwilling to offer their updated preferences, the AOM is proposed to carry out the consistency improvement process. A score H2TLPR is proposed, and then introduced hesitant 2-tuple linguistic weighted averaging (H2TLWA) operator for the aggregation of H2TLPRs. Furthermore, the quantifier-guided dominance degrees are used to obtain hesitant 2-tuple linguistic ordered weighted averaging (H2TLOWA) operator weights. Finally, a case study is carried out, showing the potentials of the methodology by using the H2TLPRs and the optimization methods, and evaluating the selection of a best investment company that's interested in the construction of one of the main infrastructure project of China Pakistan Economic Corridor (CPEC).

Keywords:*hesitant 2-tuple linguistic set, score function, additive consistency, iterative optimization methods, group decision making.*

34. Gao. W., Younas, M., Farooq, A., **Virk, A.,** & Nazeer, W. (2018). Some Reverse Degree-Based Topological Indices and Polynomials of Dendrimers. *Mathematics, 6*(10), 20. doi: 10.3390/math6100214.**(Abaid ur Rehman Virk (Mathematics /SSC)ISI Web of Science**

Abstract: Topological indices collect information from the graph of molecule and help to predict properties of the underlying molecule. Zagreb indices are among the most studied topological indices due to their applications in chemistry. In this paper, we compute first and second reverse Zagreb indices, reverse hyper-Zagreb indices and their polynomials of Prophyrin, Propyl ether imine, Zinc Porphyrin and Poly (ethylene amido amine) dendrimers.

Keywords:*reverse Zagreb index, reverse hyper-Zagreb index, reverse Zagreb, polynomials prophyrin, propyl ether imine, zinc porphyrin and poly (ethylene amido amine).*

35. Husin, M. N., **Asif, F., Zahid, Z., Zafar, S**., & Farahani, M. R. (2018). Fourth atom-bond connectivity index and fifth arithmetic-geometric index of convex polytopes by using line operator. *Advances and Applications in Discrete Mathematics, 19*(4), 491-500. doi: 10.17654/dm019040491.**(Fatima Asif (Mathematics /SSC)Zohaib Zahid, Sohail Zafar)ISI Web of Science**

Abstract: In this paper, we will compute some graph invariants such as ABC(4)(G) index and GA(5)(G) index of line graph of some convex polytopes.

Keywords:*topological indices, line graph, convex polytopes.*

36. **Asjad, M. I.,** Sarwar, S., Abdullah, M., & Khan, I. (2018). An analysis of the semi-analytic solutions of a viscous fluid with old and new definitions of fractional derivatives. *Chinese Journal of Physics, 56*(5), 1853-1871. doi: 10.1016/j.cjph.2018.08.017.**(Muhammad Imran Asjad(Mathematics /SSC)JCR Listed (IF: 1.051)**

Abstract: In this paper we present the natural convection flow of an incompressible viscous fluid subject to Newtonian heating and constant mass diffusion using a recently developed definition of the Caputo-Fabrizio fractional derivative. Boundary layer equations in dimensionless form are obtained by means of dimensionless variables. The expressions for the temperature, concentration and velocity fields are obtained in the Laplace transformed domain. The inverse Laplace transform for the temperature, concentration and

velocity field are found numerically by means of Stehfest's and Tzou's algorithms. A comparative analysis has been carried between the Caputo-Fabrizio and the Caputo fractional model obtained by Vieru (2015) through graphical illustration. At the end, we can see the impact of the flow parameters, including the new fractional parameter, on the flow which is presented graphically. As a result, the fractional viscous fluid model with the Caputo-Fabrizio fractional derivative has a higher velocity than with the Caputo.

Keywords: *caputo and caputo–fabrizio fractional derivatives, a comparison studyfree convection, newtonian heatingvertical plate, chemical reaction, constant mass diffusion.*

37. **Jamil, R. N., & Rashid, T.** (2018). Application of Dual Hesitant Fuzzy Geometric Bonferroni Mean Operators in Deciding an Energy Policy for the Society. *Mathematical Problems in Engineering*, 14. doi: 10.1155/2018/4541982.**(Raja Noshad Jamil (Mathematics /SSC) Tabasam Rashid)JCR Listed (IF: 1.145)**

Abstract: Dual hesitant fuzzy geometric Bonferroni mean is defined for dual hesitant fuzzy sets. Different properties of dual hesitant fuzzy geometric Bonferroni mean are discussed. Some special cases are studied in detail for dual hesitant fuzzy geometric Bonferroni mean. In addition, dual hesitant fuzzy weighted geometric Bonferroni mean and dual hesitant fuzzy Choquet geometric Bonferroni mean are proposed. A multicriteria decision-making method is discussed to find the best alternative among different alternatives by using proposed aggregated operators and an illustrated example is also given to understand our proposal.

Keywords:*group decision-making, power aggregation operators sets.*

38. Jawad, A., Nawaz, T., Rani, S., **Manzoor, R.,** & Moradpour, H. (2018). Role of f(T, Theta) gravity on dynamical instability of collapsing star. *Physics of the Dark Universe, 21*, 70-75. doi: 10.1016/j.dark.2018.06.002.**(Rubab Manzoor (Mathematics /SSC)JCR Listed (IF: 6.509)**

Abstract: In this paper, we find the instability ranges of a spherical symmetric structure of a collapsing object in f(T, Θ) theory of gravity. Here, T represents the torsion scalar while Θ is the trace of energy-momentum tensor. For this purpose, we use perturbation method upto first order in the modified field equations as well as in the dynamical equationsto construct a collapse equation. The collapse equation with adiabatic index Γ is used to explore the instability ranges in Newtonian and post-Newtonian approximations. It turns out that the instability ranges depend on the dynamical variables of collapsing object.

Keywords:*f(t, ϑ) gravity, dynamical equations, instability range, adiabatic index.*

39. Kang, S. M., Zahid, M. A., **Virk, A.,** Nazeer, W., & Gao, W. (2018). Calculating the Degree-based Topological Indices of Dendrimers. *Open Chemistry, 16*(1), 681-688. doi: 10.1515/chem-2018-0071.**(Abaid ur Rehman Virk (Mathematics /SSC)JCR Listed (IF: 1.425)**

Abstract: Topological indices capture the symmetry of molecular structures and provide a mathematical language to predict properties such as boiling points, viscosity, the radius of gyrations etc. [1]. We compute some newly developed topological indices of Porphyrin, Propyl Ether Imine, Zinc-Porphyrin and Poly(EThyleneAmidoAmine) Dendrimers. The results are plotted using Maple 2015 software to see the dependence on the involved structural parameters.

Keywords:*chemical graph theory, Randić index, Dendrimer.*

40. Kwun, Y. C., Farooq, A., Nazeer, W., **Zahid, Z.,** Noreen, S., & Kang, S. M. (2018). Computations of the M-Polynomials and Degree-Based Topological Indices for Dendrimers and Polyomino Chains. *International Journal of Analytical Chemistry*, 11. doi: 10.1155/2018/1709073.(**Zohaib Zahid (Mathematics /SSC)JCR Listed (IF: 1.479)**

Abstract: Topological indices correlate certain physicochemical properties like boiling point, stability, and strain energy of chemical compounds. In this report, we compute M-polynomials for PAMAM dendrimers and polyomino chains. Moreover, by applying calculus, we compute nine important topological indices of under-study dendrimers and chains.

41. Kwun, Y. C., **Virk, A..,** Nazeer, W., **Rehman, M. A.,** & Kang, S. M. (2018). On the Multiplicative Degree-Based Topological Indices of Silicon-Carbon Si2C3-I p,q and Si2C3-II p,q. *Symmetry-Basel, 10*(8), 11. doi: 10.3390/sym10080320.**(Abaid ur Rehman Virk (Mathematics /SSC), M. A. Rehman)**JCR Listed (IF: 1.256)

Abstract: The application of graph theory in chemical and molecular structure research has far exceeded people's expectations, and it has recently grown exponentially. In the molecular graph, atoms are represented by vertices and bonds by edges. Topological indices help us to predict many physico-chemical properties of the concerned molecular compound. In this article, we compute Generalized first and multiplicative Zagreb indices, the multiplicative version of the atomic bond connectivity index, and the Generalized multiplicative Geometric Arithmetic index for silicon-carbon Si2C3−I[p,q] and Si2C3−II[p,q] second.

42. Liu, J.-B., **Zahid, Z., Nasir, R.**, & Nazeer, W. (2018). Edge Version of Metric Dimension and Doubly Resolving Sets of the Necklace Graph. *Mathematics, 6*(11), 10. doi: 10.3390/math6110243.**(Zohaib Zahid (Mathematics /SSC), Ruby Nasir)**ISI Web of Science

Abstract: Consider an undirected and connected graph G=(VG,EG) , where VG and EG represent the set of vertices and the set of edges respectively. The concept of edge version of metric dimension and doubly resolving sets is based on the distances of edges in a graph. In this paper, we find the edge version of metric dimension and doubly resolving sets for the necklace graph.

43. Malik, M. G. A., Bashir, Z., **Rashid, T.,** & Ali, J. (2018). Probabilistic Hesitant Intuitionistic Linguistic Term Sets in Multi-Attribute Group Decision Making. *Symmetry-Basel, 10*(9), 28. doi: 10.3390/sym10090392.**(Tabasam Rashid (Mathematics /SSC)**JCR Listed (IF:1.256)

Abstract: Decision making is the key component of people's daily life, from choosing a mobile phone to engaging in a war. To model the real world more accurately, probabilistic linguistic term sets (PLTSs) were proposed to manage a situation in which several possible linguistic terms along their corresponding probabilities are considered at the same time. Previously, in linguistic term sets, the probabilities of all linguistic term sets are considered to be equal which is unrealistic. In the process of decision making, due to the vagueness and complexity of real life, an expert usually hesitates and unable to express its opinion in a single term, thus making it difficult to reach a final agreement. To handle real life scenarios of a more complex nature, only membership linguistic decision making is unfruitful; thus, some mechanism is needed to express non-membership linguistic term set to deal with imprecise and uncertain information in more efficient manner. In this article, a novel notion called probabilistic hesitant intuitionistic linguistic term set (PHILTS) is designed, which is composed of membership PLTSs and non-membership PLTSs describing the opinions of decision makers (DMs). In the theme of PHILTS, the probabilities of membership linguistic terms and non-membership linguistic terms are considered to be independent. Then, basic operations, some governing operational laws, the aggregation operators, normalization process and comparison method are studied for PHILTSs. Thereafter, two practical decision making models: aggregation based model and the extended TOPSIS model for PHILTS are designed to classify the alternatives from the best to worst, as an application of PHILTS to multi-attribute group decision making. In the end, a practical problem of real life about the selection of the best alternative is solved to illustrate the applicability and effectiveness of our proposed set and models.

44. Rashid, T., Faizi, S., & Zafar, S. (2018). Distance Based Entropy Measure of Interval-Valued Intuitionistic Fuzzy Sets and Its Application in Multicriteria Decision Making. *Advances in Fuzzy Systems*, 10. doi: 10.1155/2018/3637897.**(Tabasam Rashid (Mathematics /SSC), Shahzad Faizi, Sohail Zafar)**ISI Web of Science

Abstract: Fuzzy entropy means the measurement of fuzziness in a fuzzy set and therefore plays a vital role in solving the fuzzy multicriteria decision making (MCDM) and multicriteria group decision making (MCGDM) problems. In this study, the notion of the measure of distance based entropy for uncertain information in the context of interval-valued intuitionistic fuzzy set (IVIFS) is introduced. The arithmetic and geometric average operators are firstly used to aggregate the interval-valued intuitionistic fuzzy information provided by the decision makers (DMs) or experts corresponding to each alternative, and then the fuzzy entropy of each alternative is calculated based on proposed distance measure. Several numerical examples are solved to demonstrate the application to MCDM and MCGDM problems to show the effectiveness of the proposed approach.

Keywords:*similarity measure, information measures, programming methodology, inclusion measures, fuzziness weights.*

45. Shaheen, A., & **Asjad, M. I.** (2018). Peristaltic flow of a Sisko fluid over a convectively heated surface with viscous dissipation. *Journal of Physics and Chemistry of Solids, 122*, 210-217. doi: 10.1016/j.jpcs.2018.06.016. **(Muhammad Imran Asjad (Mathematics /SSC)** JCR Listed (IF: 2.207)

Abstract: We have analyzed the peristaltic flow of the mathematical model for a non-Newtonian Sisko fluid in the presence of a magnetic field and the heat transfer problem with the effects of both variable thermal conductivity and viscous dissipation. The governing equations of a non-Newtonian fluid along with heat and nanoparticles are modeled and simplified by the assumption of a low Reynolds number and a long wavelength. The velocity equation is solved by use of the homotopy perturbation technique, while the exact solutions are computed for temperature and concentration equations. The solutions depend on the Brinkman number ( ) Bк and magnetohydrodynamics ( ) M . The expressions obtained for the velocity, temperature, and concentration profiles are plotted, and the impact of various physical parameters is investigated for different peristaltic waves. We found that temperature, concentration, and pressure gradient are increasing functions of the Sisko parameter b, Brinkman number ( ) Bк, and magnetohydrodynamics ( ) M , respectively.

Keywords:*sisko fluid, peristaltic flow viscous-dissipation effects, convective boundary conditions, exact solutions.*

46. Sharif, M., &**Manzoor, R.** (2018). Stability of oscillating gaseous masses in massive Brans-Dicke gravity. *International Journal of Modern Physics D, 27*(1), 25. doi: 10.1142/s0218271817501723.**(Rubab Manzoor (Mathematics /SSC)**JCR Listed (IF: 2.171)

Abstract: This paper explores the instability of gaseous masses for the radial oscillations in post-Newtonian correction of massive Brans-Dicke gravity. For this purpose, we derive linearized perturbed equation of motion through Lagrangian radial perturbation which leads to the condition of marginal stability. We discuss radius of instability of different polytropic structures in terms of the Schwarzschild radius. It is concluded that our results provide a wide range of difference with those in general relativity and Brans-Dicke gravity.

Keywords:*brans-dicke theory, hydrodynamics, Instability, Newtonian and post-Newtonian regimes.*

47. **Zulqarnain, M., Dayan, F., & Saeed, M.** (2018). Topsis analysis for the prediction of diabetes based on general characteristics of humans. *International Journal of Pharmaceutical Sciences and Research, 9*(7), 2932-2939. doi: 10.13040/ijpsr.0975-8232.9(7).2932-2939.**(M. Zulqarnain (Mathematics /SSC) Fazal Dayan, M. Saeed)** (Not HEC Recognized)

Abstract: Worldwide diabetic patients are very common. This paper studies spread of diabetes in human living in Lahore, Pakistan. Data is collected from two local hospitals of Lahore and TOPSIS is applied to draw the results of the study. The study points out the people who are more likely to have diabetes due to various parameters like age, weight, height, body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), urinary creatinine, albuminuria and albumin creatinine ratio (ACR) etc.

Keywords:*multi-criteria decision making (MCDM), TOPSIS, normalized decision matrix (NDM), positive ideal solutions (PIS), negative ideal solutions (NIS), relative closeness (RC).*

48. **Asif, N. A.,** Hammouch, Z., **Riaz, M. B.,** & Bulut, H. (2018). Analytical solution of a Maxwell fluid with slip effects in view of the Caputo-Fabrizio derivative. The *European Physical Journal Plus, 133*(7), 13. doi: 10.1140/epjp/i2018-12098-6.**(Naseer Ahmad Asif (Mathematics /SSC), Muhammad Bilal Riaz)JCR Listed (IF: 2.240)**

Abstract: Couette flows of an incompressible Maxwell fluid with non-integer order derivative without singular kernel due to the motion of a bottom flat plate are analyzed under the slip boundary condition. An analytical transform approach is used to obtain the exact expressions for both velocity field and shear stress. Three particular cases from the general results with slip at the wall are obtained. These solutions, which are organized in simple forms in terms of exponential and trigonometric functions, can be conveniently engaged to obtain known solutions from the literature. The control of the new non-integer order derivative on the velocity and shear stress of the fluid is analyzed for some flows with practical applications. The non-integer order derivative with non-singular kernel is more appropriate for handling mathematical calculations of the obtained solutions.

49. Du, Z., &**Ali, A.** (2018). The inverse Wiener polarity index problem for chemical trees. *Plos One, 13*(5), 11. doi: 10.1371/journal.pone.0197142.**(Akbar Ali (Mathematics) JCR Listed (IF: 2.766)(SKT Campus)**

Abstract: The Wiener polarity number (which, nowadays, known as the Wiener polarity index and usually denoted by *Wp*) was devised by the chemist Harold Wiener, for predicting the boiling points of alkanes. The index *Wp* of chemical trees (chemical graphs representing alkanes) is defined as the number of unordered pairs of vertices (carbon atoms) at distance 3. The inverse problems based on some well-known topological indices have already been addressed in the literature. The solution of such inverse problems may be helpful in speeding up the discovery of lead compounds having the desired properties. This paper is devoted to solving a stronger version of the inverse problem based on Wiener polarity index for chemical trees. More precisely, it is proved that for every integer $t \in \{n - 3, n - 2,...,3n - 16, 3n - 15\}$, $n \geq 6$, there exists an n-vertex chemical tree T such that $Wp(T) = t$.

Keywords:*topological indexes, physicochemical properties, zagreb indexes, graphs, qspr.*

50. **Ali, A**., Du, Z., &**Ali, M.** (2018). A note on chemical trees with minimum Wiener polarity index. *Applied Mathematics and Computation, 335*, 231-236. doi: 10.1016/j.amc.2018.04.051.**(Akbar Ali (Mathematics), Muhammad Ali)JCR Listed (IF: 2.300) (SKT Campus)**

Abstract: The Wiener polarity index (usually denoted by W-p) of a graph G is defined as the number of unordered pairs of the vertices of G which are at distance 3. Denote by CTn the family of all n-vertex chemical trees. In a recent paper, Ashrafi and Ghalavand [1] determined the first three minimum W-p values of n-vertex chemical trees for n > 7 and characterized the chemical trees attaining the first two minimum W-p values among all the members of CTn for n >= 4. In this note, the chemical trees with the third minimum W-p value are characterized from the graph family CTn for n >= 7, and the chemical trees from the family CTn, n >= 4, with the first two minimum W-p values are also obtained in an alternative but shorter way. (C) 2018 Elsevier Inc. All rights reserved.

Keywords:*chemical graph theory, topological index, wiener polarity index, chemical tree, extremal value.*

51. Lin, W., **Ali, A.,** Huang, L., Wu, Z., & Chen, J. (2018). On the Trees with Maximal Augmented Zagreb Index. *Ieee Access, 6*, 69335-69341. doi: 10.1109/access.2018.2879745.**(Akbar Ali (Mathematics)**JCR Listed (IF: 3.557)**(SKT Campus)**

Abstract: The augmented Zagreb index (AZI), a variant of the well-known atom-bond connectivity (ABC) index, was shown to have the best predicting ability for a variety of physicochemical properties among several tested vertex-degree-based topological indices. However, contrasting to the extensive research on Problem A: characterizing n -vertex tree(s) with minimal ABC index, few works have been done on Problem B: characterizing n -vertex tree(s) with maximal AZI. Ali and Bhatti conjectured that a tree has maximal AZI iff it has minimal ABC index, with the implication that Problem B is as difficult as Problem A. In this paper, we first prove that among connected graphs with given degree sequence, there exists a breadth-first searching graph maximizing the AZI. Using this, an efficient algorithm based on tree degree sequences is designed to search the n -vertex tree(s) with maximal AZI up to $n=200$. We find that the balanced double star uniquely maximizes the AZI for $19\le n\le 200$, and consequently, we disprove the aforementioned conjecture posed by Ali and Bhatti. Naturally, the balanced double star is conjectured to be the unique tree with maximal AZI among n -vertex trees for $n\ge 19$. Toward our conjecture, we prove that all the pendent paths are of length 1 in an n -vertex tree with maximal AZI if $n\ge 19$.

Keywords: *augmented zagreb index, extremal graphs, topological indices, trees.*

52. **Ali, A.,** & Trinajstic, N. (2018). A Novel/Old Modification of the First Zagreb Index. *Molecular Informatics, 37*(6-7), 7. doi: 10.1002/minf.201800008.**(Akbar Ali (Mathematics)**JCR Listed (IF: 1.955)**(SKT Campus)**

Abstract: In the paper [Gutman, I.; Trinajsti´c, N. Chem. Phys. Lett. 1972, 17, 535], it was shown that total π-electron energy (E) of a molecule M depends on the quantity P $v\in V$ (G) d 2 v (nowadays known as the first Zagreb index), where G is the graph corresponding to M, V (G) is the vertex set of G P and dv is degree of the vertex v. In the same paper, the graph invariant $v\in V$ (G) dvτv (where τv is the connection number of v, that is the number of vertices at distance 2 from v) was also proved to influence E, but this invariant was never restudied explicitly. We call it modified first Zagreb connection index and denote it by $ZC*1$. In this paper, we characterize the extremal elements with respect to the graph invariant $ZC*1$ among the collection of all n-vertex chemical trees.

Keywords: *topological index, zagreb indices, chemical tree, vertex connection number.*

53. **Ali, A.,** Gutman, I., Milovanovic, E., & Milovanovic, I. (2018). Sum of Powers of the Degrees of Graphs: Extremal Results and Bounds. *Match-Communications in Mathematical and in Computer Chemistry, 80*(1), 5-84.**(Akbar Ali (Mathematics)** JCR Listed (IF: 2.580) (Review) **(SKT Campus)**

Abstract: For any real number α, the sum of the α-th powers of the degrees of a (molecular) graph G, denoted by 0Rα(G), is known as the general zeroth–order Randi´c index as well as the general first Zagreb index and variable first Zagreb index. Research on the graph invariant 0Rα (for specific values of α) began in the 1970s, when the first Zagreb index 0R2 and the zeroth–order connectivity/Randi´c index 0R−1/2 were introduced within the study of molecular modeling. After that, several other specific versions of the invariant 0Rα were also studied. These versions include inverse degree (or modified total adjacency index) 0R−1, modified first Zagreb index 0R−2, and forgotten topological index 0R3. The main purpose of the present survey is to present bounds and extremal results related to the invariant 0Rα, including all the aforementioned specific versions of 0Rα.

Keywords: *general randic index, variable zagreb indexes, forgotten topological index, 1st 3 smallest, edge-connected graphs, inverse degree, unicyclic, graphs, molecular-orbitals, signless laplacian, pendent vertices.*

54. **Ali, A.,** & Dimitrov, D. (2018). On the extremal graphs with respect to bond incident degree indices. *Discrete Applied Mathematics, 238*, 32-40. doi: 10.1016/j.dam.2017.12.007.**(Akbar Ali (Mathematics)**JCR Listed (IF: 0.932)**(SKT Campus)**

Abstract: Many existing degree based topological indices can be classified as bond incident degree (BID) indices, whose general form is BID(G) = ∑ uv∈E(G) f (du, dv), where uv is the edge connecting vertices u, v of the graph G, E(G) is the edge set of G, du is the degree of a vertex u and f is a non-negative real valued (symmetric) function of du and dv . Firstly, here an intuitively expected result is proven, which states that an extremal (n, m)-graph with respect to the BID index (corresponding to f) must contain at least one vertex of degree n − 1 if f satisfies certain conditions. It is shown that these certain conditions are satisfied for the general sum-connectivity index (whose special cases are the first Zagreb index and the Hyper Zagreb index), for the general Platt index (whose special cases are the first reformulated Zagreb index and the Platt index) and for the variable sum exdeg index. With help of the aforementioned result of existence of at least one vertex of degree n − 1 andfurther analysis, graphs with maximum values of theabove mentioned BID indices among tree, unicyclic, bicyclic, tricyclic and tetracyclic graphs are characterized. Some of these results are new and the already existing results are proven in a shorter and more unified way.

Keywords:*extremal graphs, degree based topological indices, bond incident degree indices.*

55. **Ali, A.** (2018). An alternative but short proof of a result of Zhu and Lu concerning general sum-connectivity index. *Asian-European Journal of Mathematics, 11*(2), 4. doi: 10.1142/s1793557118500304.**(Akbar Ali (Mathematics)**ISI Web of Science(SKT Campus)
Abstract: Recently, Zhu and Lu, [On the general sum-connectivity index of tricyclic graphs, J. Appl. Math. Comput.51(1) (2016) 177–188] determined the graphs having maximum general sum-connectivity index among all n-vertex tricyclic graphs. In this short note, an alternative but considerable short approach is proposed for determining the aforementioned graphs.

Keywords:*topological index, general sum-connectivity index, tricyclic graph.*

56. **Ali, A.** (2018). Counter examples to a conjecture concerning harmonic index. *Asian-European Journal of Mathematics, 11*(3), 3. doi: 10.1142/s1793557118500353.**(Akbar Ali (Mathematics)** ISI Web of Science(SKT Campus)
Abstract: A recently proposed conjecture by Cheng and Wang [A lower bound for the harmonic index of a graph with minimum degree at least three, *Filomat***30**(8) (2016) 2249–2260] about the harmonic index is disproved.

Keywords:*topological index, harmonic index, minimum vertex degree.*

57. **Ali, A. (2018).** Tetracyclic graphs with maximum second Zagreb index: A simple approach. *Asian-European Journal of Mathematics, 11*(5), 4. doi: 10.1142/s179355711850064x.**(Akbar Ali (Mathematics)** ISI Web of Science(SKT Campus)
Abstract: In the chemical graph theory, graph invariants are usually referred to as topological indices. The second Zagreb index (denoted by M-2) is one of the most studied topological indices. For n >= 5, let TETn be the collection of all non-isomorphic connected graphs with n vertices and n+3 edges (such graphs are known as tetracyclic graphs). Recently, Habibi et al. [Extremal tetracyclic graphs with respect to the first and second Zagreb indices, Trans. on Combin. 5(4) (2016) 35-55.] characterized the graph having maximum M-2 value among all members of the collection TETn. In this short note, an alternative but relatively simple approach is used for characterizing the aforementioned graph.

Keywords:*chemical graph theory, topological index, second Zagreb index, tetracyclic graph.*

58. Akram, A., Jami, A. R., **Ahmad, S.,** Sufyan, M., & Munir, R. (2018). Role of modified scalar variables in the modeling of spherical fluids. *International Journal of Geometric Methods in Modern Physics, 15*(8), 17. doi: 10.1142/s0219887818501402.**(Shahzad Ahmad (Mathematics)**JCR Listed (IF:1.009)(SKT Campus)
Abstract: The aim of this work is to analyze the role of shear evolution equation in the modeling of relativistic spheres in f (R) gravity. We assume that non-static diagonally symmetric geometry is coupled with dissipative anisotropic viscous fluid distributions in the presence of f (R) dark source terms. A specific distribution of f (R)

cosmic model has been assumed and the spherical mass function through generic formula introduced by Misner-Sharp has been formulated. Some very important relations regarding Weyl scalar, matter variables and mass functions are being computed. After decomposing orthogonally the Riemann tensor, some scalar variables in the presence of f (R) extra degrees of freedom are calculated. The effects of the polynomial modified structure scalars in the modeling of through Weyl, shear, expansion scalar differential equations are investigated. The energy density irregularity factor has been calculated for both anisotropic radiating viscous with varying Ricci scalar and for dust cloud with present Ricci scalar corrections.

Keywords:*unified, higher-dimensional and super field theories, celestial, mechanics, relativistic, gravitational theories other than einstein's, including asymmetric field theories.*

59. Akram, A., **Ahmad, S.,** Jami, A. R., Sufyan, M., & Zahid, U. (2018). Variations in the expansion and shear scalars for dissipative fluids. *Modern Physics Letters A, 33*(13), 15. doi: 10.1142/s0217732318500761.**(Shahzad Ahmad (Mathematics)**JCR Listed (IF: 1.308) (SKT Campus)

Abstract: This work is devoted to the study of some dynamical features of spherical relativistic locally anisotropic stellar geometry in f(R) gravity. In this paper, a specific configuration of tanh f(R) cosmic model has been taken into account. The mass function through technique introduced by Misner–Sharp has been formulated and with the help of it, various fruitful relations are derived. After orthogonal decomposition of the Riemann tensor, the tanh modified structure scalars are calculated. The role of these tanh modified structure scalars (MSS) has been discussed through shear, expansion as well as Weyl scalar differential equations. The inhomogeneity factor has also been explored for the case of radiating viscous locally anisotropic spherical system and spherical dust cloud with and without constant Ricci scalar corrections.

Keywords:*relativistic fluidsanisotropic fluidsdissipative fluids.*

60. **Ahmad, S.,** Jami, A. R., & Mughal, M. Z. (2018). Stability of anisotropic self-gravitating fluids. *Modern Physics Letters A, 33*(17), 14. doi: 10.1142/s0217732318500955.**(Shahzad Ahmad (Mathematics)**JCR Listed (IF: 1.308) (SKT Campus)

Abstract: The aim of this paper is to study the stability as well as the existence of self-gravitating anisotropic fluids in Λ-dominated era. Taking a cylindrically symmetric and static spacetime, we computed the corresponding equations of motion in the background of anisotropic fluid distributions. The realistic formulation of energy momentum tensor as well as theoretical model of the scale factors are considered in order to describe some physical properties of the anisotropic fluids. To find the stability of the compact star, we have used Herrera's technique which is based on finding the radial and the transverse components of the speed of sound. Moreover, the behaviors of other physical quantities are also discussed like anisotropy, matching conditions of interior metric and exterior metric and compactness of the compact structures are also discussed.

Keywords:*gravitation, stabilityrelativistic dissipative fluids.*

61. **Ahmad, S.,** Jami, A. R., & Aas, Z. (2018). Shear and expansion evolution for dissipative fluids. *Modern Physics Letters A, 33*(20), 18. doi: 10.1142/s0217732318501110.**(Shahzad Ahmad (Mathematics)** JCR Listed (IF: 1.308) (SKT Campus)

Abstract: The aim of this work is to analyze the role of shear evolution equation in the modeling of relativistic spheres in f(R) gravity. We assume that non-static diagonally symmetric geometry is coupled with dissipative anisotropic viscous fluid distributions in the presence of f(R) dark source terms. A specific distribution of f(R) cosmic model has been assumed and the spherical mass function through generic formula introduced by Misner–Sharp has been formulated. Some very important relations regarding Weyl scalar, matter variables and mass functions are being computed. After decomposing orthogonally the Riemann tensor, some scalar variables in the presence of f(R) extra degrees of freedom are calculated. The effects of the three parametric modified structure scalars in the modeling of Weyl, shear, expansion scalar differential equations are

investigated. The energy density irregularity factor has been calculated for both anisotropic radiating viscous with varying Ricci scalar and dust cloud with present Ricci scalar corrections.

62. **Khalid, S., & Ali, A.** (2018). On the zeroth-order general Randic index, variable sum exdeg index and trees having vertices with prescribed degree. *Discrete Mathematics Algorithms and Applications, 10*(2), 12. doi: 10.1142/s1793830918500155.**(Sohaib Khalid (Mathematics),Akbar Ali)** ISI Web of Science(SKT Campus)

Abstract: The zeroth-order general Randi´c index (usually denoted by R0 α) and variable sum exdeg index (denoted by SEIa) of a graph G are defined as R0 α(G) = P v∈V (G) (dv) α and SEIa(G) = P v∈V (G) dva dv where dv is degree of the vertex v ∈ V (G), a is a positive real number different from 1 and α is a real number other than 0 and 1. A segment of a tree is a path P, whose terminal vertices are branching or pendent, and all non-terminal vertices (if exist) of P have degree 2. For n ≥ 6, let PTn,n1, STn,k, BTn,b be the collections of all n-vertex trees having n1 pendent vertices, k segments, b branching vertices, respectively. In this paper, all the trees with extremum (maximum and minimum) zeroth-order general Randi´c index and variable sum exdeg index are determined from the collections PTn,n1 , STn,k, BTn,b. The obtained extremal trees for the collection STn,k are also extremal trees for the collection of all n-vertex trees having fixed number of vertices with degree 2 (because it is already known that the number of segments of a tree T can be determined from the number of vertices of T with degree 2 and vise versa).

63. Kwun, Y. C., Qadri, H. M., Nazeer, W., **Haq, A.U.,**& Kang, S. M. (2018). On Generalized Moduli of Quasi-Banach Space. *Journal of Function Spaces*, 10. doi: 10.1155/2018/7324783.**(Absar ul Haq (Mathematics)** JCR Listed (IF: 0.639) (SKT Campus)

Abstract: We shall discuss three generalized moduli such as generalized modulus of convexity, modulus of smoothness, and modulus of Zou-Cui of quasi-Banach spaces and give some important properties of these moduli. Furthermore, we establish relationships of these generalized moduli with each other.

64. Hayat, S*.*, **Ahmed, S., Umair, H. M.**, & Wang, S. (2018). Distance property of chemical graphs. *Hacettepe Journal of Mathematics and Statistics, 47*(5), 1071-1093. doi: 10.15672/hjms.2017.487.**(Shahzad Ahmad (Mathematics),Muhammad Umair)** JCR Listed (IF: 0.558) (SKT Campus)

Abstract: We have developed a rigorous computational technique to compute exact analytic expressions for a number of distance-based topological indices of chemical graphs. There are two main advantages of our technique over existing techniques of similar nature: first, our technique is significantly diverse as it also covers the Wiener index and eccentricity-based topological indices besides Szeged-like indices, and secondly we have considerably reduced the algorithmic and computational complexity in comparison to previous techniques. Our proposed technique generates certain vertex and edge partitions of a graph which are essential in computing the exact analytical formulas of distance-based and eccentricity-based indices. To ensure the applicability of our technique, we have computed various distance-based and eccentricity-based topological indices for certain infinite families of polyomino chain system. Moreover, we find analytical exact expressions of certain degree-based topological indices for these polyomino chains. These topological indices can be obtained as a by-product of our technique.

65. **Imran, M. A.,** Shah, N. A., Khan, I., & **Aleem, M**. (2018). Applications of non-integer Caputo time fractional derivatives to natural convection flow subject to arbitrary velocity and Newtonian heating. *Neural Computing and Applications, 30*(5), 1589-1599. doi: 10.1007/s00521-016-27416.**(M. A. Imran (Mathematics),**

Maryam Aleem) JCR Listed (IF:4.213)

Abstract: Unsteady time fractional natural convection flow of incompressible viscous fluid due to arbitrary velocity with radiation and Newtonian heating is investigated. By introducing dimensionless variables and functions, the resulting equations are solved by the Laplace transform technique. Exact solutions for temperature and velocity fields are obtained by Caputo time fractional derivatives in dimensionless form, and they are expressed in terms of Robotnov–Hartley function and Wright's function. The rate of heat transfer on plate is obtained in terms of Nusselt number. Some known solutions from the existing literature are obtained as limiting case when $\alpha = 1$. At the end, we have seen the significant influence of fractional parameter α on the temperature and velocity graphically and observed that it has shown an opposite behavior on temperature and velocity for small and large values of time t, respectively. This shows that how fractional parameter α affects the fluid flow.

Keywords: *viscous fluid, free convection, arbitrary velocity, radiation, fractional derivatives, exact solutions, newtonian heating.*

66. **Rashid, T., Faizi, S., & Zafar, S.** (2018). Outranking method for intuitionistic 2-tuple fuzzy linguistic information model in group decision making. *Soft Computing*. doi: 10.1007/s00500-018-3268-9.**(Tabasam Rashid (Mathematics),Shahzad Faizi,Sohail Zafar) JCR Listed (IF: 2.367)**

Abstract: This paper attempts to develop an outranking method based on intuitionistic 2-tuple fuzzy linguistic information and apply it to multi-criteria group decision-making problems. The theory of intuitionistic 2-tuple fuzzy linguistic elements (I2FLEs) is useful for modeling impressions and quantifying the ambiguous nature of subjective judgments in a convenient manner. The family of ELECTRE methods is well known and widely used outranking method, but it has not been investigated within the intuitionistic 2-tuple fuzzy linguistic environment. ELECTRE uses the concept of an outranking relationship. Therefore, the directional Hausdorff distance, which uses I2FLEs, is proposed and the outranking relations are subsequently defined using this distance. Furthermore, using the proposed score and accuracy functions of I2FLEs, this paper also develops an outranking method based on intuitionistic fuzzy support function, intuitionistic fuzzy risk function, intuitionistic fuzzy credibility function, and the net outranking flow index similar to the PROMETHEE method. An illustrative example is given to demonstrate the practicality and effectiveness of the developed approaches. Finally, a comparative discussion of two decision-making methods is conducted to demonstrate the advantages of the proposed method over the other.

Keywords: *intuitionistic 2-tuple fuzzy linguistic set, directional hausdorff distance, 2-tuple linguistic model, intuitionistic linguistic term set, multi-criteria group decision making, outranking method.*

67. **Ahmad, M.**, **Saeed, M.,** Arshad, M., Cheema, I. Z., & Hussain, M. (2018). Algebraic Polynomials and Invariants of Certain Chemical Networks. *Journal of Computational and Theoretical Nanoscience, 15*(4), 1340-1347. doi: 10.1166/jctn.2018.7312.**(Maqsood Ahmad (Mathematics),Muhammad Saeed)(SJR)**

Abstract: A non-empirical numeric parameter of molecular graph *G* is called topological index and is also invariant with respect to symmetry properties of Γ. Researchers, performing QSAR/QSPR analysis, had established a correlation between the biological as well as chemical characteristics of chemical species and topological indices of corresponding molecular structure. These indices are classified in to three major classes, namely, degree based, distance based and counting related polynomials. *Pólya* initiated the idea of counting polynomials in 1936 to enumerate isomers of chemical compound whereas Wiener implemented distance based index while studying boiling point of Paraffin in 1947. Enormous work has been carried out on topological indices of chemical graphs since then. In present study, we first compute M-polynomial of hexagonal and honeycomb networks and employ these polynomials as an alternate technique to work out several topological indices of vital importance like, first, second, modified and augmented Zagreb indices, inverse and general Randić indices, symmetric division deg index (SDD), harmonic index (HI), inverse sum index (ISI) and forgotten index (FI).

Keywords:*topological indices, qsar/qspr, m-polynomial, molecular graphs, hexagonal networks, honeycomb networks.*

68. **Azam, Muhammad K.,** Zafar, F., **Rehman, M. A.,** Ahmad, F., & Qaisar, S. (2018). Study of extended weyl k-fractional integral via chebyshev inequalities. *Italian journal of pure and applied mathematics, 39*, 771–782. **(Muhammad Khurshid Azam (Mathematics), Muhammad Aziz ur Rehman)** **(SJR)**
Abstract: In this paper, we introduce the extended Weyl k-fractional integral and then present its results and some inequalities. These results and inequalities hold true for: (i) k-Weyl fractional integral when s $\rightarrow$ 0; (ii) Weyl fractional integral when s $\rightarrow$ 0 and k $\rightarrow$ 1.
Keywords:*extended Weyl k–fractional integral, mellin transform, chebyshev inequalities.*

69. **Javaid, M.** (2018). On the second minimizing graph in the set of complements of trees. *AKCE International Journal of Graphs and Combinatorics*. doi: https://doi.org/10.1016/j.akcej.2018.11.005.**(Muhammad Javaid (Mathematics)****(SJR)**
Abstract: Let G be a graph of order n and A(G)=[ai,j] be its adjacency matrix such that ai,j=1 if vi is adjacent to vj and ai,j=0 otherwise, where 1≤i,j≤n. In a certain family of graphs, a graph is called minimizing (or second minimizing) if the least eigenvalue of its adjacency matrix attains the minimum (or second minimum). In this paper, we characterize the second minimizing graph among all graphs which belong to the set of complements of the trees.
Keywords:*adjacency matrix, least eigenvalue, complement of trees.*

70. **Asim, A., Nasar, R., & Rashid, T.** (2018). Correlation coefficient of intuitionistic hesitant fuzzy sets based on informational energy and their applications to clustering analysis. *Soft Computing*, 1-14. **(Adina Asim (Mathematics), Rabia Nasir, Tabasam Rashid)** **JCR Listed (IF: 2.367)**
Abstract: On daily basis human beings came across with the activity in which one should have to choose among various choices the most convenient one for the decision situation by means of mental and reasoning process. In this paper we utilize the concept of intuitionistic hesitant fuzzy set (IHFS) which is the combination of hesitant fuzzy set and intuitionistic fuzzy set to manage those situations in which professionals hesitate amid several possible membership and non-membership values to evaluate an alternative. To attain a few correlation coefficient formulas for IHFS and implement them to clustering analysis under intuitionistic hesitant fuzzy surroundings is the aim of this paper. Two examples, i.e., universities categorization on the basis of quality and countries evaluation on the basis of economy are implemented to exemplify the undeniable requirement of the clustering algorithm depend on IHFS. These examples link the distinction of assessment data supplied by unalike professionals in clustering operations.
Keywords:*correlation coefficient, hesitant fuzzy set, clusters analysis.*

71. **Faizi, S., Rashid, T.,** Xu, Z., & **Zafar, S.** (2018). Distance measures for hesitant intuitionistic fuzzy linguistic term sets based on a risk factor parameter. *International Journal of Computers and Applications*, 1-18. doi: 10.1080/1206212X.2018.1465653.**(Shahzad Faizi (Mathematics),Tabasam Rashid,Sohail Zafar)****(SJR)**
Abstract: We propose notions of some distance measures between two hesitant intuitionistic fuzzy linguistic term sets (HIFLTSs). Weighted distance measures between two collections of HIFLTSs are also proposed and analyzed for discrete and continuous cases. Based on the proposed distance measures,the relative closeness (RC) coefficients for different alternatives are established and then used to rank the alternatives in a multi-criteria group decision-making problem. Furthermore, a comparison between the RC coefficients of alternatives by using the proposed distance measures for different values of the risk factor parameter is given graphically. Two illustrative examples are provided to elaborate the applicability and advantage of the proposed approach for the selection of suitable alternative.
Keywords:*fuzzy set, hesitant fuzzy set, hesitant fuzzy linguistic term set, hesitant intuitionistic, fuzzy linguistic term set.*

72. Zhu, L., Hua, G., **Zafar, S.,** & Pan, Y. (2018). Fundamental ideas and mathematical basis of ontology learning algorithm. *Journal of Intelligent & Fuzzy Systems*, 1-14. **(Sohail Zafar (Mathematics) JCR Listed (IF: 1.426)**

Abstract: As a data utility and aided tool, ontology has been widely used in many areas of the computer. Owing to its great efficiency, ontologies have also been introduced into various engineering disciplines. In this paper, we present the fundamental ideas of how to deal with similarity measuring problem in ontology learning algorithms. The mathematical basis of ontology learning algorithms is also introduced from a statistical learning theory point of view. Finally, we present two ontology learning algorithms in multi-dividing setting and ontology sparse vector learning setting, respectively.

Keywords: *ontology, similarity measuring, graph model, machine learning, multi-dividing setting.*

73. Davidov, J., **Haq, A. U.,** & Mushkarov, O. (2018). Almost complex structures that are harmonic maps. *Journal of Geometry and Physics, 124*, 86-99. doi: https://doi.org/10.1016/j.geomphys.2017.09.010.**(Absar ul Haq (Mathematics), JCR Listed (IF: 0.712)**

Abstract: We find geometric conditions on a four-dimensional almost Hermitian manifold under which the almost complex structure is a harmonic map or a minimal isometric imbedding of the manifold into its twistor space.

Keywords: *almost complex structures, twistor spaces, harmonic maps.*

74. **Rashid, T.,** Beg, I., & **Jamil, R. N.** (2018). Induced hesitant 2-tuple linguistic aggregation operators with application in group decision making. *Applications and Applied Mathematics-an International Journal, 13*(2), 1039-1075.**(Tabasam Rashid (Mathematics) Raja Noshad Jamil) ISI Web of Science**

Abstract: In this article, hesitant 2-tuple linguistic arguments are used to evaluate the group decision making problems which have inter dependent or inter active attributes. Operational laws are developed for hesitant 2-tuple linguistic elements and based on these operational laws hesitant 2- tuple weighted averaging operator and generalized hesitant 2- tuple averaging operator are proposed. Combining Choquet integral with hesitant 2-tuple linguistic information, some new aggregation operators are defined, including the hesitant 2-tuple correlated averaging operator, the hesitant 2-tuple correlated geometric operator and the generalized hesitant 2-tuple correlated averaging operator. These proposed operators successfully manage the correlations among the elements. After investigating the properties of these operators, a multiple attribute decision making method based on these operators, is suggested. Finally, an example is given to illustrate the practicality and feasibility of proposed method.

Keywords: *aggregation operator, multiple attribute group decision making, choquet integral, hesitant 2-tuple model*.

75. Husin, N. H. M., Hasni, R., Du, Z. B., & **Ali, A.** (2018). More Results on Extremum Randic Indices of (Molecular) Trees. *Filomat, 32*(10), 3581-3590. doi: 10.2298/fil1810581h.**(Akbar Ali (Mathematics) JCR Listed (IF:0.635) (SKT Campus)**

Abstract: The Randic index R(G) of a graph G is the sum of the weights (d(u)d(v))(-1/2) of all edges uv in G, where d(u) denotes the degree of vertex u. Du and Zhou [On Randic indices of trees, unicyclic graphs, and bicyclic graphs, Int. J. Quantum Chem. 111 (2011), 2760-2770] determined the n-vertex trees with the third for n >= 7, the fourth for n >= 10, the fifth and the sixth for n >= 11 maximum Randic indices. Recently, Li et al. [The Randic indices of trees, unicyclic graphs and bicyclic graphs, Ars Comb. 127 (2016), 409-419] obtained the n-vertex trees with the seventh, the eighth, the ninth and the tenth for n >= 11 maximum Randic indices. In this paper, we correct the ordering for the Randic indices of trees obtained by Li et al., and characterize the trees with from the seventh to the sixteenth maximum Randic indices. The obtained extremal trees are molecular and thereby the obtained ordering also holds for molecular trees.

Keywords: *randic index, maximum values, trees, ordering.*

76. Lalami, S. Z. R., Levesley, J., & **Sajjad, M. F.** (2018). Radial Basis Function Solution for the LIBOR Market Model PDE. *Punjab University Journal of Mathematics, 50*(4), 23-29.**(Muhammad F. Sajjad (Mathematics)** HEC X CAT

Abstract: This research paper is intended at analyzing the interpolation of LIBOR (London Inter Bank Offer Rate) Model PDE (Partial Differential Equation) in one and two dimensions using Radial Basis Functions (RBF) on full grids. The LIBOR Market model is considered an effective and standard approach for pricing the derivatives which is based on interest rates. In recent times, Monte Carlo methods are often used in practice to price derivatives instruments because of the high dimensionality of the model. This research paper highlights the applicability of the RBF method rather than Finite Difference Method (FDM) for solving the LMM PDE, LIBOR Market Model, with the Bermudan Swaption or Chooser Option as a boundary condition. The results have suggested faster convergence to reference value than FDM in one dimension. Also, the calculation of price is similar to FDM in two dimensions.

Keywords: *radial basis function(RBF), libor market model(LMM), convergence, bermudan swaption, chooser option, full grid, sparse grid.*

77. **Javaid, M., Ahmad, M.**, Hussain, M., & TEH, W. C. (2018). Bounds of f-index for unicyclic graphs with fixed pendent vertices. *Journal of Prime Research in Mathematics*, 14, 51-61.**(Muhammad Javaid, Maqsood Ahmad (Mathematics)** HEC Y CAT

Abstract: Furtula and Gutman [J. Math. Chem., 53 (4) (2015), 1184- 1190] reinvestigated the F-index as a sum of cubes of the degrees of all the vertices in a chemical graph and proved its various properties. A connected graph with equal order and size is called unicyclic graph, where order is number of vertices and size is number of edges. In this paper, we characterize the extremal graphs in a family of graphs called by unicyclic graphs with fixed number of pendent vertices. We also investigate the bound on F-index in the same family of graphs i.e $4(2n + 3\alpha) \leq F(G) \leq 8n + \alpha(\alpha + 2)(\alpha + 3)$ for each $G \in U \alpha n$, where $U \alpha n$ is a class of all the unicyclic graphs such that the order of each graph is n with α pendent vertices.
Keywords: *forgotten index, unicyclic graphs, extremal graphs.*

78. **Javaid, M., Ibraheem, M.**, & Bhatti, A. A. (2018). Connective eccentricity index of certain path-thorn graphs. *Journal of Prime Research in Mathematics*, 14, 87-99.**(Muhammad Javaid, Muhammad Ibraheem (Mathematics)** HEC Y CAT

Abstract: Let G be a simple connected graph with V (G) and E(G) as the vertex set and edge set respectively. A topological index is a numeric quantity by which we can characterize the whole structure of a molecular graph or a network to predict the physical or chemical activities of the involved chemical compounds in the molecular graph or network. The connective eccentricity index of the graph G is defined as $\xi ce(G) = P v{\in}G d(v) e(v)$, where d(v) and e(v) denote the degree and eccentricity of the vertex $v \in G$ respectively. In this paper, we compute the connective eccentricity index of the various families of the path-thorn graphs and present the obtained results with the help of suitable mathematical expressions consisting on various summations. More precisely, the computed results are general extensions of the some known results.
Keywords: *distance-based index, eccentricity, path-thorn graph.*

79. **Dayan, F., Javaid, M., Zulqarnain, M.**, Ali, M. T., & Ahmad, B. (2018). Computing banhatti indices of hexagonal, honeycomb and derived networks. *American Journal of Mathematical and Computer Modelling*, 3(2), 38-45.**(Fazal Dayan,(Mathematics) Muhammad Javaid, Muhammad Zulqarnain)**(Not HEC Recognized)

Abstract: Banhatti indices of a graph were introduced by Kulli. In this paper we have computed the general K-Banhatti indices, first and second K-Banhatti indices, K hyper Banhatti indices, modified K Banhatti indices and sum connectivity Banhatti indices for hexagonal, honeycomb and honeycomb derived networks.
Keywords: *banhatti indices, k-banhatti indices, k-hyper banhatti indices, modified k banhatti indices, hexagonal and honeycomb networks.*

80. **Dayan, F., Javaid, M., Ali, U.,** Ahmad, B., & Zulqarnain, M. (2018). On some banhatti indices of triangular silicate, triangular oxide, rhombus silicate and rhombus oxide networks. *American Journal of Information Science and Technology*, 2(2), 42.**(Fazal Dayan,(Mathematics) Muhammad Javaid, Umar Ali)(Not HEC Recognized)**

Abstract: Silicates are the largest, the most complicated and the most interesting class of minerals by far. Kulli introduced the Banhatti indices of a graph. In this paper the general K-Banhatti indices, first and second K-Banhatti indices, K hyper Banhatti indices and modified K Banhatti indices for triangular silicate network, triangular oxide network, rhombus oxide network and rhombus silicate networks are computed.

Keywords: *triangular silicate network, triangular oxide network, rhombus oxide network, rhombus silicate network,banhatti indices.*

School of Engineering (SEN)

Department of Civil Engineering

Research Articles

1. Anjum, N., Ghani, U., Pasha, G. A., **Rashid, M. U.,** Latif, A., & Rana, M. Z. Y. (2018). Reynolds stress modeling of flow characteristics in a vegetated rectangular open channel. *Arabian Journal for Science and Engineering, 43*(10), 5551-5558. doi: 10.1007/s13369-018-3229-8.**(Muhammad Usman Rashid (Civil Engineering /SEN) JCR Listed (IF: 1.092)**

   Abstract: A computational technique to simulate turbulent and vegetated flow in a rectangular open channel was investigated. Reynolds stress model was implemented to the circular vegetation patch flow configuration for the investigation of flow properties and turbulence characteristics. A finite volume-based model was developed using a three-dimensional (3-D) numerical code FLUENT and the pre-processor Geometry and Mesh Building Intelligent Toolkit. The model was first validated and then used for simulation purpose. Vertical distribution of mean stream-wise velocities was computed at typical locations. A deceleration in the magnitude of stream-wise velocities was observed within the vegetation patch zone. Minimum values of velocity magnitude were observed directly behind the vegetation structures. Turbulence characteristics in the form of Reynolds stresses and turbulent kinetic energies investigated by this model showed that turbulence was greater in the regions of vegetation patch. This Reynolds stress modeling formulation has shown to be capable of capturing important mean flow and turbulence characteristics in the configuration considered.

   Keywords:*turbulent flow, reynolds stress model ,numerical simulation,open channel, vegetated domain.*

2. **Rashid, M. U.,** Latif, A., & Azmat, M. (2018). Optimizing Irrigation Deficit of Multipurpose Cascade Reservoirs. *Water Resources Management, 32*(5), 1675-1687. doi: 10.1007/s11269-017-1897-x.**(Muhammad Usman Rashid (Civil Engineering /SEN) JCR Listed (IF: 2.644) (Review)**

   Abstract: Reservoirs play a strategic role in the rapid monetary growth of the world by providing numerous benefits. However, the reduction in appropriate sites along with environmental and social apprehensions has resulted in curtailment of new reservoirs around the world in twenty-first century. There is a potential of benefits available from existing reservoirs which can be best capitalized through their optimized operation. Reservoirs Operation Optimization considering Sediment Evacuation (RESOOSE), recently developed model which combines multiple reservoirs operation and sediment evacuation with Genetic Algorithm based optimization module, has been used in the study. The objective of the study was to optimize the irrigation deficit through cascade reservoirs with consideration to hydropower, sediment evacuation and flood damages reduction benefits. The RESOOSE model was applied to optimize the irrigation deficits of Tarbela and Diamer Basha Reservoirs in Pakistan using developed objective function. The article computed and compared the benefits of optimized and existing rule curves. The hydropower benefits of 36.92 Billion Kw, sediment evacuation benefits of 21.534 Million m3 and flood damages of 616.19 Million US$ due to existing rule curves were considered as minimum benefits for achieving the optimized rule curves to minimize irrigation deficits. The developed optimized rule curves reduced the irrigation shortages of case study reservoirs from 6.9 to 5.8 Billion m3 (16% enhancement) annually as compared to existing rule curves. The optimized rule curves minimized the irrigation deficits by maintaining the existing benefits and without lowering the minimum operating levels of case study reservoirs. The study suggests change in existing rule curves of Tarbela and Diamer Basha Reservoirs due to less irrigation shortages. The RESOOSE model can be applied to other cascade reservoirs for optimizing the rule curves.

   Keywords:*tarbela, diamer basha, optimization, multi-objective, genetic algorithm, resoose model, irrigation deficit.*

3. Malik, A., Shakir, A. S., Khans, M. J., Naveedullah, **Latif, M.,** Ajmal, M., & Ahmad, S. (2018). Effects of different

mulching techniques on sugar beet performance under semi-arid subtropical climatic conditions. *Pakistan Journal of Botany*, 50(3), 1219-1224.**(Muhammad Latif (Civil Engineering /SEN) JCR Listed (IF: 0.750)**

Abstract: Evaporation from soil surface is an important component of the water balance in irrigated agriculture. Mulching as an effective technique not only decreases soil moisture evaporation but can also act as a useful tool to suppress weed growth and thus create favorable environment for plants growth. In this study, the effects of different types of mulches on sugar beet performance (root yield, sugar content, sugar yield and water use efficiency) were investigated for two consecutive years in the famous Peshawarvalley of Indus Basin of Pakistan. It is evident from the results that the application of surface mulches significantly enhanced all the yield components and water use efficiency by improving soil moisture status over no mulch treatment. Similarly, use of black polyethylene film mulch was found better compared to straw mulch. Overall, mulch treatments produced 11.96 to 19.45% higher root yield, 14.33 to 22.68% higher sugar yield, 2.35 to 3.78% higher sugar content, 17.68 to 34.97% higher root irrigation water use efficiency, 20.38 to 37.78% higher sugar irrigation water use efficiency, 17.07 to 30.68% higher root crop water use efficiency, and 19.57 to 33.53% higher sugar crop water use efficiency, respectively, when compared with No-Mulch treatment. The study thus revealed that the use of mulches has the potential to improve the land and water productivity of sugar beet in water limited areas.

Keywords:*crop yield, film mulch, straw mulch, root yield, sugar yield and water use efficiency.*

4. A., S. Z., **Kaleem, M. M., Usman, M., Jawad, M., & Ajwad, A.** (2018). Comparison of Mechanical Properties of Normal & Polypropylene Fiber Reinforced Concrete. *Scientific Inquiry and review, 2*(1), 33-47. **(M. M. Kaleem (Civil Engineering /SEN), M. Usman, M.Jawad, Ali Ajwad) (UMT Journal)**

Abstract: Concrete is the most commonly used construction material in the world. However, normal weight concrete shows less resistance to flexure. This research dealt with the technique to improve material efficiency in flexure as well as in compression, using polypropylene fibers. Different samples of concrete were prepared containing different dosages of polypropylene fibers (0.1%, 0.2%, 1% and 2% of the total concrete volume). The samples were then tested in compression and flexure, after 7, 14 and 28 days. The experimental investigation showed that the fibers increase the flexural strength of concrete in elastic range, when used in a specific limit. Maximum efficiency from the material was obtained at 0.2% dosage of fibers. Below and above this percentage the flexural and compressive strengthsstart decreasing. The experimental results also confirmed that with the gradual increase in polypropylene content the water absorption of concrete increases.

Keywords: *polypropylene fibers, flexure strength, compressive strength, shrinkage.*

5. **Ajwad, A., Ilyas, U., Shafiq, M., & Rashid, M. U.** (2018). Effect of Addition of Pozzoplast as Additive on Local Soil Stabilization. *NFC IEFR Journal of Engineering and Scientific Research, 5*. doi: 10.24081/nijesr.2017.2.0005.**(Ali Ajwad (Civil Engineering /SEN), Usman Ilyas, M. I. Shafiq, M. Usman Rashid) HEC Z CAT**

Abstract: The one most important technique used in construction especially in pavement and foundation is soil stabilization because it improves the engineering properties of soil such as durability, volume stability and strength. In this study the Pozzoplast, a processed siliceous (fly ash) is used as stabilizing agent for non-plastic soil collected from district Lahore Punjab. Preparation of soil sample was done by adding varying amount of Pozzoplast (5, 10, and 20% by weight). Basic properties of soil such as plasticity index, cohesion, angle of internal friction, optimum moisture content (OMC), unconfined compressive strength, maximum dry density (MDD) and shear strength were determined.All tests were carried out according to the provision of the relevant ASTM specifications. Test results showed that when fines increase, liquid limit, angle of internal friction and OMC increases and, MDD and cohesion decreases. Unconfined compressive strength also improved drastically. Detail research analysis shows that for the

stabilization of non-plastic soil as well as high plastic soil, the appropriate amount of pozzoplast (processed fly ash) was observed to be 20% of soil by weight.

Keywords:*soil stabilization, pozzoplast, optimum moisture content, maximum dry density.*

6. **Rashid, M. U., Noman, M., & Sajjad, U.** (2018). Comparative Analysis of Ballastless Track System Design Using Analytical and Numerical Tools. *Technical Journal, (UET) Taxila, 22*(IV).**(Muhammad Usman Rashid (Civil Engineering /SEN), Muhammad Noman, Umer Sajjad)**HEC Y CAT

Abstract: Railways is becoming faster, with high speed runningvehiclesexertingwheelloadsontrackscould become critical for track quality and the overall lifecycle. To cope with such high loads, state of the art ballastless track systems could be a long-term solution and to increase its acceptance under limited economic boundary conditions. FiniteElementModeling(FEM)ispowerfultoolthat optimizes the design of the ballastless track. This study examines the reliability and verification of Finite element (FE) Models with analytical tools. Firstly, using analytical tools,theZimmermannandtheWestergaardmethods, continuously reinforced concrete pavement (CRCP) slab with various cracking distances are designed followed by numerical design and analysis. Comparative design analysis is then carried out between analytical and numerical tool to evaluate the impact of input parameters on each of the tools. The finite element package SOFiSTiK is used to model ballastless track design. The verification of FE- model is also done based on calibrations, results and boundary conditions to check reliability, behavior and working. Lastly author gives some guidelines for the model verification.

Keywords:*ballastless track system, finite element modeling,westergaardand Zimmerman methods, continuously reinforced concrete pavement.*

7. Malik, A., **Shakir, A. S.,** Naveedullah, A., Khan, M. J., **Latif, M.,** Khattak, M. S., & Khan, T. A. (2018). Interactive effect of deficit irrigation and mulching on sugar beet productivity in Pakistan. *Pakistan Journal of Botany, 50*(5), 1769-1774.**(Shakir Ahmad (Civil Engineering /SEN), Muhammad Latif)** JCR Listed (IF: 0.750)

Abstract: In dry regions, irrigated agriculture is facing increasing demand for decreasing water resources. For sustainable and efficient use of the available water resources, field scale water saving strategies must be applied to enhance water productivity and crop yield. Deficit irrigation application along with suitable soil moisture conservation technique is one of the strategies and its successful application depends on crop response to different water stress levels. This research paper presents results of two years (2011-12 and 2012-13) study carried out at Sugar Crops Research Institute (SCRI) Mardan, to determine the effect of different irrigation deficit levels applied throughout the crop growing season and different types of mulching on productivity of sugar beet. The field experiments included four water stress levels designated as FI (full irrigation), DI/sub 20/, DI/sub 40/, DI/sub 60/(20, 40 and 60 percent deficit irrigation levels) and three moisture conservation practices; No mulch (NM), black polyethylene film mulch (BFM) and straw mulch (SM), respectively. Results revealed that different water stress levels and mulching combination produced significant effects on yield of sugar beet and its water productivity. The highest mean root yield was produced by FI- BFM combination and the highest mean sugar yield by DI/sub 20/-BFM treatment. Results further revealed that the relative amounts of irrigation water saved by irrigation regimes and mulching interaction was ranged from 5.83 to 66.53% and the relative reduction in seasonal water used was ranged between 2 and 47%, respectively. The mean root and sugar water productivities observed in this study were lowest for FI and NM combination and the highest for DI/sub 60/ and BFM. Overall finding of this study is that deficit irrigation and mulching can save water and improve its water productivity significantly.

Keywords:*cultivation techniques, irrigation, moisture, productivity, straw, sugar beets, water resources.*

Conference Papers

1. **Ali, N.,** & Rahim, A. (2018). *Scenario-Based Impediments for Intelligent Freight Transportation in Pakistan.* Paper presented at the 2018 15th International Conference on Smart Cities: Improving Quality of Life Using ICT & IoT (HONET-ICT). **(Nazam Ali (Civil Engineering /SEN)**

Abstract: Freight transportation is a dynamic part of a country's economy and yield positive dimensions on GDP. This paper discusses the problems that why intelligent freight transportation, a prerequisite for the regional or international evolution and development, is relatively missing from the mainstream economic geography of Pakistan. This paper discusses the possible scenario-based impediments which hinder the intelligent operations of freight transportation in the region. The core scenario-based impediments discussed in this paper include; State Fleet Policy (SFP), Advanced Driver Assistance Systems (ADAS), Infrastructure Management Systems (IMS), and City Logistics (CL). The role of the most direct key factors along with their negative projections on impact areas impeding smart transportation logistics are also highlighted in this research. For future research, these implications will also be validated via expert surveys or a Delphi-analysis.
Keywords:*freight transportation, ITS, scenario-based impediments, state fleet policy, city logistics.*

Department of Electrical Engineering

Research Articles

1. **Hussain, H. Z.,** Haider, A., Fakhar, M. S., **Ahmad, J., Asim Butt, M., & Siddique Khokhar, K**. (2018). Short-term Scheduling of Non-Cascaded Hydro-thermal System with Transmission Losses using Accelerated Particle Swarm Optimization Algorithm. *Pakistan Journal of Engineering and Applied Sciences 22*, 20-29.**(Hafiz Zaheer Hussain (Eletrical Engineering /SEN) Jameel Ahmad, Muhammad Asim Butt, Khawar Siddique Khokhar)HEC X CAT**

   Abstract: This paper presents the implementation of accelerated particle swarm optimization (APSO) algorithm for a non-cascaded hydro-thermal scheduling and economic dispatch problem with hydel power transmission losses. APSO is a single step position updating variant of PSO and due to its single step updating of particles, it is very fast in converging towards global optimization solution of non-linear economic dispatch problems, as compared to the other variants of PSO. Convergence rates of this implementation are compared with approaches presented in literature for the same problem. Our solution outperforms other solutions despite additional constraint of transmission losses.

   Keywords: *economic dispatch, hydro-thermal scheduling, accelerated particle swarm optimization (apso), power optimization.*

2. **Ahmad, J., Imran, M., Khalid, A., Iqbal, W., Ashraf, S. R., Adnan, M., . . . Khokhar, K. S.** (2018). Techno economic analysis of a wind-photovoltaic-biomass hybrid renewable energy system for rural electrification: A case study of Kallar Kahar. *Energy, 148*, 208-234. doi: https://doi.org/10.1016/j.energy.2018.01.133.**(Jameel Ahmad (Eletrical Engineering /SEN) Abdullah Khalid, Waseem Iqbal, Syed Rehan Ashraf, Muhammad Adnan, Syed Farooq Ali, Khawar Siddique Khokhar)JCR Listed (IF:4.968)**

   Abstract: This paper focuses on the techno-economic feasibility of a grid-tied hybrid microgrid system for local inhabitants of Kallar Kahar near Chakwal city of Punjab province in Pakistan and investigates the potential for electricity generation through hybrid wind, photovoltaic and biomass system. The comprehensive resource assessment of wind, biomass and solar energy is carried out for grid integration. Homer Pro software is used to model a hybrid microgrid system. Optimization results and sensitivity analysis is carried out to ensure the robustness and cost-effectiveness of the proposed hybrid microgrid system. The total load has been optimally shared among generated power through wind, photovoltaic and biomass resources and surplus power is supplied to the national grid in case of low local demand of the load. The results of techno-economic feasibility study show that hybrid power system can generate more than 50 MW. The cost of energy based on peak load demand profiles are considered for both residential and commercial sectors. The cost of hybrid system for peak load of 73.6 MW is 180.2 million USD and levelized cost of energy is 0.05744 $/kWh.

   Keywords: *hybrid power system, wind energy, photovoltaic system, feasibility analysis, biomass energy, homer pro, techno-economic analysis.*

3. **Kaleem, M.,** Guergachi, A., & Krishnan, S. (2018). Patient-specific seizure detection in long-term EEG using wavelet decomposition. *Biomedical Signal Processing and Control, 46*, 157-165. doi: 10.1016/j.bspc.2018.07.006.**(Muhammad Kaleem (Eletrical Engineering /SEN)JCR Listed (IF: 2.783)**

   Abstract: This paper presents a novel patient-specific seizure detection approach using wavelet decomposition of multi-channel EEG data and hand-engineered features extracted from the decomposed data. EEG data of all channels of each patient are segmented into four second segment lengths, and these segments are decomposed using discrete wavelet transform into four frequency bands corresponding to the δ, θ, α and β EEG rhythms. Three features are then extracted from each of these bands, which are used to classify the seizure and non-seizure segments. The proposed approach does not require any feature processing, or any post-processing for obtaining the seizure detection results. The CHB-MIT database with

data of 23 pediatric patients is used for validation of the proposed seizure detection approach using five classifiers, and accuracy, sensitivity and specificity values of 99.6%, 99.8% and 99.6% respectively, averaged over all 23 patients, are obtained using five-fold cross-validation method. The obtained seizure detection results are compared with the results of other studies using the same database, and shown to out-perform the state-of-the-art. Furthermore, the obtained results are consistent over the data of all the patients, thereby demonstrating the robustness of the approach. The computational efficiency of the proposed approach, which is another highlight of the approach, is also illustrated in the form of metrics. The suitability of the approach for seizure detection in long-term multi-channel EEG recordings is also discussed.

Keywords:_patient-specific seizure detection, long-term eeg, wavelet decomposition, feature extraction, classification._

4. **Kaleem, M.,** Gurve, D., Guergachi, A., & Krishnan, S. (2018). Patient-specific seizure detection in long-term EEG using signal-derived empirical mode decomposition (EMD)-based dictionary approach. _Journal of Neural Engineering, 15_(5), 14. doi: 10.1088/1741-2552/aaceb1.**(Muhammad Kaleem (Eletrical Engineering /SEN)**JCR Listed (IF: 3.920)

Abstract: Objective. The objective of the work described in this paper is the development of a computationally efficient methodology for patient-specific automatic seizure detection in long-term multi-channel EEG recordings approach. A novel patient-specific seizure detection approach based on a signal-derived empirical mode decomposition (EMD)-based dictionary approach is proposed. For this purpose, we use an empirical framework for EMD-based dictionary creation and learning, inspired by traditional dictionary learning methods, in which the EMD-based dictionary is learned from the multi-channel EEG data being analyzed for automatic seizure detection. We present the algorithm for dictionary creation and learning, whose purpose is to learn dictionaries with a small number of atoms. Using training signals belonging to seizure and non-seizure classes, an initial dictionary, termed as the raw dictionary, is formed. The atoms of the raw dictionary are composed of intrinsic mode functions obtained after decomposition of the training signals using the empirical mode decomposition algorithm. The raw dictionary is then trained using a learning algorithm, resulting in a substantial decrease in the number of atoms in the trained dictionary. The trained dictionary is then used for automatic seizure detection, such that coefficients of orthogonal projections of test signals against the trained dictionary form the features used for classification of test signals into seizure and non-seizure classes. Thus no hand-engineered features have to be extracted from the data as in traditional seizure detection approaches. Main results. The performance of the proposed approach is validated using the CHB–MIT benchmark database, and averaged accuracy, sensitivity and specificity values of 92.9%, 94.3% and 91.5%, respectively, are obtained using support vector machine classifier and five-fold cross-validation method. These results are compared with other approaches using the same database, and the suitability of the approach for seizure detection in long-term multi-channel EEG recordings is discussed. Significance. The proposed approach describes a computationally efficient method for automatic seizure detection in long-term multi-channel EEG recordings. The method does not rely on hand-engineered features, as are required in traditional approaches. Furthermore, the approach is suitable for scenarios where the dictionary once formed and trained can be used for automatic seizure detection of newly recorded data, making the approach suitable for long-term multi-channel EEG recordings.

Keywords:_patient-specific seizure detection, feature extraction, classification, log-term EEG, empirical mode decomposition (EMD), EMD-based dictionary approach._

5. Raza, A., Yousaf, Z., Jamil, M., Gilani, S. O., Abbas, G., Uzair, M., . . . **Shaheen, S.** (2018). Multi-Objective Optimization of VSC Stations in Multi-Terminal VSC-HVdc Grids, Based on PSO. _Ieee Access, 6_, 62995-63004. doi: 10.1109/access.2018.2875972.**(Saima Shaheen (Eletrical Engineering /SEN)**JCR Listed (IF: 3.557)

Abstract: The objective of this paper is to enhance the control performance of voltage source converter (VSC) stations within multi-terminal high voltage direct current (M-HVdc) grids under dynamic conditions. This paper presents the application of particle swarm optimization (PSO) to tune the control parameters of VSC stations. VSCs are non-linear components of the M-HVdc grids. Conventional techniques use approximated linear models to tune the control parameters which do not produce optimal results. Thus, PSO is employed to optimally tune the control parameters of VSC stations. The algorithm of the proposed objective function applies simultaneous optimization of inner and outer control layers. Dynamic simulations of a four-terminal HVdc system are developed in PSCAD/EMTDC to extol the merits of the presented optimization technique. Results show the steady state and dynamic control performances, both for classically and PSO-based tuned parameters, during load demand change from ac grids, wind power change, and eventual permanent VSC disconnection.

Keywords:*multi-terminal VSC-HVdc grid, multi-objective optimization, offshore wind farms, particle swarm optimization (PSO), voltage source converters, proportional integral (PI).*

6. **Rizwan, M.,** Whitaker, B. M., & Anderson, D. V. (2018). AF detection from ECG recordings using feature selection, sparse coding, and ensemble learning. *Physiological Measurement, 39*(12), 10. doi: 10.1088/1361-6579/aaf35b.**(Muhammed Rizwan(Eletrical Engineering /SEN)JCR Listed (IF: 2.006)**
Abstract: Objective: The objective of this paper is to provide an algorithm for accurate, automated detection of atrial fibrillation (AF) from ECG signals. Four types of ECG signals are considered: normal signals, signals representing symptoms of AF, other signals, and noisy signals. This paper represents followup work to the authors' entry in the 2017 PhysioNet Challenge as reported in the 2017 Computing in Cardiology Conference. Approach: Our approach involves extracting features from the ECG waveform and training a machine learning classifier. In feature extraction, we calculate several statistical features related to the ECG signal and fiduciary points. We also used a disciplined method of feature selection to reduce the dimensionality of the feature space. We also employ sparse coding as an unsupervised feature extraction tool. The classifier we use is a decision tree-based ensemble learning classifier. Main results: When applied to the hidden test data reserved by the PhysioNet Challenge organizers, our classifier reports F1 scores of 0.91, 0.78, and 0.71 for the Normal, AF, and Other classes, respectively. The overall test score is 0.80, and is obtained by averaging the F1 scores for these three classes. Significance: This work demonstrates that feature selection and ensemble learning can be used to improve the performance of ECG-based classification of AF.

Keywords:*atrial fibrillation, feature selection, ensemble learning, sparse, coding, dictionary learning.*

7. Zeb, K., Din, W. U., Khan, M. A., **Khan, A.,** Younas, U., Busarello, T. D. C., & Kim, H. J. (2018). Dynamic Simulations of Adaptive Design Approaches to Control the Speed of an Induction Machine Considering Parameter Uncertainties and External Perturbations. *Energies, 11*(9), 25. doi: 10.3390/en11092339.**(Ayesha Khan (Eletrical Engineering) JCR Listed (IF: 2.676)**(SKT Campus)
Abstract: Recently, the Indirect Field Oriented Control (IFOC) scheme for Induction Motors (IM) has gained wide acceptance in high performance applications. The IFOC has remarkable characteristics of decoupling torque and flux along with an easy hardware implementation. However, the detuning limits the performance of drives due to uncertainties of parameters. Conventionally, the use of a Proportional Integral Differential (PID) controller has been very frequent in variable speed drive applications. However, it does not allow for the operation of an IM in a wide range of speeds. In order to tackle these problems, optimal, robust, and adaptive control algorithms are mostly in use. The work presented in this paper is based on new optimal, robust, and adaptive control strategies, including an Adaptive Proportional Integral (PI) controller, sliding mode control, Fuzzy Logic (FL) control based on Steepest Descent (SD), Levenberg-Marquardt (LM) algorithms, and Hybrid Control (HC) or adaptive sliding mode controller to overcome the deficiency of conventional control strategies. The main theme is to design a robust control scheme having faster dynamic

response, reliable operation for parameter uncertainties and speed variation, and maximized torque and efficiency of the IM. The test bench of the IM control has three main parts: IM model, Inverter Model, and control structure. The IM is modelled in synchronous frame using dq modelling while the Space Vector Pulse Width Modulation (SVPWM) technique is used for modulation of the inverter. Our proposed controllers are critically analyzed and compared with the PI controller considering different conditions: parameter uncertainties, speed variation, load disturbances, and under electrical faults. In addition, the results validate the effectiveness of the designed controllers and are then related to former works.

Keywords:*induction motor,indirect field oriented control, PI controller, adaptive PI controller, fuzzy logic controller, sliding mode controller, adaptive sliding mode controller, space vector pulse width modulation.*

8. **Zeb, K., Uddin, W., Haider, A., Belal, S.,** Mehmood, C. A., Khan, M. A., & Kim, H. J. (2018). Robust speed regulation of indirect vector control induction motor using fuzzy logic controllers based on optimization algorithms. *Electrical Engineering, 100*(2), 787-802. doi: 10.1007/s00202-017-0553-z.**(Kamran Zeb (Eletrical Engineering), Waqar Uddin, Aun Haider, S. Belal)**JCR Listed (IF: 1.296) (SKT Campus)

Abstract: Currently, in high-performance applications, the vector control (VC) scheme of induction motor (IM) is widely employed in industry. The VC scheme has significant features of decoupling torque and flux; also, its hardware implementation is easier. Conventionally, PID control schemes are frequently used for variable speed operation. However, the performance of the VC scheme is limited over a wide range of speed operation because of de-tuning caused by parameter uncertainties. To address the aforementioned challenging problem, adaptive and robust control strategies are mostly implemented. This paper presents various novel, adaptive, and robust control strategies, namely (a) fuzzy logic controller (FLC) based on Levenberg–Marquardt algorithm (LMA), (b) FLC based on steepest descent algorithm (SDA), (c) FLC based on Newton algorithm (NA), and (d) FLC based on Gauss–Newton algorithm (GNA) for the indirect vector control (IVC) three-phase IM. The focal motive is to accomplish fast dynamic response with fault-tolerant capability, load disturbance rejection qualities, insensitivity to the parameter uncertainties, robustness to speed variation, and to acquire maximum efficiency as well as torque. The d–q modeling of the IVC IM in the synchronous reference frame and space vector pulse width modulation (SVPWM) employed in inverter are designed in MATLAB/Simulink. Our work also presents critical, analytical, and comparative assessment of the proposed controllers with traditional tuned PI control strategy for the electrical faults perturbation, load disturbances, speed variations, and parameter uncertainties. Furthermore, the simulation results of the above-mentioned designed control strategies validated robust, smooth, and faster response with permissible overshoot, undershoot, settling time, and rise time for the IVC IM drive system, compared to prior works.

Keywords:*induction motor (IM) indirect vector control (IVC) space vector pulse width modulation (SVPWM) fuzzy logic controller (FLC) steepest Descent (SD) levenberg–marquardt (LM) newton gauss–newton (GN).*

9. Ullah, R., **Ullah, Z., Haider, A.,** Amin, S., & Khan, F. (2018). Dielectric properties of tetrafluoroethane (R134) gas and its mixtures with N2 and air as a sustainable alternative to SF6 in high voltage applications. *Electric Power Systems Research,* 163, 532-537. doi: https://doi.org/10.1016/j.epsr.2018.04.019.**(Zahid Ullah (Eletrical Engineering), Aun Haider)**JCR Listed (IF: 2.856)(SKT Campus)

Abstract:A gas insulation medium SF6 has been widely employed in Gas Insulated Switchgear (GIS) since the 1960s. However, the high Global Warming Potential (GWP) limits the employment of SF6 gas as insulation medium in power system equipment. Therefore, to reduce environmental hazards, an alternative to SF6 is needed. In this regard, R134 gas seems to be a good replacement for SF6 gas considering the environmental concerns, because GWP of R134 is 94% less and cheap insulation medium, compared to SF6. Considering the aforementioned features of R134 gas, our paper presents an experimental and analytical study of R134 gas and its mixtures with N2 and air. The R134 gas emerged as a strong alternative to SF6 gas and possesses 0.85 times dielectric strength, compared to SF6 gas. We include a comparative study of SF6, R134, and their mixture by evaluating the following aspects: (a) environmental effects and (b) liquification condition. Further,

the experimental arrangement, procedures, and testing methodologies are elaborated in this paper. Our work also performs the power frequency breakdown voltage testing of R134 and its mixtures. Furthermore, the Synergistic effect, Self-recoverability, and Liquification are investigated in this paper. Based on our experiments, the final results reveal that R134 is a better insulation medium than SF6.

Keywords:*R134 gas, gas insulation, breakdown characteristics, synergistic effects, liquification.*

10. Irfan, M., Abas, N., & **Saleem, M. S.** (2018). Thermal performance analysis of net zero energy home for sub zero temperature areas. *Case Studies in Thermal Engineering, 12*, 789-796. doi: https://doi.org/10.1016/j.csite.2018.10.008.**(Muhammad Shoaib Saleem (Eletrical Engineering)(SJR)(SKT Campus)**

Abstract: With the increase in energy demand globally, environmental risks are also becoming more serious than ever before. Emission of carbon dioxide (CO_2) and other greenhouse gases (GHGs) are hastily contributing to global warming and ozone depletion phenomenon. Buildings play a major role in consumption of energy and emission of greenhouse gases. It is need of the hour to design such buildings which have zero emission and have renewable resources of energy for on-site generation. The theory of net zero energy and zero emission home is hot topic in the sustainable building industry these days. This study targets to design a model towards energy-neutral or netzero energy home in sub-zero temperature areas. On-site renewable energy resources are employed to generate energy independently including solar and wind energy. System is simulated for whole year on hourly basis in TRNSYS® simulation software. Results have shown good tendency for the construction of net-zero energy homes and renewable energy resources have shown promising outputs for on-site energy generation. Cold climate areas may have lower energy generation due to lower solar insolation during winter season. Pakistan has shown very good results and surplus energy produced. Lowest value of photovoltaic electric power generated is recorded 680 W in Barcelona during January, whereas Sydney has a lot of potential for PV generation of 1400 W. For wind turbine with hub height at 46 m, system produced 0.2 MW lowest value in California and highest value 1.85 MW in Karachi. Annual peak zone temperature has been recorded for Lahore 65 °C. System designed finds highest implementation with stated conditions.

Keywords:*renewable energy, netzero energy buildings, sustainable energy, energy security, sub-zero weather areas.*

11. Abas, N., Kalair, A. R., Khan, N., **Haider, A.,** Saleem, Z., & **Saleem, M. S.** (2018). Natural and synthetic refrigerants, global warming: A review. *Renewable and Sustainable Energy Reviews, 90*, 557-569. doi: https://doi.org/10.1016/j.rser.2018.03.099.**(Aun Haider (Eletrical Engineering), Muhammad Shoaib Saleem, JCR Listed (IF: 9.184)(SKT Campus)**

Abstract: Halogenated hydrocarbons with high ozone depletion potential (ODP) were banned under Montreal Protocol (1987) due to their detrimental effects on ozone layer that shields the planet against ultraviolet radiations. The greenhouse gases (GHG) used in modern refrigeration, air conditioning, and heat pumping systems, are under Kyoto Protocol (1997)'s time-barred permission period. In order to reduce the depletion of ozone and reverse the climate change effects, the European Union legislation (2014) and Paris Accord (2016) are strongly emphasizing the phasing out of the use of harmful synthetic refrigerants. Choice of natural refrigerants makes no net addition of the greenhouse gases (GHG) in the environment. To retrofit and modify existing cooling and heating systems using natural refrigerants, extensive investigations are in progress worldwide. This work reviews timeworn, current and the next-generation refrigerants using Refrigerant Qualitative Parametric (RQP) quantification model to assist the refrigerant choice decision process. It is based on the ratio of arithmetic sums of actual parametric values of refrigerants normalized to equivalent ideal values. This model can help in choosing alternative refrigerants to replace CFCs by HCFCs or HFCs provisionally and finally replacing HCFCs or HFC to low GWP and ODP synthetic and natural refrigerants. A set of 16 refrigerants, both natural and synthetic, as an example, is computed for the

standard Vapour Compression Cycle (VCC) based on the proposed model using REFPROP (NIST- 23 standard). The techno-economic parametric values of chosen refrigerants are taken from cited literature, ASHREA safety standards and international environmental legislations, laws and protocols. This paper reports the environment benign natural (CO_2, NH_3, HCs) and a few synthetic (R-152a, R-1234yf) refrigerants to be the optimal options.

Keywords:*ozone depletion potential (odp), global warming potential (gwp), natural refrigerants.*

12. **Ahmad, J.,** Tahir, M., & Mazumder, S. (2018). Improved Dynamic Performance and Hierarchical Energy Management of Microgrids with Energy Routing. *IEEE Transactions on Industrial Informatics,* 1-1. doi: 10.1109/TII.2018.2877739.**(Jameel Ahmad (Eletrical Engineering)JCR Listed (IF: 5.430)**

Abstract: In this paper a hierarchical distributed energy management of multi-microgrids with energy routing is proposed. Existing control strategies for power sharing, transient performance and economic-emission dispatch in microgrids with distributed generators fall short in providing good dynamic performance. To address this issue, a hierarchical distributed optimization is proposed by using top-down approach, which decomposes original economic-emission dispatch of multi-microgrid scenario into individual microgrid and energy routing sub-problems. Distributed electric vehicle charging, intermittent photovoltaic source and battery energy storage system are incorporated in the optimization model. Using multi-agent system model for distributed generation, a dynamic performance controller (DPC) is proposed for each microgrid to achieve improved performance during transients. Convergence of optimization algorithm is proved using Lyapunov theory. Performance evaluation results show that the proposed DPC for economic-emission dispatch improves system performance significantly during either load or generator switching.

Keywords:*distributed generation, multi-agent system, dynamic performance, energy router, economic-emission dispatch.*

13. Cordes, D., Zhuang, X., **Kaleem, M.,** Sreenivasan, K., Yang, Z., Mishra, V., . . . Cummings, J. L. (2018). Advances in functional magnetic resonance imaging data analysis methods using Empirical Mode Decomposition to investigate temporal changes in early Parkinson's disease. *Alzheimer's & Dementia: Translational Research & Clinical Interventions, 4*, 372-386. doi: https://doi.org/10.1016/j.trci.2018.04.009.**(Muhammad Kaleem (Eletrical Engineering) (SJR)**

Abstract:

Introduction

Previous neuroimaging studies of Parkinson's disease (PD) patients have shown changes in whole-brain functional connectivity networks. Whether connectivity changes can be detected in the early stages (first 3 years) of PD by resting-state functional magnetic resonance imaging (fMRI) remains elusive. Research infrastructure including MRI and analytic capabilities is required to investigate this issue. The National Institutes of Health/National Institute of General Medical Sciences Center for Biomedical Research Excellence awards support infrastructure to advance research goals.

Methods

Static and dynamic functional connectivity analyses were conducted on early stage never-medicated PD subjects (N = 18) and matched healthy controls (N = 18) from the Parkinson's Progression Markers Initiative.

Results

Altered static and altered dynamic functional connectivity patterns were found in early PD resting-state fMRI data. Most static networks (with the exception of the default mode network) had a reduction in frequency and energy in specific low-frequency bands. Changes in dynamic networks in PD were associated with a decreased switching rate of brain states.

Discussion

This study demonstrates that in early PD, resting-state fMRI networks show spatial and temporal differences of fMRI signal characteristics. However, the default mode network was not associated with any measurable

changes. Furthermore, by incorporating an optimum window size in a dynamic functional connectivity analysis, we found altered whole-brain temporal features in early PD, showing that PD subjects spend significantly more time than healthy controls in a specific brain state. These findings may help in improving diagnosis of early never-medicated PD patients. These key observations emerged in a Center for Biomedical Research Excellence–supported research environment.

Keywords:*resting-state fmri, empirical mode decomposition. emd. intrinsic mode function. group ica. functional connectivity. ppmi. parkinson's disease.*

14. **Ijaz, K., Khokhar, K. S., Adnan, M., & Saeed, A.** (2018). A Novel First Order Dithered Hybrid MASH-EFM with Cancellation Transfer Function Sigma-delta Modulator for Eight-bit Audio DAC. *Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences, 55*(1), 81-95.**(Khalid Ijaz (Eletrical Engineering) Khawar Siddique Khokhar, Muhammad Adnan, Awais Saeed)**HEC X CAT

Abstract: This work proposes a new architecture named "Dithered hybrid multi-stage noise shaping-error feedback modulator with cancellation transfer function" sigma-delta modulator for audio digital-to-analog (D/A) converter. Multi-stage noise shaping (MASH) architecture possesses noise shaping technique which produces high signal-tonoise ratio with greater stability. Error feedback modulator (EFM) has an advantage of providing greater stability with time varying inputs. The state-of-the-art technology under the name of dithered hybrid MASH-EFM with cancellation transfer function (CTF) sigma-delta modulator provides better noise shaping, high SNR and greater stability than the traditional sigma-delta architecture. MATLAB simulation shows that 1st order Dithered hybrid MASH-EFM SDM with CTF achieves high signal-to-noise ratio (SNR) of 184db over 22kHz bandwidth when oversampling ratio (OSR) is 128, which is approximately equal to the SNR of 2nd order traditional architecture. Other performance parameters like signal-to-quantization noise ratio (SQNR), effective number of bits (ENOB), signal-to-noise and distortion ratio (SNDR) and dynamic range (DR) are also recorded in this work. Noise transfer function (NTF) graphs are also plotted for traditional and proposed architectures. Keywords: Sigma-delta modulator (SDM),

Keywords:*sigma-delta modulator (SDM), multi-stage noise shaping (MASH), over sampling ratio (OSR), noise transfer function (NTF), signal transfer function (STF).*

15. **Abideen, Z. U., Anwar, M. B., & Tariq, H.** (2018).*Dual Purpose Cartesian Infrared Sensor Array Based PID Controlled Line Follower Robot for Medical Applications.* Paper presented at the 2018 International Conference on Electrical Engineering (ICEE). **(Zain Ul Abideen (Eletrical Engineering/SEN) M. Bilal Anwar, Hassan Tariq)**ISI Web of Science (Proceedings Paper)

Abstract: The line following robot (LFR) is used for many applications such as irrigation system, library management,shopping malls etc. Some of them have fast speed with the lowest accuracy and vice versa. There are a lot of methods to make a LFR but for high quality performance designing is very necessary along with proper algorithm. Similarly, this paper includes the implementation of PID controller with the Cartesian sensor array on a line following robot (LFR) with dual purpose lines, such as a white line with a dark surface or vice versa. This LFR is modeled with implementing the inverse kinematics and calculating the step response of DC motor with state space modeling. The basic aim of this research is to make a LFR which follows any tough path with utmost efficiency. The implementation of the Cartesian sensor array improves the speed and accuracy because it has a versatile feature to move the LFR on an inclined surface. For smooth and swift drive sensor adjustment algorithm incorporate the PID based algorithm, where feedback is taken by Infrared sensors (IR) that serves as a process Variable to calculate Error Signal. The LFR is implemented on hardware using the local electronic components and then testing of the LFR accomplish in many complex arenas which have all possible curves. This design is extremely stable and efficient to implement in many applications especially dominated in the medical field.

Keywords:*arduino, line following robot, pid, ir sensor, line tracking algorithm.*

Conference Papers

1. Alam, F., **Ullah, Z.,** Majid, A., Saleem, J., & **Haider, A.** (2018). *Design of high frequency (MHz) planar pot-core transformer.* Paper presented at the 2018 1st International Conference on Power, Energy and Smart Grid (ICPESG). **(Zahid Ullah (Eletrical Engineering), Aun Haider)**(SKT Campus)

   Abstract: High-frequency planar transformers are widely used in many electronics converters, such as inverters, drives, power supplies, and resonant converters. The design process of the high-frequency planar transformer is very complicated because of high-frequency interaction between the windings due to which numerous problems persist, namely: (a) leakage inductance, (b) skin and proximity effect, and (c) complexity of the magnetic circuit. In this regard, this paper emphasizes on the Finite Element Method (FEM) that addresses the aforementioned problems. The FEM model of the high frequency planar Pot-Core transformer is designed in two-dimensional (2D) axial symmetry using COMSOL Multiphysics Software. Moreover, the mathematical modeling, meshing aspects and combination with electrical circuit interface are examined for MHz level high-frequency Planar Pot-Core Transformer.

   Keywords:high-frequency operation, multilayer planar transformer, FEM modeling aspects, comsol, planar pot-core transformer.

2. **Azeem, B., Ullah, Z.**, Rehman, F., Ali, S. M., **Haider, A.,** Saeed, S., . . . **Hussain, I**. (2018). *Levenberg-Marquardt SMC control of grid-tied Doubly Fed Induction Generator (DFIG) using FRT schemes under symmetrical fault.* Paper presented at the 2018 1st International Conference on Power, Energy and Smart Grid (ICPESG). **(Babar Azeem, (Eletrical Engineering),Zahid Ullah, Aun Haider, I. Hussain)**(SKT Campus)

   Abstract: The variable speed Doubly-Fed Induction Generator (DFIG) is widely deployed in Wind Energy Conversion System (WECS). Levenberg-Marquardt Sliding Mode Controller (LM-SMC) is applied to Grid Side Converter (GSC) that ensure voltage regulation of DC-Link capacitor during symmetrical transmission line faults. Moreover, hardware solutions are implemented, namely STFCL and DC-Chopper to enhance the FRT capability during balanced grid faults. DC-chopper is connected in parallel with DC Link capacitor for prevention of rapid fluctuations in DC-link voltage, while the STFCL is a stator switch having ability to protect the back to back converters from inrush currents and overvoltages during grid faulty condition as well as turbine gearbox from over torque. The validity of the proposed controller and topologies are verified using simulation analysis of 1.5MW DFIG (9MW grid-connected system) prototype in MATLAB/Simulink. The results of LM-SMC controller improved with FRT schemes are critically compared with typical tuned Proportional Integral Derivative (PID) controller.

   Keywords:DFIG, levenberg-marquardt SMC, proportional integrator derivative (PID), fault-ridethrough (FRT), WECS.

3. Ullah, R., Rashid, A., **Haider, A.,Ullah, Z.,** Ahmad, N., Sulemani, M. S., & Rahman, N. U. (2018). *Performance evaluation of power transformer under different diagnostic techniques*. Paper presented at the 2018 International Conference on Computing, Mathematics and Engineering Technologies (iCoMET).**(Aun Haider (Eletrical Engineering), Zahid Ullah)**(SKT Campus)

   Abstract: In an electrical power system, the transformer is one of the most important and efficient machines, and to ensure the continuity of power supply utmost care should be taken for its safe operation. Transformers are robust device but they may fail over time due to old age, poor insulation, deterioration of cellulose as well as oil insulation. In addition, there are several elements that may lead to insulation's premature aging and damages; these may include oxygen, heat and moisture contents. transformer oil provides insulation and cooling inside a machine, however there are various factors which affect the insulation strength and smooth flow of the transformer oil over the period of time, so it is therefore very important to observe some of the specific parameters like electrical (specific resistance, dielectric strength,

dielectric dissipation factor or tan delta), chemical (Water content, sludge content, acidity) and physical (viscosity, flash point, pour point) to check the effectiveness of the transformer oil Therefore by keeping in mind the factor of reliability, this work presents three field transformers along with application of different diagnostic methods on their oil sample. At the end of this work, the detailed analysis carried out on the basis of effects of temperature, humidity, and loading. Tests are performed to check the appearance, breakdown voltage, water content, acidity, dielectric dissipation or tan delta Dissolved gas analysis (DGA) and kinematic viscosity of the oil samples, results obtained from these tests are then compared to IEC standards to check the effectiveness of the oil samples.

Keywords:*ageing, electric strength, IEC standards, moisture, power transformer insulation, transformer oil viscosity, oil sample, power transformer, different diagnostic techniques, electrical power system, power supply utmost care, old age, poor insulation, oil insulation, insulation strength, dielectric dissipation factor, water content, field transformers, kinematic viscosity, heat content, moisture content, performance evaluation, specific resistance, dielectric strength, tan delta, sludge content, breakdown voltage, Oils, Reliable Operation, Diagnostic Techniques.*

4. Cordes, D., **Kaleem, M. F.,** Zhuang, X., Sreenivasan, K., Yang, Z., Curran, T., & Mishra, V. (2018). *Frequency Characteristics of Blind-Deconvolved Resting-State Networks using Empirical Mode Decomposition*. Paper presented at the 2018 Joint Annual Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), Paris, FRANCE, Paris, France http://archive.ismrm.org/2018/5482.html.**(Muhammad Farhat Kaleem (Eletrical Engineering/SEN)**

Abstract: Energy-period relationships and frequency content of Intrinsic Mode Functions (IMFs) were studied in deconvolved fMRI data using a blind deconvolution method. Results are shown for multiband MB8 resting-state data collected with a TR of 0.765s for a group of 22 healthy subjects. Findings of the present study suggest that high-frequency content in the major primary resting-state networks (such as the Default Mode Network, Visual Network, Auditory Network, or Fronto-Parietal network) is rather limited and not supported to be of any significance for high frequencies larger than 0.21 Hz, whether in BOLD data or blind-deconvolved data.

5. **Ijaz, K.** (2018). *A new approach to remove limit cycle in Hybrid multi-stage noise shaping-error feedback sigma-delta modulator*. Paper presented at the 2nd international conference on innovative computing, University of Management and Technology (UMT), Lahore, Pakistan.**(Khalid Ijaz (Eletrical Engineering/SEN)**

Abstract: The output bit stream of a sigma-delta modulator experiences a bit repetition when the constant noise superimposes on its input over a short period of time. This leads to an issue called limit cycle. Limit cycle affects the stability and performance of sigma-delta modulator by degrading its spurious-free dynamic range. Dithering was widely used to remove this issue in the past. In Hybrid multi-stage noise shaping-error feedback sigma-delta modulator, only dithering is insufficient to eliminate limit cycles. This work proposes a new method which is successive bits comparison and reduction to detect and disturb the limit cycles. In this approach, current bit is subtracted from the previous bit. If a subtraction results in a zero value then it indicates the presence of limit cycles. After that those bits, which are the replicas of previous bits, are reduced. Dithering is applied at the output of SDM to maintain its dynamic range. Power spectral density simulation in MATLAB/Simulink suggests that this presented technique effectively removes the limit cycles from the shaped noise. The graphs also represent that it improves the spurious-free dynamic range which approaches to 52.29db.

6. Ahmad, B., **Iqbal, A., Saqib, R., Mirza, M. M., & Lali, A. u. M.** (2018). *Design and Implementation of Bluetooth Controlled Painting Robot for Auto Industry.* Paper presented at the Computing conference 2018 Cham. **(Ayesha Iqbal (Eletrical Engineering/SEN) Roshaan Saqib, Mohammad Mustafa Mirza, Atta ul Mohsin Lali)**

Abstract: This research paper presents a robotic arm based paint booth system for auto industry. Acrylic arm is used as robotic arm consisting of two different parts: the upper part that rotates at 180° and the lower part that rotates at 360°. Robotic arm minimizes waste and keeps the interior safe from paint drops as it follows targeted painting. Ultrasonic sensor is used for position allocation of the desired object which has to be painted, which improves spray paint efficiency and quality. The movement of the robot is controlled via Bluetooth using an Android App designed by the authors using MIT App Inventor. The prototype model of this robot presented in the paper was practically implemented and successfully run by the authors.
Keywords:*android, auto industry, bluetooth robotic, arm ultrasonic, sensor.*

7. **Khalid, R., Shaheen, S.**, Aqeel-Ur-Rehman, & **Javed, A.** (2018, 10-12 September 2018). *Van de Graaff Generator – A Cost Effective Solution.* Paper presented at the Proc. of the 4rth International Conference on Power Generation Systems and Renewable Energy Technologies (PGSRET), Islamabad, Pakistan.**(Ramna Khalid (Eletrical Engineering/SEN) Saima Shaheen, Asfa Javed)**

Abstract:A Van de Graaff generator is an electrostaticaccelerator that is used for scientific experiments to get high voltages in less time with a high safety factor. The generated charges are used to speed up subatomic particles. Very high voltages up to the order of 5 Mega Volts can be generated by using it. One can easily perform experiments on this generator without having any sort of severe shock. This device is commonly used in physics and high voltage laboratory, to get high electrostatic charges, to perform various experiments. But due to its high price most of the institutes, especially in the developing countries, cannot afford this device. This study presents a solution to the problem by proposing a very economical design of Van de Graaff generator. Easily available materials are used to produce a low-price device. The measurements are taken between time and voltage at different motor speeds. The relationships have been derived in graphical form between certain parameters. The proposed design is verified by validating the results by comparing to the standards. The proposed design is a step forward towards a feasible instrument that can be adopted on a wide scale for the educational and the research purposes.
Keywords:*androidvan de graaff generator (vdg), electrostatic accelerator, high voltage generator.*

Department of Energy Engineering

Research Articles

1. Farooq, M., Almustapha, M. N., **Imran, M.,** Saeed, M. A., & Andresen, J. M. (2018). In-situ regeneration of activated carbon with electric potential swing desorption (EPSD) for the H2S removal from biogas. *Bioresource Technology, 249*, 125-131. doi: 10.1016/j.biortech.2017.09.198.**(Muhammed Imran (Energy Engineering /SEN)**JCR Listed (IF: 5.807)

   Abstract: In-situ regeneration of a granular activated carbon was conducted for the first time using electric potential swing desorption (EPSD) with potentials up to 30 V. The EPSD system was compared against a standard non-potential system using a fixed-bed reactor with a bed of 10 g of activated carbon treating a gas mixture with 10,000 ppm H2S. Breakthrough times, adsorption desorption volume, capacities, effect of regeneration and desorption kinetics were investigated. The analysis showed that desorption of H2S using the new EPSD system was 3 times quicker compared with the no potential system. Hence, physical adsorption using EPSD over activated carbon is efficient, safe and environmental friendly and could be used for the in-situ regeneration of granular activated carbon without using a PSA and/or TSA system. Additionally, adsorption and desorption cycles can be obtained with a classical two column system, which could lead towards a more efficient and economic biogas to biomethane process.

   Keywords:*activated carbon, biogas, epsd, in-situ regeneration, physical adsorption.*

2. **Imran, M.,** Haglind, F., Asim, M., & Alvi, J. Z. (2018). Recent research trends in organic Rankine cycle technology: A bibliometric approach. *Renewable & Sustainable Energy Reviews, 81*, 552-562. doi: 10.1016/j.rser.2017.08.028.**(Muhammed Imran (Energy Engineering/SEN)**JCR Listed (IF: 9.184) (Review)

   Abstract: This work describes the contribution of researchers around the world in the field of the organic Rankine cycle in the period 2000–2016. A bibliometric approach was applied to analyze the scientific publications in the field using the Scopus Elsevier database, together with Science Citation Index Expanded. Different aspects of the publications were analyzed, such as publication type, major research areas, journals, citations, authorship pattern, affiliations as well as the keyword occurrence frequency. The impact factor, h-index and number of citations were used to investigate the strength of active countries, institutes, authors, and journals in the organic Rankine cycle technology field. From 2000 to 2016, there were 2120 articles published by 3443 authors from 997 research institutes scattered over 71 countries. The total number of citations and impact factor are 36,739 and 4597, respectively, corresponding to 17 citations per paper and an impact factor of 2.168 per publication. The research articles originate primarily from China, the USA, and European countries. Results indicate that China, the United States, Italy, Greece, Belgium, Spain, Germany and the United Kingdom are the leading countries in organic Rankine cycle research and account for 64% of the total number of publications. The core research activities in the field are mainly focused on applications of the organic Rankine cycle technology, working fluids selection/performance, cycle architecture, and design/optimization. The most productive journal, author, institution, and country are Energy, Ibrahim Dincer, Tianjin University China and China, respectively.

   Keywords:*Organic Rankine Cycle, Scientometric, Bibliometric Research, trends, Low temperature, Waste heat.*

Conference Papers

1. **Shaukat, M., Ahmad, I., Rasheed, F., & Kamal, B.** (2018). *Assessment of health and safety issues in a manufacturing* Paper presented at the International Conference on Sustainability, Technology and Business (ICSTB 2018), Novotel Melaka, Melaka, Malaysia.**(Munim Shaukat (Industrial Engineering/SEN)Ijaz Ahmad, Faiza Rasheed, Basit Kamal)**

   Abstract: Industrial Sector is of vital worth for economic development of every country. Likewise in Pakistan, industrial sector holds for about 24% of GDP. For any sort of business, always there exists the possibility of an

accident or any damage for employees' health. For the very reason a dire requirement of a safety system arises (e.g. plan a strategy, authorize people and have unambiguous procedures); to administer such issues. Albeit a lot of research has been accomplished in construction sector; however it is not comprehensive and even manufacturing sector research scope is limited to a small level. A labor normally spends most of his time at work place; therefore work place must be safe and healthy; to evade any perilous impact regarding his safety concerns. This research is based on a case study conducted in a well renowned manufacturing industry of Pakistan. Pivotal focus of research is the assessment of health and safety practices and safety culture prevalent in manufacturing sector. A questionnaire survey would be performed to collect data regarding safety issues; so as to find out what is erroneous in Pakistan's manufacture why they are so and what should be done for their correction of these fallacious practices.

Keywords: *health and safety practices, HSE, Safety Culture, Injury Management.*

Department of Mechanical Engineering

Research Articles

1. **Sultan, T.,** Ahmad Chaudhry, I., **Ahmad, Z.**, Khurram, M. S., Ghauri, M., Rafiq, S., & Hussain Jaffery, M. (2018). Computational analysis of viscous flow using modified sparse point representation method. *Journal of Engineering Technology, 6*(1), 435-451.**(Tipu Sultan (Mechanical Engineering /SEN), Zeshan Ahmad)**JCR Listed (IF: 1.250)

Abstract: Intro: The blue-ribbon intentions of the Sparse Point Representation (SPR) is to represent the function through point values, prescribed by wavelets coefficient based on interpolation wavelet transform. In fluid dynamics, there are three formidable impediments shock, boundary layer and turbulence. The numerical simulations of these phenomena require immense computational power and memory requirements too. There are many numerical calculations which are redundant and much needed to be eliminated from many simulation processes. Methodology: In wavelet transform this is accomplished by a thresholding function to control the flag values of the grid points in SPR dataset. The aim of the present work is to propose, apply and assess a modified thresholding function which is able to cope with viscous effects. Thresholding function was modified by invoking the viscous effects to have better compression ratio and faster convergence acceleration. Results & conclusion: The viscous SPR method with modified threshold function is successfully applied to two-dimensional sub-sonic and transonic case studies for steady state conditions using 2-D Navier-Stokes equations. Two-time integration techniques Lower-Upper Symmetric-Gauss-Seidel (LU-SGS) and RungeKutta were employed. The new modified thresholding function was employed to boundary layer flow and shock phenomenon for computational analysis. The modified thresholding not only preserves the accuracy of previous method but also enhances the convergence acceleration and data compression.

Keywords: *wavelets, SPR, wavelet transform, data compression, convergence acceleration.*

2. **Ahmad, Z., Sultan, T.,** Asad, M., Zoppi, M., & Molfino, R. (2018). Fixture layout optimization for multi point respot welding of sheet metals. *Journal of Mechanical Science and Technology, 32*(4), 1749-1760. doi: 10.1007/s12206-018-0331-5.**(Zeshan Ahmad (Mechanical Engineering /SEN)Tipu Sultan)**JCR Listed (IF: 1.194)

Abstract: The high quality of welding in the automotive industry is achieved by proper positioning of the fixture elements. A new method, N-3-2-1 (N ≥ 1), is proposed for fixture layout optimization of sheet metals. The flexible nature of the sheet metals requires N+3 fixture elements to constrain it normal to the surface (primary plane), but 2-1 fixture elements for other two directions (secondary and tertiary). The objective function is to achieve high stiffness of the workpiece and is calculated in terms of strain energy. Finite element analysis (FEA) was combined with genetic algorithm. A method was also proposed to find the optimum fixturing position of the workpiece in multipoint respot welding operation. Two different kinds of

case studies were solved and the performance of the proposed method was also tested in the industrial scenario by fixturing the workpiece and completing the respot welding operation with satisfactory results.

Keywords: *fixturelayout optimization, fixture element, respot welding, genetic algorithm, finite element (fe)*

3. Yilbas, B. S., **Anwar, M. K.,** & Al-Sharafi, A. (2018). Innovative Design of a Thermal Battery: Influence of Carbon Nanotubes Concentration on Thermal Storage Characteristics. *International Journal of Thermophysics, 39*(10), 24. doi: 10.1007/s10765-018-2437-5.**(Muhammad Khalil Anwar (Mechanical Engineering /SEN)** **JCR Listed (IF: 0.829)**

Abstract: Innovative design of a thermal battery resembling the solar thermal receiver is introduced. The fully connected aluminum meshes and the phase change material (NaCO3) with the presence of multiwall carbon nanotubes (MWCNT) are used as the thermal energy storing medium in the thermal battery. The aluminum meshes behave like heat carriers and increase heat diffusion rates, while the use of MWCNT in the phase change material enhances the thermal conductivity of the thermal energy storing medium. The flow field, temperature rise, and liquid fraction are simulated numerically in the thermal battery using the finite element code for various concentrations of MWCNT. The findings revealed that the aluminum meshes improve the thermal conduction in the energy storing medium. Temperature increases locally in the storing medium and disturbs the uniform-like temperature distribution inside the thermal battery when only phase change material is used. The presence of MWCNT enhances the thermal conductivity and minimizes the excessive temperature rise inside the storing medium. In addition, the mixture of phase change material and MWCNT provides almost steady rate of melting inside the thermal battery; however, increasing MWCNT concentration > 6 % in the phase change material does not significantly shorten the total melting duration of the energy storing medium.

Keywords: *carbon, nanotubes, concentrated, solar, receiver phase, change material, thermal battery.*

4. Yilbas, B. S., **Anwar, M. K.,** & Hussaini, F. A. (2018). A mobile thermal battery resembling a solar receiver: Innovative design and performance assessment. *International Journal of Energy Research, 42*(8), 2766-2780. doi: doi:10.1002/er.4065.**(Muhammad Khalil Anwar (Mechanical Engineering /SEN)** **JCR Listed (IF:3.009)**

Abstract: An innovative design of a mobile thermal battery resembling the solar receiver is presented. A ternary salt mixture consisting of 52% KNO3, 18% NaNO3, and 30% LiNO3 by wt% is used as the thermal energy storing medium inside the thermal battery. Since the thermal conductivity of the ternary salt mixture is low, aluminum meshes are introduced to create a thermal conduction tree inside the thermal energy storing medium. The actual field data are used in the simulations to resemble the solar irradiation emanating from the parabolic trough and focusing onto the thermal battery outer surface. To improve the uniform heating at the outer surface, the thermal battery rotation along the centerline of the trough is considered. The temperature parameter is introduced to assess the uniform-like temperature distribution inside the ternary salt mixture. It is found that the use of aluminum meshes improves the heat diffusion in the phase change material of the ternary salt mixture; in which case, it acts like a thermal conduction tree inside the thermal battery. The rotation of the thermal battery results in uniform-like temperature distribution across the thermal battery cross section and suppresses the excessive temperature rise because of the local heating in the close region of the thermal battery outer surface.

Keywords: *phase change material, thermal battery, thermal energy storage, thermal performance.*

5. **Farooq, M., Asim, M., Imran, M., Imran, S., Ahmad, J., & Younis, M. R.** (2018). Mapping past, current and future energy research trend in Pakistan: a scientometric assessment. *Scientometrics, 117*(3), 1733-1753. doi: 10.1007/s11192-018-2939-8.**(Muhammad Farooq (Mechanical Engineering /SEN), Muhammad Asim, Muhammad Imran, Shahid Imran, Jameel Ahmad, Muhammad Rizwan Younis)****JCR Listed (IF: 2.173)**

Abstract: This work describes the contribution of researchers in the field of the energy from Pakistan in the period 1990–2016. A scientometric approach was applied to analyze the scientific publications in the field

using the Scopus Elsevier database. Different aspects of the publications were analyzed, such as publication type, major research areas, journals, citations, authorship pattern, affiliations as well as the keyword occurrence frequency. The present research trends are analyzed and future research directions are outlined. The impact factor, h-index and number of citations were used to investigate the strength of active institutes, authors, and journals in the field of the energy in Pakistan. From 1990 to 2016, 991 articles have been published by 2139 authors from 213 research institutes. The total number of citations and impact factor are 10,287 and 2301 respectively, corresponding to 10 citations per paper and an impact factor of 2.32 per publication. The research articles originate primarily from COMSATS, NUST, PIEAS, and PINSTECH. Pakistan has published 60% of publication with the collaboration of the foreign institutes, mainly from the United States, the United Kingdom, China and Malaysia. The core research activities in the field are mainly focused on resource assessment, energy policy, energy efficiency, feasibility study, energy economics, and performance assessment. The most productive journal, author, institution, are renewable & sustainable energy review, Shahbaz M., and COMSATS, respectively.

Keywords: *renewable energy, scientometric, bibliometric, Pakistan, research trend, energy policy, energy modeling.*

School of System and Technology (SST)

Department of Computer Science

Research Articles

1. **Khan, Y. D., Rasool, N**., Hussain, W., Khan, S. A., & Chou, K.-C. (2018). iPhosT-PseAAC: Identify phosphothreonine sites by incorporating sequence statistical moments into PseAAC. *Analytical Biochemistry, 550*, 109-116. doi: https://doi.org/10.1016/j.ab.2018.04.021.**(Yaser Daanial Khan (Computer Science /SST), Nouman Rasool)JCR Listed(IF:2.275)**

   Abstract: Among all the post-translational modifications (PTMs) of proteins, Phosphorylation is known to be the most important and highly occurring PTM in eukaryotes and prokaryotes. It has an important regulatory mechanism which is required in most of the pathological and physiological processes including neural activity and cell signalling transduction. The process of threonine phosphorylation modifies the threonine by the addition of a phosphoryl group to the polar side chain, and generates phosphothreonine sites. The investigation and prediction of phosphorylation sites is important and various methods have been developed based on high throughput mass-spectrometry but such experimentations are time consuming and laborious therefore, an efficient and accurate novel method is proposed in this study for the prediction of phosphothreonine sites. The proposed method uses context-based data to calculate statistical moments. Position relative statistical moments are combined together to train neural networks. Using 10-fold cross validation, 94.97% accurate result has been obtained whereas for Jackknife testing, 96% accurate results have been obtained. The overall accuracy of the system is 94.4% to sensitivity value 94% and specificity 94.6%. These results suggest that the proposed method may play an essential role to the other existing methods for phosphothreonine sites prediction.

   Keywords:*phosphothreonine, ANN, statistical moments, hahn polynomials, cross-validation.*

2. Arshad, S., **Shahzaad, B.,** Azam, M. A., Loo, J., Ahmed, S. H., & Aslam, S. (2018). Hierarchical and Flat-Based Hybrid Naming Scheme in Content-Centric Networks of Things. *Ieee Internet of Things Journal, 5*(2), 1070-1080. doi: 10.1109/jiot.2018.2792016.**(Babar Shahzaad (Computer Science /SST) JCR Listed (IF: 5.863)**

   Abstract: Information-centric networking (ICN) approaches have been considered as an alternative approach to TCP/IP. Contrary to the traditional IP, the ICN treats content as a first-class citizen of the entire network, where names are given through different naming schemes to contents and are used during the retrieval. Among ICN approaches, content centric networking (CCN) is one of the key protocols being explored for Internet of Things (IoT), names the contents using hierarchical naming. Moreover, CCN follows pull-based strategy and exhibits the communication loop problem because of its broadcasting mode. However, IoT requires both pull and push modes of communication with scalable and secured content names in terms of integrity. In this paper, we propose a hybrid naming scheme that names contents using hierarchical and flat components to support both push and pull communication and to provide both scalability and security, respectively. We consider an IoT-based smart campus scenario and introduce two transmission modes: 1) unicast mode and 2) broadcast mode to address loop problem associated with CCN. Simulation results demonstrate that proposed scheme significantly improves the rate of interest transmissions, number of covered hops, name aggregation, and reliability along with addressing the loop problem.

   Keywords:*Content naming, content-centric networking (CCN), information-centric networking (ICN), Internet of Things (IoT), push-support.*

3. Ehsan, A., Mahmood, K., **Khan, Y. D.,** Khan, S. A., & Chou, K.-C. (2018). A Novel Modeling in Mathematical Biology for Classification of Signal Peptides. *Scientific Reports*, 8(16). doi: 10.1038/s41598-018-19491-y. **(Yaser Daanial Khan (Computer Science /SST) JCR Listed (IF: 4.122)**

   Abstract: The molecular structure of macromolecules in living cells is ambiguous unless we classify them in a scientific manner. Signal peptides are of vital importance in determining the behavior of newly formed

proteins towards their destined path in cellular and extracellular location in both eukaryotes and prokaryotes. In the present research work, a novel method is offered to foreknow the behavior of signal peptides and determine their cleavage site. The proposed model employs neural networks using isolated sets of prokaryote and eukaryote primary sequences. Protein sequences are classified as secretory or non-secretory in order to investigate secretory proteins and their signal peptides. In comparison with the previous prediction tools, the proposed algorithm is more rigorous, well-organized, significantly appropriate and highly accurate for the examination of signal peptides even in extensive collection of protein sequences.

Keywords: *amino-acid-composition, tuple nucleotide composition, immunoglobulin, light-chains, sequence-based predictor, cleavage sites, neural-networks, membrane-protein, recognition, identification, topology.*

4. **Hussain, M.,** Al-Haiqi, A. M., Zaidan, A. A., Zaidan, B. B., Kiah, M., **Iqbal, S.,** . . . Abdulnabi, M. (2018). A security framework for mHealth apps on Android platform. *Computers & Security, 75*, 191-217. doi: 10.1016/j.cose.2018.02.003.**(Muzammil Hussain (Computer Science /SST), Shaukat Iqbal)** **JCR Listed (IF: 2.65)**

Abstract: Mobile Health (mHealth) applications are readily accessible to the average users of mobile devices, and despite the potential of mHealth applications to improve the availability, affordability and effectiveness of delivering healthcare services, they handle sensitive medical data, and as such, have also the potential to carry substantial risks to the security and privacy of their users. Developers of applications are usually unknown, and users are unaware of how their data are being managed and used. This is combined with the emergence of new threats due to the deficiency in mobile applications development or the design ambiguities of the current mobile operating systems. A number of mobile operating systems are available in the market, but the Android platform has gained the topmost popularity. However, Android security model is short of completely ensuring the privacy and security of users' data, including the data of mHealth applications. Despite the security mechanisms provided by Android such as permissions and sandboxing, mHealth applications are still plagued by serious privacy and security issues. These security issues need to be addressed in order to improve the acceptance of mHealth applications among users and the efficacy of mHealth applications in the healthcare systems. The focus of this research is on the security of mHealth applications, and the main objective is to propose a coherent, practical and efficient framework to improve the security of medical data associated with Android mHealth applications, as well as to protect the privacy of their users. The proposed framework provides its intended protection mainly through a set of security checks and policies that ensure protection against traditional as well as recently published threats to mHealth applications. The design of the framework comprises two layers: a Security Module Layer (SML) that implements the security-check modules, and a System Interface Layer (SIL) that interfaces SML to the Android OS. SML enforces security and privacy policies at different levels of Android platform through SIL. The proposed framework is validated via a prototypic implementation on actual Android devices to show its practicality and evaluate its performance. The framework is evaluated in terms of effectiveness and efficiency. Effectiveness is evaluated by demonstrating the performance of the framework against a selected set of attacks, while efficiency is evaluated by comparing the performance overhead in terms of energy consumption, memory and CPU utilization, with the performance of a mainline, stock version of Android. Results of the experimental evaluations showed that the proposed framework can successfully protect mHealth applications against a wide range of attacks with negligible overhead, so it is both effective and practical.

Keywords: *Security Privacy Health, Health applications, Android platform, Android security, OS security.*

5. **Hussain, M.,** Zaidan, A. A., Zidan, B. B., **Iqbal, S.,** Ahmed, M. M., Albahri, O. S., & Albahri, A. S. (2018). Conceptual framework for the security of mobile health applications on Android platform. *Telematics andInformatics, 35*(5), 1335-1354. doi: 10.1016/j.tele.2018.03.005.**(MuzammilHussain (Computer Science**

/SST), Shaukat Iqbal)JCR Listed (IF: 3.789)

Abstract: Mobile Health (mHealth) applications are readily accessible to the average user of mobile devices, and despite the potential of mHealth applications to improve the availability, affordability and effectiveness of delivering healthcare services; they handle sensitive medical data, and as such, have also the potential to carry substantial risks to the security and privacy of their users. Developers of applications are usually unknown, and users are unaware of how their data are being managed and used. This is combined with the emergence of new threats due to the deficiency in mobile applications development or the design ambiguities of the current mobile operating systems. A number of mobile operating systems are available in the market, but the Android platform has gained the topmost popularity. However, Android security model is short of completely ensuring the privacy and security of users' data, including the data of mHealth applications. Despite the security mechanisms provided by Android such as permissions and sandboxing, mHealth applications are still plagued by serious privacy and security issues. These security issues need to be addressed in order to improve the acceptance of mHealth applications among users and the efficacy of mHealth applications in the healthcare systems. Thus, this paper presents a conceptual framework to improve the security of medical data associated with Android mHealth applications, as well as to protect the privacy of their users. Based on the literature review that suggested the need for the intended security framework, three-distinct and successive phases are presented, each of which is described in a separate section. First, discussed the design process of the first phase to develop a security framework for mHealth apps to ensure the security and privacy of sensitive medical data. The second phase is discussed who to achieve the implementation of a prototypic proof-of-concept version of the framework. Finally, the third phase ending discussed the evaluation process in terms of effectiveness and efficiency for the proposed framework.

Keywords:*taint analysis, telemedicine, malware, devices, methodology, features, privacy, records, usage, apps.*

6. **Hussain, N., Anees, T., Faheem, M. R., Shaheen, M.,** Manzoor, M. I., & Anum, A. (2018). Development of a Novel Approach to Search Resources in IoT. *International Journal of Advanced Computer Science and Applications, 9*(9), 385-398.**(Nisar Hussain (Computer Science /SST)Tayyaba Anees, Muhammad Rehan Faheem, Momina Shaheen)**ISI Web of Science

Abstract: Internet of Things (IoT) referred to interconnected the world of things like physical devices, cars, sensors, home appliances, actuators and machines embedded with software at any time, any location. The increasing number of IoT devices facing challenges which are registration, integration, describing sensor, interoperability, semantics, security, discovery and searching. The current systems are suitable for limited number of devices. Our ecosystem change day by day which means we have billions and trillions of devices connecting to the Internet in future. One major challenge in current system is searching of suitable Smart Things from a millions or even billions number of devices in IoT. For the purpose of searching and indexing, some discovery methods and techniques are discussed and compared. Those techniques and methods are studied and find out the limitations and issued of the current system. Another challenge to searching the Smart Things is a variety of description models for describing the Smart Things. In this piece of work, a novel search engine is proposed to search the Smart Things with variety of description models. A web interface is implemented in this research with HTML, JSON and XML formats. The description models of Smart Things SensorML, SensorThings API and W3C JSON-LD are implemented in the current proposed system.

Keywords:*IoT resources, search engine for IoT, SensorM.*

7. Kalid, N., Zaidan, A. A., Zaidan, B. B., Salman, O. H., Hashim, M., & **Hussain, M.,** (2018). Based Real Time Remote Health Monitoring Systems: A Review on Patients Prioritization and Related "Big Data" Using Body Sensors information and Communication Technology. *Journal of Medical Systems, 42*(2), 30. doi:

10.1007/s10916-017-0883-4.**(Muzammil Hussain (Computer Science /SST)** **JCR Listed (IF: 2.098)**

Abstract: The growing worldwide population has increased the need for technologies, computerised software algorithms and smart devices that can monitor and assist patients anytime and anywhere and thus enable them to lead independent lives. The real-time remote monitoring of patients is an important issue in telemedicine. In the provision of healthcare services, patient prioritisation poses a significant challenge because of the complex decision-making process it involves when patients are considered 'big data'. To our knowledge, no study has highlighted the link between 'big data' characteristics and real-time remote healthcare monitoring in the patient prioritisation process, as well as the inherent challenges involved. Thus, we present comprehensive insights into the elements of big data characteristics according to the six 'Vs': volume, velocity, variety, veracity, value and variability. Each of these elements is presented and connected to a related part in the study of the connection between patient prioritisation and realtime remote healthcare monitoring systems. Then, we determine the weak points and recommend solutions as potential future work. This study makes the following contributions. (1) The link between big data characteristics and real-time remote healthcare monitoring in the patient prioritisation process is described. (2) The open issues and challenges for big data used in the patient prioritisation process are emphasised. (3) As a recommended solution, decision making using multiple criteria, such as vital signs and chief complaints, is utilised to prioritise the big data of patients with chronic diseases on the basis of the most urgent cases.

Keywords: *real-time remote monitoring, telemedicine, patient prioritization, big data, multi-criterion decision making.*

8. **Khan, Y. D., Rasool, N., Hussain, W.,** Khan, S. A., & Chou, K. C. (2018). iPhosY-PseAAC: identify phosphotyrosine sites by incorporating sequence statistical moments into PseAAC. *Molecular Biology Reports*, 45(6), 2501-2509. doi: 10.1007/s11033-018-4417-z.**(Yaser Daanial Khan(Computer Science /SST),Nouman Rasool, Waqar Hussain)** **JCR Listed (IF: 1.889)**

Abstract: Protein phosphorylation is one of the most fundamental types of post-translational modifications and it plays a vital role in various cellular processes of eukaryotes. Among three types of phosphorylation i.e. serine, threonine and tyrosine phosphorylation, tyrosine phosphorylation is one of the most frequent and it is important for mediation of signal transduction in eukaryotic cells. Site-directed mutagenesis and mass spectrometry help in the experimental determination of cellular signalling networks, however, these techniques are costly, time taking and labour associated. Thus, efficient and accurate prediction of these sites through computational approaches can be beneficial to reduce cost and time. Here, we present a more accurate and efficient sequence-based computational method for prediction of phosphotyrosine (PhosY) sites by incorporation of statistical moments into PseAAC. The study is carried out based on Chou's 5-step rule, and various position-composition relative features are used to train a neural network for the prediction purpose. Validation of results through Jackknife testing is performed to validate the results of the proposed prediction method. Overall accuracy validated through Jackknife testing was calculated 93.9%. These results suggest that the proposed prediction model can play a fundamental role in the prediction of PhosY sites in an accurate and efficient way.

Keywords: *phosphotyrosine prediction pseaac statistical moments neural network.*

9. **Mahmood, S., Khan, Y. D.**, & Mahmood, M. K. (2018). A treatise to vision enhancement and color fusion techniques in night vision devices. *Multimedia Tools and Applications, 77*(2), 2689-2737. doi: 10.1007/s11042-017-4365-y.**(Salman Mahmood (Computer Science /SST) Yaser Daanial Khan)****JCR Listed (IF: 1.541)**

Abstract: In this article a vast literary and ample historic review has been examined to provide in detail introduction, knowledge and comparison of night vision imaging techniques. It unveils night vision enhancement methods described in the recent times such as contrast enhancement; color transfer based clustering, fast color contrast enhancement and pseudo-color fusion algorithm for self-adaptive

enhancement system along many others. Furthermore, the scientific and mathematical details are elaborated along with the mechanisms used image fusion techniques, color mapping, histogram matching and statistical evaluation. Conclusively, the channel based color fusion technique stood out through statistical and perceptual analysis.

Keywords:*night vision, vision enhancement, color fusion.*

10. Ramzan, M., **Farooq, M. S.,** Zamir, A., Akhtar, W., Ilyas, M., & Khan, H. U. (2018). An Analysis of Issues for Adoption of Cloud Computing in Telecom Industries. *Engineering Technology & Applied Science Research, 8*(4), 3157-3161.**(Muhammad Shoaib Farooq (Computer Science /SST)ISI Web of Science**

Abstract: In the modern era companies seek the use of modern technologies in order to upgrade their infrastructure and enhance their business growth. The use of business intelligence, data science and cloud computing (CC) has become an integral part of business. Different factors play important role in the adoption of cloud services. An organization willing to adopt cloud services should consider them. This paper explores the factors and addresses the issues in implementing and deploying CC in telecom companies. In addition, this study also shares the benefits of utilizing CC which is a novel technical pattern which can change the use of different associations of information technology as a service. CC concentrates on the idea of definition, security problems, service models and infrastructures of its development. The important point is to analyze how this paradigm should be adopted in telecom industries and its results. This research study presents a comparative analysis of adaptation of CC by various telecom industries. The results identify certain limitations which also play their role for adaptation of CC in telecom companies.

Keywords:*cloud computing, telecom industry, IaaS, SaaS, benefits of cloud computing.*

11. Ramzan, M., Khan, H. U., **Awan, S. M**., Akhtar, Waseem, Ilyas, M., Mahmood, A., & Zamir, A. (2018). A Survey on using Neural Network based Algorithms for Hand Written Digit Recognition. *International Journal of Advanced Computer Science and Applications, 9*(9), 519-528.**(Shahid Mehmood Awan (Computer Science /SST) ISI Web of Science**

Abstract: The detection and recognition of handwritten content is the process of converting non-intelligent information such as images into machine edit-able text. This research domain has become an active research area due to vast applications in a number of fields such as handwritten filing of forms or documents in banks, exam form filled by students, users'authentication applications. Generally, the handwritten content recognition process consists of four steps: data preprocessing, segmentation, the feature extraction and selection, application of supervised learning algorithms. In this paper, a detailed survey of existing techniques used for Hand Written Digit Recognition(HWDR) is carried out. This review is novel as it is focused on HWDR and also it only discusses the application of Neural Network (NN) and its modified algorithms. We discuss an overview of NN and different algorithms which have been adopted from NN. In addition, this research study presents a detailed survey of the use of NN and its variants for digit recognition. Each existing work, we elaborate its steps, novelty, use of dataset and advantages and limitations as well. Moreover, we present a Scientometric analysis of HWDR which presents top journals and sources of research content in this research domain. We also present research challenges and potential future work.

Keywords:*neural network, digit recognition, segmentation, supervised learning, image classification, computer vision.*

12. **Saeed, S.,** Mahmood, M. K., &**Khan, Y. D.** (2018). An exposition of facial expression recognition techniques. *Neural Computing & Applications, 29*(9), 425-443. doi: 10.1007/s00521-016-2522-2.**(Somia Saeed (Computer Science /SST),Yaser Daanial Khan) JCR Listed (IF: 4.215) (Review)**

Abstract: Automated facial expression recognition schemes have been a subject of interest ever since the inception of its idea. The initial efforts required supervised and controlled environments to get realistic and convincing experimental results. Various improved methods have been suggested to detect the facial

expressions of a human. Some of the popularly used methods are automatic expression recognition system (AERS), graph-preserving sparse nonnegative matrix factorization (GSNMF) algorithm, two-phase test sample representation (TPTSR) technique and temporal template method. The current state-of-the-art techniques are able to detect facial expressions in difficult and obscured environments. Advancements in this technique have helped researchers to use video sequences as images to detect expressions. A single image is extracted from a video sequence, and elaborate techniques are applied to detect the expression. This article endeavors to discuss these intricate techniques and critically analyzes them. It helps the reader to understand the contemporary problems in facial recognition systems and how various researchers have employed different models to overcome these challenges. In this paper, the performance of various techniques such as AERS, GSNMF algorithm, TPTSR, performance-based character animation, temporal template method, feature extractions using Gabor filter and image sequencing-based methods has been scrutinized in terms of their efficiency, accuracy and effectiveness. The efficiency and accuracy of the techniques have been compared using various benchmarks such as leave one out, cross-validation and receiver operating characteristics. Each technique bears its own advantages and disadvantages in terms of accuracy and efficiency. The highest accuracy rate is exhibited by the technique using canny edge detection algorithm and chamfer image method.

Keywords:*facial expression, expression recognition, emotion recognition.*

13. **Shah, A. A**., Ehsan, M. K., **Ishaq, K.,** Ali, Z., &**Farooq, M. S.** (2018). An Efficient Hybrid Classifier Model for Anomaly Intrusion Detection System. *International Journal of Computer Science and Network Security, 18*(11), 127-+. **(Asghar Ali Shah (Computer Science /SST), Kashif Ishaq, Muhammad Shaoib Farooq)**ISI Web of Science

Abstract: Ensuring security has always been a challenging problem for both customized network solutions and information systems. Intrusion Detection System (IDS) is playing a very important role to ensure security both in network solutions and information systems. Significant efforts have already been made and many efforts are underway to improve the IDS but still there are many short comings. This study proposed a model based on extensive survey to create an efficient hybrid classifier which is jointly based on feature selection, parameter optimization and classification. Feature selection is adapted to refine the area of interest by improving the accuracy of classification, then to optimize the parameters; genetic algorithm (GA) is the most appropriate technique to be used. Parameters optimization using GA also plays a remarkable role to improve classification using support vector machine (SVM). SVM is considered a suitable machine learning technique for classification of intrusions which are detected both in networks and information systems. Finally SVM will classify the observed activity as normal or attack using adopted linear or nonlinear techniques. The proposed solution paves a way to improve accuracy by efficiently detecting the intrusions within real time applications of network and systems.

Keywords:*IDS, Classification, SVM, GA, Attacks types.*

14. Rehman, Z. U., **Fayyaz, H.,** Shah, A. A., Aslam, N., Hanif, M., & Abbas, S. (2018). Performance evaluation of MLPNN and NB: A Comparative Study on Car Evaluation Dataset. *International Journal of Computer Science and Network Security, 18*(9), 144-147. **(Hira Fayyaz (Computer Science /SST)** ISI Web of Science

Abstract: Cars are vital in everyday life. It plays an important role as it's a comfortable mean of transportations. Every car has a distinct flavor in term of price, feature, safety and the level of luxury it provides. People tend to make clear choices when they decide to buy car for themselves. They evaluate different cars on various parameters. Manufacturing and business are interested to know the popular features on which buyers make their choice as it can enhance their business value. Data mining algorithms can be employed in this respect. Various data mining algorithms perform differently. The purpose of this research work is to equating two influential algorithm evaluating dataset acquired from the University of

California Irvine. This research focuses on comparing and contrasting speed, accuracy and performance of these algorithms.

Keywords:*multi-layer perceptron (MLPNN), naïve bayesian (NB), artificial neural network (ANN).*

15. **Farooq, M., Abid, A., Farooq, U., & Saleem, I.** (2018). Content domain and strategy for teaching linked list in pedagogically effective manner. *Pakistan Journal of Science, 70*(1), 85-90.**(Muhammad Shoaib Farooq (Computer Science /SST), Adnan Abid, Uzma Farooq, Imran Saleem)** HEC Z CAT

Abstract: The objective of this study was to address the problem of effectively teaching linked list, which was a core topic of data structure course. For this purpose, a survey based methodology was adopted to define the content domain and a teaching strategy for this topic. Among the contributions of this research, firstly, the content domain of the topic was defined using a taxonomy comprising of sub categories that included structure of a linked list; implementation variants; persistence of a linked list; and advanced complex variants. Secondly, the relative importance of the sub-topics in the content domain was also defined by conducting a survey form teachers and students. It was observed that out of thirteen subtopics, only seven should be covered in the first course of data structure, while the rest of the six topics could be provided as optional reading material.

Keywords:*abstract data type, sentinel linked list, variants of link list, object oriented and structured paradigms.*

16. **Hussain, W., Qaddir, I., Mahmood, S., & Rasool, N.** (2018). In silico targeting of non-structural 4B protein from dengue virus 4 with spiropyrazolopyridone: study of molecular dynamics simulation, ADMET and virtual screening. *Virus Disease, 29*(2), 147-156. doi: 10.1007/s13337-018-0446-4.**(Waqar Hussain (Computer Science /SST),Iqra Qaddir, Sajid Mahmood, Nouman Rasool)** JCR Listed(IF:0.364)

Abstract: Dengue fever is one of the most prevalent disease in tropical and sub-tropical regions of the world. According to the World Health Organisation (WHO), approximately 3.5 billion people have been affected with dengue fever. Four serotypes of dengue virus (DENV) i.e. DENV1, DENV2, DENV3 and DENV4 have up to 65% genetic variations among themselves. dengue virus 4 (DENV4) was first reported from Amazonas, Brazil and is spreading perilously due to lack of awareness of preventive measures, as it is the least targeted serotype. In this study, non-structural protein 4B of dengue virus 4 (DENV4-NS4B) is computationally characterised and simulations are performed including solvation, energy minimizations and neutralisation for the refinement of predicted model of the protein. The spiropyrazolopyridone is considered as an effective drug against NS4B of DENV2, therefore, a total of 91 different analogues of spiropyrazolopyridone are used to analyse their inhibitory action against DENV4-NS4B. These compounds are docked at the binding site with various binding affinities, representing their efficacy to block the binding pocket of the protein. Pharmacological and pharmacokinetic assessment performed on these inhibitors shows that these are suitable candidates to be used as a drug against the dengue fever. Among all these 91 compounds, Analogue-I and Analogue-II are analysed to be the most effective inhibitor having potential to be used as drugs against dengue virus.

Keywords: *dengue virus 4 non-structural protein 4B DENV4-NS4B molecular dynamic simulation Spiropyrazolopyridone ADMET Virtual screening.*

17. **Hameed, K.,** Khan, A., Ahmed, M., Alavalapati, G. R., & Rathore, M. M. U. (2018). Towards a formally Verified zero watermarking scheme for data integrity in the Internet of Things based-wireless sensor networks. *Future Generation Computer Systems-the International Journal of Escience, 82*, 274-289. doi: 10.1016/j.future.2017.12.009.**(Khizar Hameed (Computer Science)** JCR Listed (IF: 4.639)(SKT Campus)

Abstract: The Internet of Things (IoT) is an emerging paradigm in which billions of devices communicate, thus producing and exchanging information related to real world objects (things). Sensor nodes are specialized

nodes for handling transmission of a large volume of data in situations where the source nodes communicate with base stations (BS) via a set of intermediate nodes. Applications based on WSN claim that integrity and trustworthiness are the key aspects as the data received from source nodes is the major source for BS to take critical decisions. To establish the trustworthiness between sensor node and BS, a novel zero watermarking scheme is proposed in this paper. In order to ensure integrity and trustworthiness, our proposed scheme embeds a watermark in original data before it is transmitted to BS which is responsible for verifying the watermark embedded with data. We have compared proposed scheme with existing Asymmetric Cryptography (ACT) and Reversible Watermarking (RW) schemes based on the performance parameters such as computational overhead and the energy utilization. Analysis results suggest that proposed scheme can handle multiple attacks on data and watermark such as data deletion, data modification, and data insertion attack. Moreover, our experimental results demonstrate that the presented scheme is lightweight, computationally efficient, and better in energy utilization. A formal verification for proof of correctness using high level Petri nets (HLPNs) is also provided to verify the claims of our work.

Keywords: *zero watermarking, data integrity, sensor networks, high level petri nets(HLPN).*

18. **Ali, Z.,** Rasool, Raihan ur, Bloodsworth, P., & Mansoor, S. B. (2018). Facebook-based cloud resource sharing. *Computers & Electrical Engineering, 66*, 162-173. doi: 10.1016/j.compeleceng.2017.11.006.**(Zahra Ali (Computer Science)**JCR Listed (IF: 1.747) (SKT Campus)

Abstract: Sharing cloud resources between groups of users are a challenge. Cloud providers do not commonly support users in sharing their spare dedicated resources with others. In developing countries, it is often too expensive for people to acquire a virtual machine of their own. Users may, therefore, wish to manage costs and increase computational resource usage by sharing their instances with others. This paper presents a container based cloud resource bartering (CRB) model for sharing user's computational resources through a social network. In our approach, we have integrated a Facebook account with the computational cloud to enable tenants to share their unused cloud resources with other users. The performance of the proposed prototype is evaluated under different workloads. Based on our experimental results we conclude that the proposed model is well suited for the creation of a low-cost social cloud in developing countries.

Keywords: *Cloud resource bartering, Social cloud, Resource sharing in cloud, Enterprise virtual organization, Green social cloud.*

19. **Ali, S. F., & Hassan, M. T.** (2018). Feature Based Techniques for a Driver's Distraction Detection using Supervised Learning Algorithms based on Fixed Monocular Video Camera. *KSII Transactions on Internet & Information Systems, 12*(8). **(Syed Farooq Ali (Computer Science/SST), Malik Tahir Hassan) (SJR)**

Abstract: Most of the accidents occur due to drowsiness while driving, avoiding road signs and due to driver's distraction. Driver's distraction depends on various factors which include talking with passengers while driving, mood disorder, nervousness, anger, over-excitement, anxiety, loud music, illness, fatigue and different driver's head rotations due to change in yaw, pitch and roll angle. The contribution of this paper is two-fold. Firstly, a data set is generated for conducting different experiments on driver's distraction. Secondly, novel approaches are presented that use features based on facial points; especially the features computed using motion vectors and interpolation to detect a special type of driver's distraction, i.e., driver's head rotation due to change in yaw angle. These facial points are detected by Active Shape Model (ASM) and Boosted Regression with Markov Networks (BoRMaN). Various types of classifiers are trained and tested on different frames to decide about a driver's distraction. These approaches are also scale invariant. The results show that the approach that uses the novel ideas of motion vectors and interpolation outperforms other approaches in detection of driver's head rotation. We are able to achieve a percentage accuracy of 98.45 using Neural Network.

20. **Habib, S.,** & Akram, M. (2018). Diagnostic methods and risk analysis based on fuzzy soft information. *International Journal of Biomathematics, 11*(08), 1850096. doi: 10.1142/s1793524518500961.**(Shaista Habib (Mathematics)**JCR Listed (IF:0.846)

Abstract: In our daily life problem we face uncertainties in making right decisions. In this study, we propose two different decision-making problems in medical field. The first problem is fever diagnosing and second problem is mouth cancer risk analysis. In the first problem, we use fuzzy soft similarity measures and fuzzy soft matrix operations to diagnose the type of fever. We consider a hypothetical case study and manipulate similarity measures on it. Our work diagnoses different patients having similar symptoms. We also develop a small application using JAVA. In the second problem, we perform risk analysis of mouth cancer. The proposed fuzzy soft expert system takes two biochemical parameters as inputs that is, serum total malondialdehyde (MDA), and serum proton donors capacity (donors_protons) and determines the risk of mouth cancer. Our study facilitates doctors by diagnosing mouth cancer at its earlier stages. There are four main components of our fuzzy soft expert system. The first component is named as fuzzification which converts crisp input into linguistic variables and formulates fuzzy sets. The second component transforms fuzzy sets into their respective fuzzy soft sets. The third component determines indispensable parameters and performs parameter reduction. The fourth component performs risk analysis by using algorithm. We use exemplary dataset and run all the components of fuzzy soft expert system to compute cancer risk.

Keywords:*Fuzzy soft set similarity measure, fuzzy soft metrics, algorithm, time complexity, chikungunya, malaria, dengue, mouth cancer, serum total malondialdehyde, serum proton donor capacity.*

21. **Bilal, A.**, Zia, M. F., Asif, M. H., & Yousaf, M. S. (2018). Fast fourier transform based cost effective implementation of the arc fault current interrupter. *Revue Roumaine Des Sciences Techniques-Serie Electrotechnique Et Energetique, 63*(4), 365-370. **(Ahmed Bilal (Computer Science/SST)**JCR Listed (IF:1.114)

Abstract: A conventional circuit breaker cannot account for an arc as a result of a spark in an electrical circuit and hence cannot trip the circuitry, which might lead to a fire. These fires often result in heavy losses of lives and property damage. Arc fault current interrupter is the device which is able to trip the circuit in case of a short circuit like a conventional circuit breaker as well as in case of a potentially dangerous electrical arc which would result in a fire. The main purpose of implementing the AFCI's is to differentiate between a harmless arc which might be a result of a switching operation or any other load operation and a dangerous electric arc which can cause electrical fire. Experimental results show that the proposed AFCI is efficient and cost effective.

Keywords: *arc fault circuit interrupter (AFCI), Arc, over current, electrical fires, fast Fourier transform (FFT).*

22. **Zafar, A., Shafique, A., Nazir, Z., & Zia, M. F.** (2018). *A Comparison of Optimization Techniques for Energy Scheduling of Hybrid Power Generation System*. 21st IEEE International Multi-Topic Conference (INMIC). Hamdard Univ, Fac Engn Sci & Technol, Karachi, PAKISTAN. **(Abdullah Zafar, Amish Shafique, Zunaira Nazir, Muhammad Fahad Zia (Computer Science)**ISI Web of Science (Proceedings Paper)

Abstract: Hybrid power generation system not only reduces our dependency on fossil fuel power generation stations but also helps us to meet the peak load demand. Renewable energy resources such as solar and wind in hybrid power generation system can play a vital role in reducing fuel cost and emission of conventional power generation system. In this paper, energy scheduling of hybrid power generation system is carried out by considering the fuel cost of thermal power generators and their emissions. Different optimization techniques, genetic algorithm, pattern search method, and interior point algorithm are used in this paper to optimally schedule the energy required from the thermal power generators to meet the load demand by taking into account the power from the renewable energy resources. These optimization techniques are compared in respect of fuel cost, emissions and computational time complexity. Interior point

algorithm outperforms patter search method and genetic algorithm. It achieves more reduced fuel cost and emission as compared to pattern search method and genetic algorithm.

Keywords: *Genetic algorithm, hybrid power generation system, interior point algorithm, pattern search method, optimization.*

23. **Ali, Z.,** Rasool, Raihan ur, Bloodsworth, P., & Mansoor, S. B. (2018). Facebook-based cloud resource sharing. *Computers & Electrical Engineering, 66*, 162-173. doi: 10.1016/j.compeleceng.2017.11.006.**(Zahra Ali (Computer Science)**JCR Listed (IF: 1.747) **(SKT Campus)**

Abstract: Sharing cloud resources between groups of users are a challenge. Cloud providers do not commonly support users in sharing their spare dedicated resources with others. In developing countries, it is often too expensive for people to acquire a virtual machine of their own. Users may, therefore, wish to manage costs and increase computational resource usage by sharing their instances with others. This paper presents a container based cloud resource bartering (CRB) model for sharing user's computational resources through a social network. In our approach, we have integrated a Facebook account with the computational cloud to enable tenants to share their unused cloud resources with other users. The performance of the proposed prototype is evaluated under different workloads. Based on our experimental results we conclude that the proposed model is well suited for the creation of a low-cost social cloud in developing countries.

Keywords: *Cloud resource bartering, social cloud, Resource sharing in cloud, Enterprise virtual organization, Green social cloud.*

24. **Yasir, T.** (2018). *Smart Phone Based Early Intervention Framework for Intellectually Disable Children of Pakistan.* Paper presented at the 2018 International Conference on Frontiers of Information Technology (FIT). **(Tahreem Yasir (Computer Science/SST)** ISI Web of Science (Proceedings Paper)

Abstract: Early Intervention (EI) services are especially designed for Intellectually Disabled Children (IDC) to help improve their adaptive behavior and intellectual functioning. They called EI as these services are provided as soon as the first sign of disability appears. Social stories, video modeling and cognitive games are the most famous early intervention techniques. Because IDC are kinesthetic learners; learn through demonstration, thus these techniques can proved to more effective when presented through different technological platforms such as smart phones. This study explores effectiveness of EI techniques presented through Mobile Education Applications (MEA) for IDC of Pakistan. After reviewing the existing MEAs; most of which are not suitable for local IDC due to language and cultural differences, this study proposes a framework for the development of a compact MEA Parity, consisting of culturally tailored video modeled social stories, cognitive games and Urdu alphabet tracing, intended for local IDC of Pakistan.

25. **Ghauri, A. W., Khan, Y. D.,** Rasool, N., Khan, S. A., & Chou, K. C. (2018). pNitro-Tyr-PseAAC: Predict Nitrotyrosine Sites in Proteins by Incorporating Five Features into Chou's General PseAAC. *Current Pharmaceutical Design, 24*(34), 4034-4043. doi: 10.2174/1381612825666181127101039.**(Ahmed W. Ghauri, Yaser Daanial Khan(Computer Science /SST)**JCR Listed (IF: 2.575)

Abstract: Background: Closely related to causes of various diseases such as rheumatoid arthritis, septic shock, and coeliac disease; tyrosine nitration is considered as one of the most important post-translational modification in proteins. Inside a cell, protein modifications occur accurately by the action of sophisticated cellular machinery. Specific enzymes present in endoplasmic reticulum accomplish this task. The identification of potential tyrosine residuesinaproteinprimarysequence, which can be nitrated, is a challenging task.

Methods: To counter the prevailing, laborious and time-consuming experimental approaches, a novel computational model is introduced in the present study. Based on data collected from experimentally verified tyrosine nitration sites feature vectors are formed. Later, an adaptive training algorithm is used to

train a back propagation neural network for prediction purposes. To objectively measure the accuracy of the proposed model, rigorous verification and validation tests are carried out.

Results: Through verification and validation, a promising accuracy of 88%, a sensitivity of 85%, a specificity of 89.18% and Mathew's Correlation Coefficient of 0.627 is achieved.

Conclusion: It is concluded that the proposed computational model provides the foundation for further investigation and be used for the identification of nitrotyrosine sites in proteins.

Keywords: *nitrotyrosine, PseAAC, statistical moments, 5-step rule, prediction, rheumatoid arthritis.*

Conference Papers

1. **Yasir, T.** (2018). *Child Computer Interaction: A Case of Preschool Edutainment Systems.* Paper presented at the 2018 International Conference on Smart Computing and Electronic Enterprise (ICSCEE). **(Tahreem Yasir (Computer Science/SST),**

   Abstract: At present, computers and information technologies have become a vital part of our lives and are widely been in used for education and learning. More and more schools and parents are incorporating computers for educating preschool children. Studies have shown that early interaction with computers and technology can help improve the cognitive and motor skills of preschool children. Although a lot of systems have been developed for children of various ages however, most of the systems developed for preschool children have not been developed keeping in view their inadequate cognitive and motor skills. This paper aims to revisit the development processes in preschool children to design a desktop system to help them learn basic concepts of mathematics.

   Keywords:*child computer interaction, edutainment, motor development, cognitive development, interaction issues, perceptual development, motor development.*

Department of Software Engineering

Research Articles

1. **Ali, S. F., Khan, R.,** Mahmood, A., **Hassan, M. T.,** & Jeon, M. (2018). Using Temporal Covariance of Motion and Geometric Features via Boosting for Human Fall Detection. *Sensors, 18*(6), 19. doi: 10.3390/s18061918.**(Syed Farooq Ali (Software Engineering/SST),Reamsha Khan Malik, Tahir Hassan)**JCR Listed (IF: 2.475)

Abstract: Fall induced damages are serious incidences for aged as well as young persons. A real-time automatic and accurate fall detection system can play a vital role in timely medication care which will ultimately help to decrease the damages and complications. In this paper, we propose a fast and more accurate real-time system which can detect people falling in videos captured by surveillance cameras. Novel temporal and spatial variance-based features are proposed which comprise the discriminatory motion, geometric orientation and location of the person. These features are used along with ensemble learning strategy of boosting with J48 and Adaboost classifiers. Experiments have been conducted on publicly available standard datasets including Multiple Cameras Fall (with 2 classes and 3 classes) and UR Fall Detection achieving percentage accuracies of 99.2, 99.25 and 99.0, respectively. Comparisons with nine state-of-the-art methods demonstrate the effectiveness of the proposed approach on both datasets.

Keywords:*intelligent surveillance systems, human fall detection, health and well-being, safety and security.*

2. Rafique, M. A., Jeon, M., & **Hassan, M. T.** (2018). Deformable object tracking using clustering and particle filter. *Computing and Informatics, 37*(3), 717-736. doi: 10.4149/cai_2018_3_717.**(Malik Tahir Hassan, (Software Engineering/SST)** JCR Listed (IF: 0.410)

Abstract: Visual tracking of a deformable object is a challenging problem, as the target object frequently changes its attributes like shape, posture, color and so on. In this work, we propose a model-free tracker using clustering to track a target object which poses deformations and rotations. Clustering is applied to segment the tracked object into several independent components and the discriminative parts are tracked to locate the object. The proposed technique segments the target object into independent components using data clustering techniques and then tracks by finding corresponding clusters. Particle filters method is incorporated to improve the accuracy of the proposed technique. Experiments are carried out with several standard data sets, and results demonstrate comparable performance to the state-of-the-art visual tracking methods.

Keywords:*Visual object tracking, data clustering, object segmentation, cluster, correspondence.*

3. Quratulain, Saddique, A., **Tariq, I., Bin Maqsood, T.,** Ishaq, I., Zafar, S., & Malik, B. H. (2018). Comparison of Mobile Phone Proceessor's Architecture. In W. Li & M. S. P. Babu (Eds.), *Proceedings of 2018 Ieee 9th International Conference on Software Engineering and Service Science* (pp. 970-973).**(Iqra Tariq, Tala Bin Maqsood(Software Engineering/SST)**ISI Web of Science (SKT Campus)(Proceeding Paper)

Abstract: Today mobile phone has become a necessary element. Technology is trying to make the processors speedy, efficient, responsive, compatible and cost effect by doing significant changes. The architecture of the mobile phone processor is affected by the communication, performance and low power consumption. Different architecture for mobile phone processors are used here. A comparison is performed to come up with the supportive architecture to meet cost, performance, power saving, market value and demand etc.

Keywords: *mobile processors; multi-core processors; DSP(Digital signal Processors); ARM Processors; stream processing accelerators.*

Department of Informatics and System

Research Articles

1. **Sani, S. S.**, & Yaqub, A. (2018). MIMO-OFDM Energy Efficient Cognitive System with Intelligent Anti-jam Capability. *Wireless Personal Communications*, *98*(2), 2291-2317. doi: 10.1007/s11277-017-4975-8. **(Syeda Shaima Sani (Informatics/SST) JCR Listed (IF: 1.200)**

Abstract: Today's wireless communication systems are highly susceptible to malicious jamming attacks and interference signals. These attacks are sent via communication link at the same frequency as the intended signal. The sent information is thus corrupted and the receiver is unable to correctly decode the sent data stream. This paper thereby seeks to come up with an anti-jamming system that is able to respond intelligently to such malicious attacks, block them and enable the correct decoding of a message. The proposed system objectives are to ensure that data throughput is at its highest, energy consumption at the lowest level and the bit error rate is maintained at a very low level during and after any jamming attack. The system is also able to identify jammer state from transmit power and respond accordingly.
Keywords: *bit error rate, energy efficiency, channel hopping system, optimization, OFDM Anti-jamming.*

2. Sarwar, S., & **Iqbal, S.** (2018). Stability analysis, dynamical behavior and analytical solutions of nonlinear fractional differential system arising in chemical reaction. *Chinese Journal of Physics, 56*(1), 374-384. doi: 10.1016/j.cjph.2017.11.009. **(Shaukat Iqbal (Informatics/SST) JCR Listed (IF: 1.051)**

Abstract: In chemical reaction process, mathematical modeling of certain experiments lead to Brusselator system of equations. In this article, the dynamical behavior of reaction Brusselator system with fractional Caputo derivative is studied. Also, its stability and chaotic attractors of the commensurate fractional dynamical Brussleator system are discussed. The fractional derivative operators are nonlocal and having weak singularity as compare to the classical derivative operators. To find the analytical solutions of fractional dynamical systems is a big challenge; therefore, new techniques are worth demanding to solve such problems. To overcome this difficulty, the optimal homotopy asymptotic method is extended in this study to the system of fractional partial differential equations. A numerical example is presented as well to investigate the convergence, performance, and effectiveness of this method.
Keywords: *fractional calculus, chaos, lyapunov exponents, stability, brusselator system, system of partial differential equations, optimal homotopy asymptotic method.*

3. Ahmad, A., **Javed, I.,** Nazar, W., & Mukhtar, M. A. (2018). Short Circuit Stress Analysis Using FEM in Power Transformer on H-V Winding Displaced Vertically & Horizontally. *Alexandria Engineering Journal, 57*(1), 147-157. doi: 10.1016/j.aej.2016.10.006. **(Iqra Javed (Informatics/SST) ISI Web of Science**

Abstract: The aim of this work was to work out the mechanical stresses within transformer resulting from the extreme short-circuit currents. The forces and stresses set up in transformer windings as the result of exterior or interior short-circuits or of switching operations, are measured in detail. A variety of arrangements of windings in large power transformers are described. Points at which mostly high mechanical stresses take place in concentric windings are discussed in detail. Analytical and FEM calculations for individual short circuit forces, axial and radial have been discussed. The result was then compared with actual measurements on a prototype 20 MVA 132/11.5 kV power transformer [15]. Various failure mechanisms due to these forces have been discussed. Design parameters are also discussed, whose values determine the maximum stresses which may occur in any part of the transformer. Effects of irregularity in various parts and various properties of materials have been studied and the usage of appropriate material for withstanding the dynamic effects of SC is discussed. Effect of workmanship errors on short circuit withstand capability has also elucidated. Finally, a complete model is developed. (C) 2016 Faculty of Engineering, Alexandria University. Production and hosting by Elsevier B.V.

4. Khan, R., Khattak, R. W., Khan, M. S., & **Mushtaq, T. M.** (2018). Analysis of Optical Attenuation from Measured Visibility Data in Islamabad, Pakistan. *Mehran University Research Journal of Engineering and Technology, 37*(2), 269-278. doi: 10.22581/muet1982.1802.04.**(Muhammad Tahir Mushtaq (Informatics/SST)** HEC X CAT

Abstract:FSOL (Free-Space Optical Links) are becoming very popular due to the inherent advantages of high data rates, rapid deployment, portability, cost effective and immunity to electromagnetic interference. FSOL is a line-of-sight technology that uses a modulated beam of light to transmit and receive the data of multiple of Giga Bit per second. FSOL uses the free space or atmosphere as a communication channel. Optical signal launched at transmitter end, travels through the atmosphere and reaches to the receiver, is severely affected by the local atmospheric conditions. Atmosphere contains different atmospheric particulates like fog, rain, snow, smog, clouds and haze. These atmospheric particulates, particularly fog, effect the propagation of optical signal passing through the atmosphere and cause significant amount of optical attenuation. In order to deploy FSO system, a detailed analysis of local weather condition is much more important. Here, we present the measured visibility data for analysis of optical attenuation. Visibility data was measured at COMSATS Institute of Information Technology from 2009-2012. Percentage CDF (Cumulative Distribution Function) is used to find out the detailed insight about the optical attenuation of FSOL. Yearly based CDFs is compared with each other which clearly suggest that almost 99% of time optical attenuation remains within the range of 2 dB/km.

5. **Naseer, S.,** Saleem, Y., Khalid, S., Bashir, M. K., Han, J., & Iqbal, M. M. (2018). Enhanced Network Intrusion Detection using Deep Convolutional Neural Networks. *Ksii Transactions on Internet and Information Systems, 12*(10), 5159-5178. doi: 10.3837/tiis.2018.10.028. **(Sheraz Naseer (Informatics/SST)** (SJR)

Abstract: Due to the monumental growth of Internet applications in the last decade, the need for security of information network has increased manifolds. As a primary defense of network infrastructure, an intrusion detection system is expected to adapt to dynamically changing threat landscape. Many supervised and unsupervised techniques have been devised by researchers from the discipline of machine learning and data mining to achieve reliable detection of anomalies. Deep learning is an area of machine learning which applies neuron-like structure for learning tasks. Deep learning has profoundly changed the way we approach learning tasks by delivering monumental progress in different disciplines like speech processing, computer vision, and natural language processing to name a few. It is only relevant that this new technology must be investigated for information security applications. The aim of this paper is to investigate the suitability of deep learning approaches for anomaly-based intrusion detection system. For this research, we developed anomaly detection models based on different deep neural network structures, including convolutional neural networks, autoencoders, and recurrent neural networks. These deep models were trained on NSLKDD training data set and evaluated on both test data sets provided by NSLKDD, namely NSLKDDTest+ and NSLKDDTest21. All experiments in this paper are performed by authors on a GPU-based test bed. Conventional machine learning-based intrusion detection models were implemented using well-known classification techniques, including extreme learning machine, nearest neighbor, decision-tree, random-forest, support vector machine, naive-bays, and quadratic discriminant analysis. Both deep and conventional machine learning models were evaluated using well-known classification metrics, including receiver operating characteristics, area under curve, precision-recall curve, mean average precision and accuracy of

classification. Experimental results of deep IDS models showed promising results for real-world application in anomaly detection systems.

Keywords:*deep learning, convolutional neural networks, autoencoders, LSTM, k_NN, decision_tree, intrusion detection, convnets, information security.*

6. **Naseer, S.**, Saleem, Y., Khalid, S., Bashir, M. K., Han, J. H., Iqbal, M. M., & Han, K. J. (2018). Enhanced Network Anomaly Detection Based on Deep Neural Networks. *Ieee Access, 6*, 48231-48246. doi: 10.1109/access.2018.2863036.**(Sheraz Naseer (Informatics/SST) JCR Listed (IF: 3.557)**

Abstract: Due to the monumental growth of Internet applications in the last decade, the need for security of information network has increased manifolds. As a primary defense of network infrastructure, an intrusion detection system is expected to adapt to dynamically changing threat landscape. Many supervised and unsupervised techniques have been devised by researchers from the discipline of machine learning and data mining to achieve reliable detection of anomalies. Deep learning is an area of machine learning which applies neuron-like structure for learning tasks. Deep learning has profoundly changed the way we approach learning tasks by delivering monumental progress in different disciplines like speech processing, computer vision, and natural language processing to name a few. It is only relevant that this new technology must be investigated for information security applications. The aim of this paper is to investigate the suitability of deep learning approaches for anomaly-based intrusion detection system. For this research, we developed anomaly detection models based on different deep neural network structures, including convolutional neural networks, autoencoders, and recurrent neural networks. These deep models were trained on NSLKDD training data set and evaluated on both test data sets provided by NSLKDD, namely NSLKDDTest+ and NSLKDDTest21. All experiments in this paper are performed by authors on a GPU-based test bed. Conventional machine learning-based intrusion detection models were implemented using well-known classification techniques, including extreme learning machine, nearest neighbor, decision-tree, random-forest, support vector machine, naive-bays, and quadratic discriminant analysis. Both deep and conventional machine learning models were evaluated using well-known classification metrics, including receiver operating characteristics, area under curve, precision-recall curve, mean average precision and accuracy of classification. Experimental results of deep IDS models showed promising results for real-world application in anomaly detection systems.

Keywords: *Deep learning, convolutional neural networks, autoencoders, LSTM, k_NN, decision_tree, intrusion detection, convnets, information security.*

Conference Papers

1. **Ali, M. N., Naveed, I.**, Khan, M. A., Nasir, A., & **Mushtaq, M. T.** (2018, October 23-25, 2018). *Sensing Time Optimization Using Genetic Algorithm in Cognitive Radio Networks.* Paper presented at the International Conference on Intelligent Technologies and Applications (INTAP 2018), Singapore.**(Muhammad Nadeem Ali (Informatics/SST),Iqra Naveed, Muhammad, Tahir Mushtaq)**

Abstract: Spectrum sensing is a key issue in cognitive radio. Communication spectrum hole detection plays an important role in effective bandwidth utilization. The secondary user (non-licensed) can transmit its data over the idle channel. Sensing time is another issue in spectrum sensing. The minimum spectrum sensing time the collision between the data transmission of primary and secondary user can be kept under a desired value. The desired value will enhance the throughput of the secondary use. In this paper, genetic algorithm was used for the optimization of the sensing time. A significance improvement is noted in sensing time. The results were simulated on MATLAB.

Keywords: *cognitive radio, spectrum sensing, probability of collision, sensing time throughput optimization, genetic algorithm.*

School of Business and Economics (SBE)

Department of Economics

Research Articles

1. Asgher, N., **Hafeez-ur-rehman** & Mumtaz, A. (2018). Impact of Institutional Quality, Energy Prices and Financial Development on Income Inequality: Evidence from Selected Asian Countries. *Journal of the Research Society of Pakistan, 55*(1).**(Hafeez-ur-Rehman (Economics /SBE)****HEC X CAT**

Abstract: The present study analyzes the impact of financial sector development, institutional quality and energy prices on income inequality using panel data for 12 Asian developing countries for the time period 1990-2015. Fully Modified OLS has been applied to determine the long run relationship among the variables. The results of the study suggest that institutions affect income inequality positively, which means with the enhancement of institutions the inequality rises. Financial development and income distribution also have positive and significant relationship. The coefficient of energy prices is positively related to income inequality. The study concludes that the role of institutions in income inequality is highly important and the impact of financial development on poor class of the society is significant. This calls for appropriate measures to monitor the energy prices. The study suggests that the role of government in reducing income inequality is indispensable and government should invest in health, education and worker's training for improving the standard of living of the poor.

2. Maqbool, S., Anwar, S., & **Hafeez-ur-rehman.** (2018). Competitiveness and Comparative Advantage of Pakistan in Leather and Leather Products Trade: Analysis and Trends. *European Online Journal of Natural and Social Sciences, 7*(1). **(Hafeez-ur-Rehman (Economics /SBE)** **(Not HEC Recognized)**

Abstract: Livestock sector is considered the second key sector of agriculture through its share of more than half to value added and 11.8% to GDP and main source of raw material for leather industry of the country. This local availability of raw materials and low wage cost gives the country a competitive edge in the world market. This study is an effort to examine Pakistan's competitiveness of leather and leather products with a set of Revealed Comparative Advantage (RCA) and Revealed Competitive Advantage index with respect to international trade. The study has utilized Balassa index, Vollrath index and Revealed Symmetric Comparative Advantage index for empirical analysis in Pakistan during the time span from 2003 to 2014. The findings of the study illustrate that Pakistan has a high degree of comparative advantage in this sector during period under analysis which indicates the potential of leather sector exports for foreign exchange earnings. The results of the study also show that the position of Leather sector lies in the "Competitive position product group" and "Threatened product group". There is need to strengthen comparative and competitive advantage in Leather sector by policy support and facilitating role by all stakeholders to attain the growth in livestock and agriculture sector and improve the income of related stakeholders.
Keywords:*leather and leather products, competitiveness, comparative advantage,vollrath index, balassa index, Pakistan.*

3. **Arshed, N.,** Anwar, A., Kousar, N., & Bukhari, S. (2018). Education Enrollment Level and Income Inequality: A Case of SAARC Economies. *Social Indicators Research, 140*(3), 1211-1224. doi: 10.1007/s11205-017-1824-9. (**Noman Arshed (Economics /SBE)** **JCR Listed (IF: 1.648)**

Abstract: This study is based on the idea that education forms a quadratic relationship with the income inequality. To evaluate it for South Asian Association for Regional Cooperation (SAARC) countries, this study uses the panel data from 1990 to 2015. Long runpanel data necessitated the use of panel co-integration approach, followed up with fully modifed OLS model to generate long-run coefcients. The results depict that initially primary and secondary enrollment increases inequality while tertiary enrollment decreases it.

However, after a certain threshold level of enrollment (76% for primary, 42% for secondary and 7% for tertiary), their efect reverses. Thus, it makes inverted U shape for primary and secondary enrollment and U shape for tertiary enrollment. Hence education shows diminishing marginal return efect. Only the countries of India, Sri Lanka, Maldives and Nepal in SAARC economies have high enough education enrollments to cause a negative effect on income inequality.

Keywords:*education, income inequality, DMR, Panel co-integration, Panel FMOLS.*

4. **Hassan, M. S.**, Tahir, M. N., **Wajid, A.,** Mahmood, H., & Farooq, A. (2018). Natural Gas Consumption and Economic Growth in Pakistan: Production Function Approach. *Global Business Review, 19*(2), 297-310. doi: 10.1177/0972150917713533.**(Muhammad Shahid Hassan (Economics /SBE) Ayesha Wajid)(Not HEC Recognized)**

Abstract: This study investigates the relationship between energy consumption and economic growth in case of Pakistan using annual data from 1977 to 2013. Using Johansen maximum likelihood approach to estimate the long-run relationship and Granger causality to check the direction of causality, the study finds that the long-run relationship between natural gas consumption and economic growth is positive and statistically significant. Furthermore, the Granger causality shows that there exists energy-led growth hypothesis in Pakistan as Granger causality runs from energy to economic growth. The policy implication is that uninterrupted availability of energy is essential and conservation strategies could be harmful for the economic growth.

Keywords:*Pakistan, economic growth, natural gas consumption.*

5. Asghar, N., **Hafeez-ur-Rehman**, & Mujaddid, H. G. (2018). Efficiency Analysis of Hospitals in Punjab Districts: An Application of DEA Bootstrap. *Journal of Business Studies* - JBS, 14(1), 120-128 p. **(Hafeez-ur-Rehman, (Economics /SBE)HEC Y CAT**

Abstract: The main objective of this study is to analyze the efficiency of hospitals of districts of Punjab a province of Pakistan. The study uses output oriented DEA bootstrap technique formeasuring the efficiency of hospitals by utilizing four inputs and two outputs. The results ofthe study reveal that not a single district appears to be fully efficient when bias correctedefficiency technique is used. The overall efficiency which is measured in the form of mean efficiency have shown rising trend in 2011 and afterward little deterioration in 2013. Thestudy identifies the less efficient and highly efficient districts of hospitals of Punjab province of Pakistan. The inference from this study may be helpful for policy makers to formulate and implement policies which help the hospitals of districts of Punjab to perform better throughimproving their efficiency.

Keywords: *technical efficiency, DEA bootstrap, output, hospitals.*

6. Ali, M., **Hafeez-Ur-Rehman**, & Parvaiz, Z. (2018). Technical, Allocative and Economic Efficiency of Public Hospitals of Punjab (Pakistan): A Data Envelopment Analysis. *Journal of Pakistan Vision,* 19(2), 01-08 p. **(Hafeez-ur-Rehman, (Economics /SBE)HEC Y CAT**

Abstract: This study analyzes the performance of 25 DHQs hospitals of the Punjab province of Pakistan, during the two time periods i.e. 2006- 2010 (pre-decentralization era) and 2011-2015 (postdecentralization Research Outlook 2018 | School of Business and Economics (SBE) 123 era). Data envelopment analysis (DEA) has been used to estimate the economic efficiency (EE) of DHQs for the above mentioned two time periods. Our empirical results indicate that the average level of EE of 25 DHQs increased from 0.57 in the first period to 0.67 in the second period. An improvement in the performance of 76% of hospitals has been noted after the decentralization.

7. Bashir, F., **Hafeez-ur-Rehman**, Ahmad, R., & Nasim, I. (2018). Sectoral Investment and Employment Generation in Pakistan: An Econometric Analysis. *Review of Economics and Development Studies,* 4(2), 261-270. **(Hafeez-ur-Rehman, (Economics /SBE)HEC Y CAT**

Abstract: This study is projected at investigating the influence of SectoralInvestment on Employment Generation. For this purpose, time series data is collected from Pakistan over the period from 1972 to 2017. Augmented Dickey fuller test reveals that few variables considered in the study are stationary at level and few at first difference. So, econometric results are estimated using autoregressive and distributed lag model for long run elasticities. Long run co-integrating relationship is established at 2.5 percent level using ARDL bound testing approach. ARDL long run results concludes that Agricultural Investment, Industrial Investment, Services Sector Investment and Trade openness are increasing employment while inflation and tax revenue are seemed to be negatively related with employment of Pakistan in the long run.

Keywords: *agricultural investment, industrial investment, services sector investment, employed labor force, trade openness, inflation, tax revenue.*

8. Bashir, F., **Hafeez-ur-Rehman**, Ahmad, R., & Nasim, I. (2018). The impact of energy consumption on services sector output in developing countries: panel data analysis. *Pakistan Journal of Social Sciences (PJSS)*, 38(2), 427-436. **(Hafeez-ur-Rehman, (Economics /SBE)** HEC Y CAT

Abstract: The purpose of this study is to examine the influence of energy consumption on services sector output of 69 developing countries over the period from 1990 to 2014. The results of the study are estimated using Panel ARDL technique after examining stationary using Levin, Lin & Chu test of all the variables. The results of Levin, Lin & Chu test exhibit that Services sector output, labor force, capital formation, energy consumption, GDP Deflator and broad money are stationary at level while Government expenditure is stationary at first difference. The long run results finalizes that broad money, energy consumption, labor force , GDP deflator, government expenditure and capital formation are increasing services sector output of developing countries in the long run.

Keywords: *services sector, labor force, capital, fiscal policy, monetary policy, energy consumption, price level.*

9. Mehmood, R. K., & **Hafeez-ur-Rehman.** (2018). Capacity Building for Sustainable Human Development: A Panel PMG/ARDL Analysis of East and South Asia. *Paradigms,* 12(2), 147-152. **(Hafeez-ur-Rehman, (Economics /SBE)** HEC Y CAT

Abstract: One of the biggest challenges of today's world is to ensure, now and in the future, sustainable human development across the globe. The idea of this study is developed from Agenda2030. During the last couple of decades, improvement inhuman development has been observed across the globe. However, many disparities are found in developing countries. People in developing countries are still not able to fully utilize their talent in economic activities. East Asian and South Asian regions are chosen for analysis in this study. The panel data often selected countries from both regions are collected from1996 to 2016. After checking the stationarity of variables,PMG estimator is applied to estimate a model of study. The long-run estimated results confirm that simultaneous development of the economy, society, and environment is necessary to build the capacity of selected countries for sustainable human development.

Keywords: *agenda 2030, capacity building, sustainable, human development, disparities, east asia and south asia,pmg estimator.*

10. Hussain Qureshi, M., & **Kalim, R.** (2018). How Shariah Compliance and Traditional Banks are performing? A Case of Pakistan. *International Journal of Islamic Economics and Finance Studies, 4*(3), 6-20. DOI: 10.25272/ijisef.416706.**(Rukhsana Kalim (Economics /SBE)** (Not HEC Recognized)

Abstract: The study is conducted with the objective of comparing shariah compliance and traditional banks of Pakistan from performance perspective. The relative investigations are conducted by means of ttest, for the period 2010-2017. Ratios based on CAMELS approach are applied to identify the managerial and

monetary performance of shariah compliance and traditional banks of Pakistan. It is observed that Shariah compliance banks are significantly better in managing capital adequacy, management adequacy/quality, earning ability, liquidity and sensitivity to risk as compared to their traditional counterparts. The findings reveal significant implications for policy makers in assessing the capabilities of Shariah compliance and traditional banks in Pakistan, and for ascertaining the direction of future banking system in Pakistan. Findings of the study also underpin awareness and trust in Shariah compliance banks of Pakistan. Furthermore, according to authors information, there is no comprehensive research in Pakistan that differentiate the performance of Shariah compliance and traditional banks by applying CAMELS approach on variables under study as well as on current data set.

Keywords:*shariah compliance banks, traditional banks, performance.*

11. Kalim, R., & **Arshed, N.** (2018). What determines the Social Efficiency of Islamic Banking Investment Portfolio? *Journal of Islamic Business and Management (JIBM), 8*(2). Available at: https://jibm.org/wp-content/uploads/2018/12/6Rukhsana.pdf.**(Noman Arshed (Economics /SBE)HEC Y CAT**

Abstract: While operating in competition with conventional banks, Islamic banks need to push up the returns to depositors so that they could attract funds. If an Islamic bank optimizes its investment portfolio to maximize deposit returns, it might have increasing access to the supply of deposit funds. Unlike other studies, which consider return to deposit as a cost, this study considers it as means to public benefit. It has used all 53 known full-fledged Islamic banks operating in Pakistan, Malaysia and MENA countries in a panel stochastic frontier analysis for data between 2001 and 2015 and confirmed that Islamic banks are approximately 26% optimized. Mudaraba investment presents itself as the best candidate for boosting the efficiency. Also, if the market is favorable in terms of banking profits, market return rate of investment, banking sector development and risks, then efficiency could be increased.

Keywords:*musharaka, mudaraba, ijarah, murabaha, panel stochastic frontier model, Islamic banking, efficiency.*

Copnference Papers

1. **Kalim, R.** (2018). *Options and Challenges of Islamic Fiscal Policy: The way to look forward*. Paper presented at the published in proceedings of International Symposium of Islam and Economics, December 8-9, 2018, P. 16, at Istanbul University, Turkey.**(Rukhsana Kalim (Economics /SBE)**
Abstract: *Not found*

2. **Kalim, R.,** Faiz, I., & **Arshad, N.** (2018). *Investor Confidence and Asymmetric Effects of Terrorism - A case of Pakistan.* Paper presented at the published in the proceedings of ISER International Conference (18th - 19th August 2018,London, UK).**(Rukhsana Kalim (Economics /SBE) Noman Arshed)**
Abstract: There are many challenges that will be faced by government to implement this Imitative like affordability of vacant land, financial Implications and hinders, involvement of private and real estate sectors and developers, time frame and implementation, legal and institutional compliances etc. Beyond measures to improve households' income in the long run, a holistic approach is needed to effectively bridge the minimize supply-demand housing gap and provision of affordable houses in Pakistan.

3. **Arshed, N.** (2018*). Education Stock and its Implications for Income Inequality: The case of Asian economies*. Paper presented at the 9th International Conference on Management Research, The Superior College Lahore.**(Noman Arshed (Economics /SBE)**
Abstract: *Not found*

Department of Finance

Research Articles

1. **Rafay, A., & Farid, S.** (2018). Shariah Supervisory Board Report (SSBR) in Islamic banks: An experimental study of investors' perception and behavior. *International Journal of Islamic and Middle Eastern Finance and Management, 11*(2), 274-296. doi: doi:10.1108/IMEFM-07-2017-0180.**(Abdul Rafay (Finance /SBE), Saqib Farid)**ISI Web of Science

Abstract: Purpose The primary purpose of this study is to determine the impact of information ordering in Shariah Supervisory Board Report (SSBR) on investors' behavior and perception about the performance of Islamic bank in terms of Shariah compliance and other conventional parameters. Design/methodology/approach the study used the belief adjustment model to evaluate the desired effects of ordering positive and negative information (if any) in SSBR of an Islamic bank. This study extends the previous literature on information ordering as a pioneer experimental study in emerging economies. Findings Evidence shows that investors and technical users of performance reports consider SSBR as significant for financial and investment decisions from the Islamic perspective. The results indicate that the primacy effect does exist and is statistically significant. Practical implications The SSBR provides the management with an excellent opportunity to communicate and convince the investors about Shariah compliance features of an Islamic bank. Additionally, it also highlights the functional use of impression management to manipulate the investor' behavior and perception. Originality/value for the first time, this study specifically investigates the effect of conscious information ordering in SSBR of Islamic banks on investor's perceptions and behaviors.

Keywords: *behavior,perception,experiment,impression management,shariah supervisory board,belief adjustment model.*

2. **Rafay, A.,** Chen, Y., A. B. Naeem, M., & Ijaz, M. (2018). Analyzing the Impact of Credit Ratings on Firm Performance and Stock Returns: Evidence from Taiwan. *Iranian Economic Review, 22*(3), 767-786. doi: 10.22059/ier.2018.67452.**(Abdul Rafay (Finance /SBE) (SJR)**

Abstract: The study covers three aspects; factors determining credit ratings, impact of credit ratings on performance of entities and the relationship between stock returns and credit ratings. The study focuses on the firms listed in Taiwan Stock Exchange (TSE) of Taiwan. The empirical analysis uses the data of 50 firms rated by Taiwan Ratings Corporation (TRC) for the period 2010-2015. Two estimation techniques Ordered Probit Model and Panel Data Regression are applied. Performance is measured using return on investment and Tobin's Q factors. The findings depict that credit ratings are predicted by important firm specific factors like size and growth opportunities, capital intensity, asset returns, sector type etc. Results also suggested that firms with higher credit ratings tend to have better performance. For future research, similar study may be conducted with the ratings issued by other Taiwanese or non-Taiwanese agencies covering more firms and time span.

Keywords: *TRC, TSE, credit ratings, stock returns, performance, ordered probit model, Tobin's Q. JEL classification: G24.*

3. **Nosheen, S., Naveed-Ul-Haq, & Sajjad, M. F**. (2018). Corporate Governance, Disclosure Quality and Cost of Equity: Evidence from Pakistan. *The Lahore Journal of Business, 6*(2). **(Safia Nosheen (Finance /SBE) Naveed-Ul-Haq, Muhammad Faisal Sajjad)**HEC Y CAT

Abstract: The link between disclosure of corporate information and the cost of equity in firms is one of the most important issues in finance. This paper aims to examine the connection between corporate governance, disclosure quality of information, and the cost of equity in Pakistani-listed (PSX-listed) firms. Using the Generalized Methods of Movements (Sys-GMM) model, a sample of 167 non-financial firms listed on Pakistan Stock Exchange (PSX) for the period of 2011-2015was analyzed. Sys-GMM estimation was applied to overcome the problem of endogeneity among corporate governance variables. To test the robustness of

GMM estimations, we compared the results of pooled ordinary least squares (OLS) and fixed-effect estimations and found they did not overcome the problem of endogeneity, providing spurious results. We found a negative association between cost of equity and disclosure quality of financial statements. The findings suggested that the board size, concentrated ownership and CEO duality, are found as significant factors in reducing the cost of equity of PSX-listed firms. Audit committee independence and audit quality of the firm showed a positive relationship with the firm's cost of equity. Our findings suggest that employing a high-quality auditor and independent director's results in increased cost of equity for PSX-listed firms. Furthermore, no significant relationship between independence of the boards and duration of the authorizations of financial statements by the board of directors is found. The results also revealed the investors demand more return on their investments if inadequate and incomplete information is disclosed in the annual reports of the firms. This study provides useful insights for Pakistani corporate governance regulators, the executive management of Pakistani firms, and their investors.

Keywords: *corporate governance, disclosure quality, cost of capital, Pakistani listed firms.*

4. **Naveed-Ul-Haq**, Raja, A. A., Nosheen, S., & Sajjad, M. F. (2018). Determinants of client satisfaction in web development projects from freelance marketplaces. *International Journal of Managing Projects in Business, 11*(3), 583-607. doi: doi:10.1108/IJMPB-02-2017-0017.**(Naveed-Ul-Haq(Finance /SBE), Ammar Aftab Raja, Dr. Safia Nosheen, Muhammad Faisal Sajjad)**HEC Y CAT

Abstract: Purpose The purpose of this paper is to identify the major factors of client satisfaction (CS) that are critical for web development projects in freelance marketplaces. This quantitative study is done from the point of view of the web development services clients. Five major dimensions were proposed as determinants of CS from the literature review: ease of use, user interface, information, security and privacy. Design/methodology/approach a web-based survey methodology is used as the main data collection instrument. Statistical techniques such as confirmatory factor analysis and multiple linear regressions are used to analyze 162 responses of questionnaires. Findings The findings suggest that all factors do influence CS. In terms of strength, security had the highest level of impact on CS, so it is the strongest determinant among all factors. After security, ease of use and information are considered as strong determinants. So, this study concludes that the five major determinates do affect CS in web development projects from freelance marketplaces. Research limitations/implications this research is limited only to the top freelance marketplaces, such as Upwork, Freelancer, Fiverr, Guru, Envato Studio, etc. The sample size is relatively small and this study is focused on web development projects only. Moreover, this research is focused only on the characteristics or attributes of the projects final outcome, i.e. website. Practical implications this study attempts to identify the important factors that have a relation with CS, thus giving freelancers an indication of what to look for when working on any web development project posted by any client in a freelance marketplace. Understanding the determinants of CS will also help Pakistani information technology freelancers involved in web development projects and services to increase their project performance, improve their CS rate and increment client following. Originality/value this presents the first study on the determinants of CS in web development projects from freelance marketplaces.

Keywords:client satisfaction,freelance marketplaces,it programming,web development projects.

5. Farooqi, M., Azhar, S. M., &**Tashfeen, R.** (2018). Jihadist Organizations: History and Analysis. *Journal of social, Political and Economic studies (43)*, 1-2. **(Rubeena Tashfeen (Finance /SBE) (SJR)**

Abstract: This article attempts to understand the global jihadist movement as a new form of organizational unit, seeking a better understanding and control of terrorism and jihad. It reviews the history of a number of jihadist groups, including the Taliban, Hezbollah, Al-Qaeda, ISIS, and the Tehreek Taliban Pakistan. The

authors tell how "Jihad" has taken on a second meaning that exalts violence, as distinguished from the original meaning that speaks of spiritual self-improvement.

6. **Tashfeen, R.,** & Azhar, T. M. (2018). The proxies conundrum. *Management Research Review, 41*(4), 453-486. doi: doi:10.1108/MRR-06-2017-0174.**(Rubeena Tashfeen (Finance /SBE),Tashfeen Mahmood Azhar)(SJR)(Review)**

Abstract: Purpose – No systematic models are being used in empirical research that provides assurance for the choice of proxies that are being used. The purpose of this paper is to examine the validity of the proxies being used in empirical research, and as a case study, it focuses on the area of financial derivatives. Design/methodology/approach – First, the authors review results of proxies from the financial derivatives literature and follow with empirical tests to confirm the findings from the review. Findings – The review shows that proxies provide mixed results. The findings are further supported by the results from empirical tests. It suggests that measures used in the studies related to financial derivatives theory may need to be refined and highlights that no solid bases or tests have been developed for the proxies used to measure the constructs. Research limitations/implications – As individual proxies are examined across studies, a metaregression analysis cannot be used, and there is no other available model to capture this type of examination. The approach adopted has some limitations but provides a basis for examining the reasonableness of proxies as measures of constructs. Originality/value – This is the first study that attempts to examine the strength of proxies in capturing related constructs. The methodology is unique to a review of past studies in financial derivatives. It supports the need for developing more rigorous models/bases for the measures being used, and this is an area that has been ignored in empirical research.
Keywords:corporate finance, financial distress, constructs, financial derivatives, managerial risk aversion, proxies, tax convexity.

7. **Rafay, A.,** & Khan, A. (2018). Synergy for Sustainability in the Upcoming Telecommunications Revolution: The Case of a Developing Economy. In A. Borchers (Ed.), *Technology Management in Organizational and Societal Contexts* (pp. 51-76). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-5279-6.ch003.**(Abdul Rafay (Finance /SBE)(Book Chapter)**

Abstract: This chapter examines the merger of two cellular companies (MOBILINK and WARID) for sustainability in the telecommunication sector of Pakistan. During 2011-2013, WARID faced the news of the possible sales of the company due to falling revenues, constant poor network quality, and lower network coverage in rural areas. In 2014, all telecom players participated in the auction for 3G/4G licenses, but WARID did not participate due to its technology neutral license (TNL). Important decisions were taken in 2014 like launching of 4G/LTE services in major cities, US$500 million investment, increase of tower sites, opening of new regional sales offices. These decisions along with presence of TNL made WARID an attractive target for merger with MOBILINK. In 2016, the formal merger was finalized for benefits like synergies in CAPEX/OPEX, fastest 4G network, network reach to rural areas, roll-out of new services like the internet of things (IoT) and mobile banking. The merger proved successful. During the first quarter of 2017, the company generated PKR 38.7 billion in revenues, up from the same period a year before.

8. Farooqi, M., Azhar, S. M., &**Tashfeen, R.** (2018). Jihadist Organizations History and Analysis. *The Journal of Social, Political and Economic Studies, 43*(1&2), 142-151. **(Rubeena Tashfeen (Finance /SBE)(SJR)**

Abstract: This article attempts to understand the global jihadist movement as a new form of organizational unit, seeking a better understanding and control of terrorism and jihad. It reviews the history of a number of jihadist groups, including the Taliban, Hezbollah, Al-Qaeda, ISIS, and the Tehreek Taliban Pakistan. The authors tell how "Jihad" has taken on a second meaning that exalts violence, as distinguished from the original meaning that speaks of spiritual self-improvement.

9. **Farid, S., &Khan, T.M.** (2018) Dynamic Links between Stock Market Returns and Industry Returns. *Global Management Journal for Academic and Corporate Studies. 8*(2), 99-109. **(SaqibFarid and Tahseen Mohsan Khan (Finance/SBE)**HEC Y CAT

Abstract: Different from the prior studies that focus on the unidirectional relationship between industry returns and stock market in Pakistan, this study has examined the bi-directional causal relationship between industry returns and stock market returns by considering multiple structural breaks. Unlike the conventional approach, we investigated the industry leading, market leading, feedback and neutrality hypotheses in Pakistan Stock Exchange (PSX). The study employed robust time series techniques such as Granger causality test and Generalized Impulse Response Functions (GIRF) on monthly data of stock returns from January 2000 to December 2017. The results show that the information in industry returns could be effectively used to predict aggregate stock market returns. Additionally, our findings confirm industry leading hypothesis for Cement, Fertilizer, Oil and Gas and Power industries; market leading hypothesis for Chemical, Food and Insurance industries; feedback hypothesis for automobile sector and neutrality hypothesis for Banking, Pharma, Textile and Miscellaneous industries. The findings of the study can assist investors in formulating country- and industry-specific investment strategies in PSX. Keywords: Industry Returns, Market Returns, Information Diffusion, Causal Relationship, Structural Breaks, Out of Sample Performance Test.

Keywords:*industry returns, market returns, information diffusion, causal relationship, structural breaks, out of sample performance test.*

10. **Sadiq, R., Khan, T. M., Arshed, N.** (2018). Empirical Analysis of Structural Income Changes in Commercial Banks: A Case of Pakistan. *The Lahore Journal of Business 7*(1). **(Ramla Sadiq (Finance/SBE) Tahseen Mohsan Khan, Noman Arshed)**HEC Y CAT

Abstract: This study attempts to determine the impact of structural income on the performance of commercial banks in Pakistan. Utilizing the population of listed commercial banks, the role of structural income is analyzed in the context of ownership mode1 and category mode2. The time frame for analysis is FY2008 to FY2015. Structural incomes is determined as non-mark up and mark up income, and analyzed on the basis of change in assets, equity and gross income3, using non-linear approach. Owner mode finding suggests conventional banks tilt towards non mark-up income significantly for asset and gross income base increase and Islamic banks insignificantly towards mark-up income. Category mode findings suggest category_1 low and high performing banks, category_2 and category_4 low performing banks significantly tilt towards non mark-up income for increase in all bases. Category_2 high performing banks significantly tilt towards non mark-up income for increase in equity base and category_5 high performing banks significantly tilt toward non mark-up income for increase in all bases. Where, the category_5 low performing banks significantly tilt towards mark-up income for increase in equity bases. Our findings also show that conventional leads Islamic banks and category_3 banks lead other banks categories in terms of managing profitability. Islamic banks are ahead conventional and category_1 banks are ahead among categories in term of utilization of funds.

Keywords:*ownership mode, category mode, non mark-up income.*

Conference Papers

1. Saadullah, Tashfeen, R., & **Younas, K.** (2018). *Investment Cash Flow Sensitivity: The role of cash flow Volatility.*Paper presented at the International Conference on Action Research in Multidisciplinary Perspectives (ICARMP 19-20 March 2018) The University of Lahore. **(Kinza Younas (Finance/SBE)**
Abstract: *Not found*

2. **Nosheen, S., Khan.T.M.& Naveed-ul-Haq**. (2018). *Corporate Governance Mechanism to Improve Disclosure Quality of the Firms: A Comparative Analysis of One-Tier and Two-Tier Board Structures; Evidence from ASEAN Countries.* Paper presented at the AiCoBM July 25-26, 2018. **(Safia Nosheen (Finance/SBE) Tahseen Mohsan Khan, Naveed-ul-Haq)**

Abstract: This study investigates and compares the determinants of disclosure quality of one tier and two tier board structures in selected ASEAN countries. We measure the significance of different corporate governance mechanism of top 50 companies from Malaysia, Indonesia, Thailand, and Singapore from 2011 to 2015.The results of independent sample t-test prove that the variances of the disclosure quality scores of one-tier and two-tier board structures are different. In order to avoid problems of omitted variable bias, unobserved heterogeneity, endogeneity we use Tobit regression model with random effects. The results confirm that the disclosure quality having dependence on board size, board expertise, board meetings, board diversity, timeline for both one-tier and two-tier board structures. The female board members and free cash flows have sole dependence on one-tier board. Whereas board power and block holders having sole dependence on two-tier boards. Study also establishes the relationship between board independence with disclosure quality of board structures.

Keywords:*disclosure quality, board structures, one-tier boards, two-tier boards, asean countries, determinants of disclosure quality.*

Department of Management

Research Articles

1. **Ahmed, F., Hassan, A., Ayub, M. U.,** & Klimoski, R. (2018). High Commitment Work System and Innovative Work Behavior: The Mediating Role of Knowledge Sharing. *Pakistan Journal of Commerce & Social Sciences, 12*(1).**(Fiza Ahmed (Management /SBE), Atif Hassan, Malik Umer Ayub)HEC Y CAT**

   Abstract: In this modern and competitive era, organizations for their endurance and success rely on the innovative ideas. For today's managers it becomes imperative to look for those ways and means through which they could innovate and this research is very much highlighting the said aspect. This study empirically examines and explores the impact of high commitment work system on innovative work behavior and addresses the role of knowledge sharing as a mediator. Basically, it provides a mechanism through which high commitment work system fosters innovative work behavior in telecommunication sector companies of Pakistan. Using the findings of this research, telecommunication companies, particularly mobile network companies can transform and bring novelty in their services to proliferate in a competitive market. All the established relationships are theoretically explained, empirically tested and supported through literature review. Results revealed that all three variables of the study exhibit positive relationship. All four established hypotheses are accepted and the relationship between high commitment work system and innovative work behavior partially mediated by knowledge sharing behavior.

   Keywords:*high commitment work system, knowledge sharing, innovative work behavior.*

2. De Clercq, D., Haq, I. U., & **Azeem, M. U.** Role ambiguity and perceptions of unfair performance appraisals: mitigating roles of personal resources. *Asia Pacific Journal of Human Resources, 0*(0). doi: doi:10.1111/1744-7941.12178.**(Muhammad Umer Azeem (Management /SBE)JCR Listed(IF:1.163)**

   Abstract: Drawing from conservation of resources theory and attribution theory, this study adds to human resource literature by investigating the relationship between role ambiguity and employees' beliefs that their performance is unfairly evaluated by their organization, as well as the buffering roles of relevant personal resources. In particular, the presence of unclear role descriptions may spur perceptions of unfair performance appraisals, but this process should be mitigated by organization-specific experience and Islamic work values. Data from Pakistani firms offer empirical support for these hypothesized effects. From a practical perspective, the findings indicate that human resource managers who fail to provide clear role descriptions to employees can mitigate accompanying concerns about the presence of unfair performance evaluations, to the extent that they encourage employees to leverage valuable personal resources.

   Keywords:*attribution theory, conservation of resources theory, Islamic work ethic, organizationspecific experience, role ambiguity, unfairness.*

3. De Clercq, D., Haq, I. U., Raja, U., **Azeem, M. U.,** & Mahmud, N. (2018). When is an Islamic work ethic more likely to spur helping behavior? The roles of despotic leadership and gender. *Personnel Review, 47*(3), 630-650. doi: doi:10.1108/PR-06-2017-0192. **(Muhammad Umer Azeem, (Management /SBE) JCR Listed (IF: 1.427)**

   Abstract: Purpose The purpose of this paper is to investigate how employees' Islamic work ethic might enhance their propensity to help their coworkers on a voluntary basis, as well as how this relationship might be invigorated by despotic leadership. It also considers how the invigorating role of despotic leadership might depend on employees' gender. Design/methodology/approach Survey data were collected from employees and their supervisors in Pakistani organizations. Findings Islamic work values relate positively to helping behaviors, and this relationship is stronger when employees experience despotic leadership, because their values motivate them to protect their colleagues against the hardships created by such leadership. This

triggering role of despotic leadership is particularly strong among female employees. Practical implications for organizations, the results demonstrate that Islamic work values may be important for creating a culture that promotes collegiality, to a greater extent when employees believe that their leaders act as despots who exploit their followers for personal gain. Originality/value this study elaborates how employees' Islamic work ethic influences the likelihood that they help their coworkers, particularly in work contexts marked by stress-inducing leadership.

Keywords:*quantitative, conservation of resources theory, helping behaviour, islamic work ethic, despotic leadership.*

4. De Clercq, D., Ul Haq, I., **Azeem, M. U.,** & Raja, U. (2018). Family incivility, emotional exhaustion at work, and being a good soldier: The buffering roles of waypower and willpower. *Journal of Business Research, 89*, 27-36. doi: 10.1016/j.jbusres.2018.04.002.**(Muhammad Umer Azeem, (Management /SBE)JCR Listed (IF: 2.509)**

Abstract: This study unpacks the relationship between family incivility and organizational citizenship behavior (OCB), suggesting a mediating role of emotional exhaustion and moderating roles of waypower and willpower, two critical dimensions of hope. Three-wave data from employees and their peers in Pakistani organizations show that an important reason that family incivility diminishes OCB is that employees become emotionally overextended by their work. Employees' waypower and willpower buffer this harmful effect of family incivility on emotional exhaustion though, such that this effect is mitigated when the two personal resources are high. The study also reveals the presence of moderated mediation, such that the indirect effect of family incivility on OCB through emotional exhaustion is weaker for employees high in waypower and willpower. For organizations, this study accordingly identifies a key mechanism by which family adversity can undermine voluntary behaviors; this mechanism is less forceful among employees who are more hopeful though.

Keywords:*organizational citizenship behavior, family incivility, emotional exhaustion, waypower, willpower, conservation of resources theory.*

5. **Bajwa, S. U., Kitchlew, N., Shahzad, Khuram, & Rehman, K. U.** (2018). Public-Private Partnership (PPP) as an Interdependent Form (I-Form) Organization. *International Journal of Public Administration, 41*(11), 859-867. doi: 10.1080/01900692.2017.1298610. **(Sami Ullah Bajwa (Management /SBE), Naveda Kitchlew, Khuram Shahzad, Khaliq Ur Rehman)ISI Web of Science**

Abstract: As "public-private partnership" (PPP) is becoming a popular model among states, the debate concerning how to make it more successful is accelerating. Based on insights from contemporary organization theory (OT), the present article suggests that instead of taking PPP as "partnership" between private and public sector partners, it is rather more beneficial to construe it as inter-dependent form (I-Form) organization. Subsequently, it identifies three types of interdependencies, faced by PPP-based I-Form organizations, and furnishes a model-comprising of initial and external conditions, and interplay of internal factors-that could enable smooth functioning and performance of I-Form organization.

Keywords:*public-private partnerships, organization theory, public administration, interdependent form of organization.*

6. Meo, M. **S., Khan,** V. J., Ibrahim, T. O., Khan, S., Ali, S., & Noor, K. (2018). Asymmetric impact of inflation and unemployment on poverty in Pakistan: new evidence from asymmetric ARDL cointegration. *Asia Pacific Journal of Social Work and Development, 28*(4), 295-310. doi: 10.1080/02185385.2018.1523745.**(Shabnam Khan (Management /SBE)JCR Listed (IF: 0.263)**

Abstract: The current study is intended to examine the asymmetric impact of inflation and unemployment on the poverty of Pakistan over the period of 1970 to 2016 by applying asymmetric Autoregressive Distributed Lag (ARDL) cointegration approach. The resultsrevealed the presence of long-run asymmetries among

inflation, unemployment and poverty. These findings also confirmed the atypical reaction of poverty to negative and positive shocks in unemployment and inflation. Furthermore, findings also confirmed negative and significant association among health expenditures (HE), population growth and poverty. The findings of the study have relevant implications for policymakers interested in the asymmetric relationship among inflation, unemployment and poverty in Pakistan.

Keywords:*poverty, asymmetric, nardl, inflation, unemployment.*

7. Sheikh, S., Syed, A. M., & **Shah, S. S. A.** (2018). Corporate Reinsurance Utilisation and Capital Structure: Evidence from Pakistan Insurance Industry. *Geneva Papers on Risk and Insurance-Issues and Practice, 43*(2), 300-334. doi: 10.1057/s41288-017-0063-2.**(Syed Sikander Ali Shah, (Management /SBE)JCR Listed (IF: 0.683)**

Abstract: The core objective of this work was to define significant determinants of corporate reinsurance utilisation in the life and non-life insurance industries in Pakistan based on the corporate demand for insurance theory, the bankruptcy cost argument, the agency cost theory, the risk-bearing hypothesis and the renting capital hypothesis. It also assessed which of these two insurance sectors has greater demand for reinsurance. Covering 33 insurance companies (6 life and 27 non-life insurance companies) over the period 2002–2012, the study outcomes show that some factors have a more significant impact on reinsurance purchases by insurance companies than others. Solvency risk, underwriting risk, firm performance, rate of interest and business mix are shown to be significant factors in defining the demand for reinsurance, but they influence reinsurance utilisation differently in the life and non-life branches. Only the variables firm size and inflation rate show similar results in both insurance branches in Pakistan, in contrast to the mixed outcomes generated by other variables of interest. The study further concluded that life insurance firms with high leverage levels lean more towards reinsurance purchases and solvency risk than non-life stock insurance firms operating in Pakistan.

Keywords:*Insurance, reinsurance, leverage corporate, demand theory, agency cost.*

8. Ahmed, F., **Kitchlew, N., Bajwa, S. U.,** & Shahzad, K. (2018). Congruence of Market Orientation and Organizational Learning: Performance Perspective. *Pakistan Journal of Commerce & Social Sciences, 12*(1), 309-329. **(Naveda Kitchlew (Management /SBE), Sami Ullah Bajwa)HEC Y CAT**

Abstract: The purpose of this study is to investigate the relationship between market orientation, organizational learning and organizational performance. The study follows quantitative research strategy and cross-sectional survey design to collect data from manufacturing firms operating in Pakistan. Regression analysis and structural equation modeling techniques are used to analyze data. Results indicate that both market orientation and organizational learning significantly affect organizational performance. Additionally, customer orientation and inter-functional coordination are also positively related with all dimensions of organizational learning. Competitor orientation is significantly related with only knowledge interpretation dimension of organizational learning. This research explains how customer knowledge and competitor knowledge is instrumental towards an organization's learning behavior. This research is valuable to practitioners as they can learn how customer knowledge can provide them with multiple opportunities to create superior value. Similarly, competitor related knowledge is instrumental in drawing a competitive strategy to win customers. This paper is novel as it confirms market orientation as an antecedent of organizational learning. Furthermore, the paper explores significant implications of components of market orientation for organizational learning subprocesses.

Keywords:*market orientation, customer orientation, competitor orientation, organizational learning, Inter-functional Coordination, knowledge acquisition, knowledge distribution, knowledge interpretation.*

9. Haq, I. U., De Clercq, D., **Azeem, M. U.,** & Suhail, A. (2018). The Interactive Effect of Religiosity and Perceived

Organizational Adversity on Change-Oriented Citizenship Behavior. *Journal of Business Ethics*. doi: 10.1007/s10551-018-4076-y.**(Muhammad Umer Azeem (Management /SBE)**JCR Listed (IF: 2.917)

Abstract: This study adds to business ethics research by examining how employees' religiosity might enhance their propensity to engage in change-oriented citizenship behavior, as well as how this effect may be invigorated in adverse organizational climates with respect to voluntarism. Two-wave survey data collected from employees in Pakistan show that change-oriented citizenship activities increase to the extent that employees can draw on their personal resource of religiosity and perceive little adversity, measured in this study with respect to whether voluntarism is encouraged. Further, the relative usefulness of religiosity for spurring change-oriented citizenship behavior is particularly strong when employees experience high levels of this organizational adversity, because employees with high religiosity tend to believe that such behavior is more needed in these organizational contexts. For organizations, these results demonstrate that the energy derived from religiosity may stimulate voluntary efforts that invoke organizational change, and the perceived value of such energy allocation is greater when employees perceive organizational environments that provide little encouragement to go beyond formal job duties.

Keywords:*change-oriented, citizenship behavior, religiosity, organizational climate.*

10. **Farooq, W.,** & Khalid Bhatti, O. (2018). Muslim Personality Effects on Workplace Deviance: An Empirical Analysis of Employees Working in Small and Medium Enterprises (SMEs`). *Al-Qalam, 24*(1). **(Waqas Farooq (Management /SBE)** HEC Y CAT

Abstract: Workplace deviant activities are the biggest menace faced by organizations today; moreover, no organization is immune to it. A significant amount of research has indicated that personality factors predict workplace deviance by using the conventional measures of personality. Researchers have neglected the spiritual and religious aspect of personality, in particular the personality characteristics as defined by Islam. In order to fill this gap in literature, the current study analyses do Muslim personality dimensions (intellectual, spiritual, and social) negative impact workplace deviance (interpersonal and organizational). Data were collected from 347 employees of small and medium enterprises (SMEs) operating/registered in Kuala Lumpur, Malaysia. The results indicate that Muslim personality spiritual and social dimension have negative influence on workplace deviance. Theoretically, the study extends the resource based view, and it provides empirical support for Al-Ghazali's theory of Muslim personality. Limitations and future directions have also been discussed.

11. **Zahra, N., Rasheed, H., & Atif, H.** (2018). Online Retail Stores Service Quality and Its Impact on Behaviors of Customers with Mediating Role of Attitude. *Global Management Journal for Academic & Corporate Studies (GMJACS),* 8(1), 140-153.**(Noreen Zahra (Management /SBE), Haroon Rasheed, Atif Hassan)**HEC Y CAT

Abstract: Online retail stores is an emerging market in Pakistan and all the managers of such online retail stores are struggling to win the trust and positive attitude of the customer while offering quality services. Such online retail stores are its embryonic stage thus the awareness of web presence and customer perception regarding service quality is important to offer better value. Many studies have been conducted in recently to measure the service quality dimension of online retail stores but such studies have been so far less observed in Pakistani context where it is still a new culture. The aim of this article is to measure the online retail store service quality, attitude and behavior of customers who are buying online and extract the leading dimension. A survey of 295 customers shows that ease of use, privacy, order condition and procedural fairness are leading dimensions impacting positively the behavior of customer while mearing service quality. It is also interpreted that positive attitude towards online retail store buying can enforce the positive and consistent behavior towards online shopping.

Keywords:*ease of use, information accuracy, functionality, order condition, interactive fairness, outcome fairness, procedural fairness, attitude, theory of planned behavior, technology acceptance model, SERVQUAL.*

12. **Hassan, A., Ghaffar, A.,** & Dinglasan, E. M. D. (2018). Cross-Country Analysis of Students' Evaluation of University Teaching: Relationship between Faculty Behavior, Student Satisfaction and Teaching Quality. *NUML Journal of Critical Inquiry*, *16*(1).**(Abdul Ghaffar (Management /SBE), Atif Hassan)**HEC Y CAT

Abstract: There is an emergent global consensus that students' evaluation (feedback) of university teaching is fundamentally controversial. Few would argue that a system that tells the "satisfactory" teaching of faculty members could be biased, for example; lenient faculty behavior may get a high percentage of feedback and may compromise quality of teaching. Similarly, strict behavior of faculty may get low percentage of feedback despite good quality of teaching. In this way, there is a possibility of relationship between quality of teaching and positive students' feedback. In order to examine the relationship between faculty behavior, student satisfaction and teaching quality, this study aimed to provide a cross-country analysis. The study employs focus group methodology. Focus group used in this research study has been operated under participant observation method. In each country (Pakistan, Philippines), in depth group interviews were conducted in two separate sessions, including focus group with students and faculty members. Four distinct focus group sessions were conducted to ensure the validity and reliability of the collected data. First stage of students' focus group inferred that a majority of the students like lenient teachers and they definitely give positive feedback if a faculty member gives less complicated and not so challenging assignments and other activities. They further stated that if a teacher remained strict throughout the class, students usually give a low score in their evaluation. Therefore, student feedback may not be an accurate reflection of the student satisfaction and is not a good indicator of effective teaching. In the second stage of faculty's focus group, opinion of faculty is consistent with the view of student's focus group discussion about lenient and strict faculty behavior and its relationship with students' satisfaction and teaching quality with few alterations. They further added that scale of students' feedback should be re-validated for more accuracy. Results showed a good consistency for both Pakistani and Philippines sample.

13. Manzoor, S., Fatima, N., Bhatti, A. A., & **Ali, A.** (2018). Zagreb connection indices of some nanostructures. *Acta Chemica Iasi, 26*(2), 169-180. doi: 10.2478/achi-2018-0011. **(Akbar Ali(Management /SBE)** ISI Web of Science (SKT Campus)

Abstract: There is an emergent global consensus that students' evaluation (feedback) of university teaching is fundamentally controversial. Few would argue that a system that tells the "satisfactory" teaching of faculty members could be biased, for example; lenient faculty behavior may get a high percentage of feedback and may compromise quality of teaching. Similarly, strict behavior of faculty may get low percentage of feedback despite good quality of teaching. In this way, there is a possibility of relationship between quality of teaching and positive students' feedback. In order to examine the relationship between faculty behavior, student satisfaction and teaching quality, this study aimed to provide a cross-country analysis. The study employs focus group methodology. Focus group used in this research study has been operated under participant observation method. In each country (Pakistan, Philippines), in depth group interviews were conducted in two separate sessions, including focus group with students and faculty members. Four distinct focus group sessions were conducted to ensure the validity and reliability of the collected data. First stage of students' focus group inferred that a majority of the students like lenient teachers and they definitely give positive feedback if a faculty member gives less complicated and not so challenging assignments and other activities. They further stated that if a teacher remained strict throughout the class, students usually give a low score in their evaluation. Therefore, student feedback may not be an accurate reflection of the student satisfaction and is not a good indicator of effective teaching. In the second stage of faculty's focus group, opinion of faculty is consistent with the view of student's focus group discussion about lenient and strict faculty behavior and its relationship with students' satisfaction and teaching quality with few alterations. They further added that

scale of students' feedback should be re-validated for more accuracy. Results showed a good consistency for both Pakistani and Philippines sample.

14. **Mohi-ud-Din, A., Khalil, A., & Hassan, A. (2018).** Empirical Investigation of Service Quality and Students' Satisfaction in Higher Education. *Journal of Contemporary Teacher Education, 2*(1), 09-22.**(Asad Mohi-ud-Din (SAP), Atif Hassan) HEC Y CAT**

Abstract: Higher educational institutions are able to gain students trust by treating them in equitable manner, handling their complaints in caring manner. Students' lives undergo a series of interrelated occurrence that persuades and overlies the student satisfaction. Thus, the main intention of this research was to comprehend the role of services quality in satisfaction of students with the value provided by their institutions, in return of what they have invested. This study also analyzes the difference between the satisfaction level of students of public and private universities towards quality of services. A standardized questionnaire to measure the higher education performance named HEdPERF, originally designed by Firdaus (2006) was administered to 190 business education students of private and public sector universities of Lahore city. The Research revealed that student satisfaction is more dependent upon the availability of resource person and resources. Results of study also showed a significant difference between satisfaction of students of public and private universities towards provision of quality services. This research suggested that universities should improve service quality on continuous basis.

Conference Papers

1. **Hassan, A.** (2018). *Analysis of trust as essence of transformational leadership: Impact on work engagement and organization citizenship behavior.* Paper presented at the Conference on Organizational Learning, Knowledge and Capabilities "Learning to make a difference", Liverpool, UK. **(Atif Hassan (Management /SBE)**
   Abstract: *Not found*

2. **Hassan, A.** (2018). *Influence of Transformational Leadership on Proactive Work Behavior: Mediating Role of Psychological Empowerment*. Paper presented at the Clute International Conference Washington DC.**(Atif Hassan (Management /SBE)**
   Abstract: *Not found*

3. **Chauhan, M. A. H.** (2018). *Service Culture in Higher Education Institute*. Paper presented at the The IAFOR International Conference on Education – IICEHawaii2018, Hawaii (IICEHawaii). **(Mohammad Ali Haider Chauhan (Management /SBE)**
   Abstract: This paper is an attempt to explore existing systems and suggest new designs, with practical suggestions for introducing a service culture in a Higher Education Institution (HEI). Culture constitutes of many elements and for the purpose of this paper the focus is on creative service culture for satisfying customers (students and industry) of a higher educational institute and role of human resource management in co-creating a service experience. It is important for an institute that its employees develop a service culture and how HRM policies/guidance helps in creating a service culture within an HEI co-creating a service experience. The service system interactions between students, professors, and university are critical for value co-creation as a central concept generally applicable to service science concepts. Paper attempts to look at students as part of the human resource of a university. One cannot look upon our customer in a

service culture environment as an external entity. Management of university must establish practices that enhance the concept of students (customers) as part of the human resource of an HEI. Emphasis is on the interaction among the students, customer contact employees (professors, registrar, admissions, examination etc) and the management of university (policy makers) in an HEI. A suggestion to launch a model program is proposed as an example in the end that can be a starting point for any HEI to embark on a journey towards creating new service culture allows for sharing and exchange of memorable experiences with its customers.

4. Haq, I., **Azeem, M. U.**, Raja, U., & Sharif, I. (2018). *Combined Effects of Perceived Threat of Terrorism, PsyCap, Negative Affectivity on Job Outcomes.* Paper presented at the Academy of Management Proceedings. **(Muhammad Umer Azeem (Management /SBE)**

Abstract: Using the conservation of resources theory, we proposed that perceived threats of terrorism would have negative impact on employees' wellbeing, stress, emotional exhaustion, job performance, and individually directed citizenship behaviors (OCBI). We further proposed that negative affectivity would worsen the negative relationships of perceived fear of terror with psychological wellbeing and job performance. Similarly, we proposed that psychological capital would reduce the negative impact of fear of terror on stress, emotional exhaustion, job performance, and individually directed citizenship behaviors. We tested our hypotheses in two studies using time-lagged data with independent measures for behaviors. In study 1, two-wave data comprising 160 peer-employee dyads supported the proposed relationships of fear of terror with wellbeing and performance and the moderating role of negative affectivity. In study 2, two wave data from 350 employee- supervisor dyads supported the negative relationship of perceived threat of terror with stress, emotional exhaustion, performance, and OCBI. Results also supported the moderating role pf psychological capital in these relationships. We believe that our research adds meaningfully to the limited research on the affects of terrorism on employees' wellbeing and behaviors. We discuss implications of our findings for managers and future research.

5. **Farooq, W.,** Rizvi, F., & Habib, A. (2018). *The Relationship between Psychological Contract Breach and Organizational Affective Commitment: Moderating Role of Personality Traits*. Paper presented at the 4th International Conference on Frontiers of Education Technologies (ICFET 2018) June25-27, 2018 Moscow, Russia.**(Waqas Farooq (Management /SBE), Farheen Rizvi, Arhum Habib)**

Abstract: Affective commitment (AC) is an employee behavior that is desired by organizations. Using affective event theory, the study posits that psychological contract breach (PCB) negatively influences affective commitment. Furthermore the aforesaid relationship is moderated by the big five personality traits i.e. (agreeableness, conscientiousness, neuroticism, extraversion, and openness to experience). The survey data was collected from universities employees in Lahore, Pakistan. The results indicate that PCB negatively impacts affective commitment, while extraversion, agreeableness, and conscientiousness moderates the PCB and AC relationship. Implications, limitations, and future directions have been discussed.

Keywords:*affective commitment, psychological contract breach, big five personality traits, moderation, university, affective event theory.*

Department of Operations & Supply Chain

Research Articles

1. **Aslam, H.,** Blome, C., Roscoe, S., & **Azhar, T. M**. (2018). Dynamic supply chain capabilities: How market sensing, supply chain agility and adaptability affect supply chain ambidexterity. *International Journal of Operations & Production Management, 38*(12), 2266-2285. doi: 10.1108/ijopm-09-2017-0555.**(Haris Aslam (Operation and Supply Chain/SBE), Tashfeen Mahmood Azhar)**JCR Listed (IF: 2.955)

Abstract: Purpose: This paper positions market sensing, supply chain agility and supply chain adaptability as a coherent cluster of dynamic supply chain capabilities. The purpose of this paper is to understand how dynamic supply chain capabilities interrelate and their effect on supply chain ambidexterity.

Design/methodology/approach:

Based on a survey of Pakistani manufacturing firms, a theoretically-derived model was tested in a structuralequationmodel.

Findings:

The results of the study show that a market-sensing capability is an antecedent of supply chain agility and supply chain adaptability. Furthermore, supply chain agility, directly, and supply chain adaptability, indirectly, affect supply chain ambidexterity. Supply chain agility, therefore, mediates the relationship betweensupplychainadaptabilityandsupplychainambidexterity.

Originality/value:

The contribution of this study lies in: first, identifying dynamic capability clusters relevant for achieving supply chain ambidexterity; second, evaluating performance implications of dynamic capabilities in the supply chain, specifically supply chain agility and adaptability; and third, proposing a unique measurement of supply chain ambidexterity in the light supply chain theory, and empirically evaluating the relationship between dynamic capabilities and supply chain ambidexterity.

Keywords: *Survey,Supply chain agility.*

2. **Aslam, H., Rashid, K., Wahla, A. R., & Tahira, U.** (2018). Drivers of Green Supply Chain Management Practices and their Impact on Firm Performance: A Developing Country Perspective. *Journal of Quantitative Methods, 2*(1), 87-113. **(Haris Aslam (Operation and Supply Chain/SBE), Kamran Rashid, Asadur Rahman Wahla, Uzma Tahira)**(UMT Journal)

Abstract: The purpose of this paper is to identify the drivers of Green Supply Chain Management (GSCM) practices among the manufacturing firms of a developing country, and to examine the impact of GSCM practices on firms' economic and environmental performance. A structural equation model is developed to study the hypothesized relationships between three drivers and GSCM practices. Furthermore, the relationship between GSCM practices and firm's economic and environmental performance is also investigated. A sample of manufacturing firms is taken from the companies listed in the local stock exchange. Cross-sectional data of 80 responses from these manufacturing firms is collected. The developed model is tested through Partial Least Square Structural Equation Modeling (PLS-SEM) technique. Results show that customer's pressure and firm's internal drive (enviropreneurship) positively impacts the adoption of GSCM practices whereas the relationship between governmental legislation GSCM practices adoption is not significant. GSCM practices positively impact the supply chain buying firm's economic and environmental performance.

Keywords: *green supply chain management (GSCM), developing country, environmental performance, Structural equation modeling, partial least square (PLS).*

3. **Aslam, H., & Azhar, T. M.** (2018). Dynamic Capabilities and Performance: A Supply Chain Perspective. *Pakistan Journal of Commerce & Social Sciences, 12*(1). **(Haris Aslam(Operation and Supply Chain/SBE),Tashfeen Mahmood Azhar)**HEC Y CAT

Abstract: Ever changing market environment in terms of technology and competitive situation requires firms to continuously reconfigure their resource configurations. Based on the dynamic capabilities view of the firm, we propose the dynamic capabilities relevant in the context of supply chains. We conceptualize dynamic capabilities of a firm as consisting of multiple levels. Capabilities at the highest level affect the formation of first order dynamic supply chain capabilities. Furthermore, first order capabilities modify the operational capabilities. We propose constructs for second and first order dynamic supply chaincapabilities. Performance implications of dynamic supply chain capabilities have also been empirically tested based on data from 275 managers from Pakistani manufacturing industry. The results show a support for the assertions by dynamic capability theorists.

Keywords:*dynamic supply chain capabilities, dynamic capabilities, operational capabilities, supply chain performance, structural equation modelling.*

4. **Saeed, A.,** Jun, Y., Nubuor, S. A., Priyankara, H. P. R., & Jayasuriya, M. P. F. (2018). Institutional Pressures, Green Supply Chain Management Practices on Environmental and Economic Performance: A Two Theory View. *Sustainability*, 10(5), 24. doi: 10.3390/su10051517.**(Amer Saeed (Operation and Supply Chain/SBE)**JCR Listed (IF: 2.075)

Abstract: The adoption of green practices within and outside organizational boundaries is imperative to ascertain environmental and economic performance goals. This article examined whether internal and external green supply chain management (GSCM) practices have the same or different kinds of regulatory, market, or competitive pressures. We employed institutional theory to identify different kinds of pressures, and resource dependence theory to explore the impact of internal and external GSCM practices on performance. An empirical study was conducted by collecting data through a structured questionnaire administered in Pakistan to the executives in the manufacturing industry. A total of 207 responses were used for data analysis by employing the partial least squares structural equation modeling (PLS-SEM) method. Normative pressures were found to be the most significant in both internal and external GSCM practices, while coercive and mimetic pressures positively affected internal and external GSCM practices, respectively. Internal GSCM practices proved to be more significant in improving environmental performance, and also had a substantial impact on external GSCM practices. In contrast, External GSCM practices had a significant positive effect on economic performance, while environmental performance also contributed to improving economic performance. The theoretical and managerial implications are discussed for academics, policymakers, and industry practitioners.

Keywords:*green supply chain management, internal GSCM practices, external GSCM practices, environmental performance, economic performance.*

5. Priyankara, H. P. R., Luo, F., **Saeed, A.,** Nubuor, S. A., & Jayasuriya, M. P. F. (2018). How Does Leader's Support for Environment Promote Organizational Citizenship Behaviour for Environment? A Multi-Theory Perspective. *Sustainability, 10*(1), 20. doi: 10.3390/su10010271.**(Amer Saeed(Operations and Supply Chain/SBE)**JCR Listed (IF: 2.075)

Abstract: Organizational citizenship behaviour for environment of employees is indispensable in realizing environmental sustainability goals of organizations. However, in the growing literature of employee green behaviour at work, scant attention has been paid on the impact of leader's specific support for environment, and the mechanisms through which it impacts organizational citizenship

behaviour for environment. Drawing upon social exchange theory, self-determination theory and theory of normative conduct, we tested the impact of leader's support for environment, autonomous motivation for environment and perceived group's green climate on organizational citizenship behaviour for environment in an integrated model. The sample included 313 executive level employees of green implemented textile and apparel manufacturing factories in Sri Lanka. The results of structural equation modelling showed a direct positive impact of leader's support for environment on organizational citizenship behaviour for environment. Further, autonomous motivation for environment and perceived group's green climate were found to be partial mediators between leader's support for environment and organizational citizenship behaviour for environment. We discussed the theoretical implications for sustainability literature and the managerial implications for organizational practitioners in promoting organizational citizenship behaviour for environment.

Keywords: *autonomous motivation for environment, employee green behavior, leader's support for environment, organizational citizenship behaviour for environment, perceived group's green climate.*

6. **Yusuf, I., & Azhar, M. T.** (2018). Policy Design for Sustainable Supply Chain Through Training: The Case of XYZ Packaging Company. In Qudrat-Ullah & A. Hassan (Eds.), *Innovative Solutions for Sustainable Supply Chains*: Sprigner.**(Ijaz Yusuf(Operation and Supply Chain/SBE),Tashfeen Mahmood Azhar)(Book Chapter)**

Abstract: Trainings imparted to the company employees are prerequisite for organizational transformation. Impact of the trainings appears in the form of changed behavior and attitude of the employees that contribute significantly for enhancement of the supply chain score of the focal firm. This chapter discusses the types of trainings generally categorized in soft skills and hard skills. Training need analysis is the best proven method utilized to identify the competency gaps of current employees. Soft skills trainings and hard skills trainings are designed for capacity building in order to reduce the gap and raise the employee productivity toward the sustainable supply chain management. Soft skills trainings not only change the attitude and behavior of the employee but as well enhance the motivational level of the employees that ultimately contribute in terms of better product quality and waste reduction. Hard skills trainings improve the technical capabilities of the workers. Reduced waste percentage, improved process settings, declining cost of quality, mistake proofing in product design, and enhanced productivity are the contributing factors for sustained supply chain performance. Training need analysis is the most appropriate method in the case company for assessing the competency gap. Training budget is allocated accordingly to reduce the competency gap. The objective of this chapter is to design the plausible policies for enhanced supply chain performance conducting experimentation with the simulated system dynamics model. What type of the training is required more and how significantly these training impact the supply chain score for enhanced supply chain performance are the research questions being explored. Experimentation with the model unveils the underlying symptoms and keeps on playing with the model to make the system better behaved. Training which is usually considered as an expenditure can be a valuable asset if its effectiveness improvesthesupplychainperformance. System dynamics simulated model is developed to design the policy streams for improved supply chain performance.

Department of Quantitative Methods

Research Articles

1. **Raza, S. M. M.,** Ali, S., &**Butt, M. M.** (2018). DEWMA control charts for censored data using Rayleigh lifetimes. *Quality and Reliability Engineering International, 34*(8), 1675-1684. doi: doi:10.1002/qre.2354. **(Syed Muhammad Muslim Raza (Quantitative Method /SBE), Muhammad Moeen Butt)**JCR Listed (IF: 1.604)

Abstract: We present conditional expected value (CEV) and conditional median (CM)-based double exponentially weighted moving average (DEWMA) charts formonitoring the type I censored data. We use the Rayleigh distribution forillustration of the proposed chart and mainly focus on the mean level shifts.The relation of variance level shifts with mean level shifts for the Rayleighdistribution is also discussed. In particular, we discuss known parameter aswell as the unknown parameter case, where the parameter estimation is doneby the method of maximum likelihood. Furthermore, a comparison betweenCEVDEWMA and CMDEWMA is also a part of this study. The performanceof the proposed chart is evaluated using the average run length and a real-lifecase study is also presented in this article.

Keywords:*average run length (ARL), conditional expected values (CEV), conditional median, CEVDEWMA,control charts, maximum likelihood estimate (MLE), type I censoring.*

2. Iqbal, N., & **Sial, M. H.** (2018). Semi-parametric analysis of agricultural production under dichotomy of inputs. *Agricultural Economics, 64*(8), 378-388. **(Maqbool H. Sial (Quantitative Method /SBE)** JCR Listed (IF: 1.732)

Abstract: Inputs used in agriculture play asymmetric roles during the production process. Growth inputs, i.e. water, nutrients, seed and soil environment, become a part of the biological growth of plants, whereas facilitating inputs, i.e. labour, capital and pesticides, help regulate the functions of growth inputs from outside of the plants. This insight about the asymmetric role of agricultural inputs has been incorporated into agricultural economics on the basis of agronomic principles of crop production. The objective of this study was to analyse the effect of facilitating inputs on the technical efficiency of growth inputs. This analysis has been carried out semi-parametrically by employing the double bootstrap procedure on farm household level data from Pakistan. The results indicate that pesticides, capital and family labour scale up the technical efficiency of the growth inputs, whereas hired labour significantly scales down this efficiency. We recommend the creation of alternative employment opportunities for the rural labour force, provision of effective agricultural extension services to farm families, a minimisation of trade barriers to the import agricultural machinery and an enhancement of the extent of farm mechanization.

Keywords: *damage control, data envelopment analysis, doubles bootstrap procedure, facilitating inputs, growth inputs, technical efficiency.*

3. **Sial, M. H.,** Sarwar, G., & Akram, W. (2018). Education and within Groups Earning Inequality in Pakistan. *Pakistan Journal of Commerce & Social Sciences, 12*(1). **(Maqbool H. Sial (Quantitative Method /SBE)** (SJR)

Abstract: The present study focuses on identifying and estimating the extent of earning inequality due to increase in the level of education in Pakistan. Utilizing four rounds of household level surveys conducted at national level during 2001-2014, the study analyzes the effect of education on earning inequality within workers having same level of education. Quantile regression is employed to estimate and test earning inequality within workers having primary, secondary and tertiary education respectively. The results confirm that there is significant heterogeneity in the returns within each level of education. Such disparities are shown to be larger for workers at upper quantiles of the earnings distribution versus the lower counterpart. The results also show that within-group earning inequality is higher for workers with tertiary education than with secondary and primary education. Finally, the findings suggest that earning inequality does not remain same over time. These dynamic changes have enlarged lower as well as upper tail of earning distribution causing further income inequality in Pakistan. Therefore, these findings has identified that heterogeneity in

the returns has very serious implication for distribution of income, general welfare and labor markets in Pakistan.

Keywords: *human capital, education, earnings distribution, quantile regression.*

4. Ahmad, S., **Sial, M. H.,** & Ahmad, N. (2018). Indirect taxes and economic growth: An Empirical Analysis of Pakistan. Pakistan Journal of Applied Economics, 28(1), 65-81. **(Maqbool H. Sial (Quantitative Method /SBE) (Not HEC Recognized)**

Abstract: The study investigates the empirical relationship between indirect taxes and economic growth in Pakistan. For estimation, the annual time series data (1974 to 2010) was used. The main purpose of the research is to find the long-run and short-run relationship between indirect taxes and economic growth. Philips Perron and Augmented Dickey fuller unit root tests were used to check the stationarity of every variable in the study. Auto Regressive Distributed Lag (ARDL) bounds testing approach for cointegrations (developed in 2001) was applied to estimate the long-run and short-run relationship among the variables. Indirect taxes have negative and significant effect on economic growth in long-run while its coeffcients in short-run were insignificant. Due to one per cent increase in indirect taxes, economic growth would decrease by 1.68 per cent. ECM coefficient of indirect taxes shows 45 per cent speed of adjustment in a year. According to the research results it is imperative to decrease indirect taxes and increase the direct taxes, if we want to augment the economic growth. Currently, contribution of direct taxes out of total tax revenue is only 33 per cent and the share of indirect taxes is 63 per cent, while it should be reversed if economic growth has to increase.

Keywords: *indirect Taxes, ARDL, Economic Growth. JEL Classification: E62, H20.*

5. Raza, S. M. M., & **Butt, M. M.** (2018). Modified Shewhart Control Chart Based on CEV for Gamma Distributed Lifetimes in the Presence of Type-I Censored Data. *Journal of Quantitative Methods Volume, 2*(1), 115-126. **(Muhammad Moeen Butt (Quantitative Method /SBE) (UMT journal)**

Abstract: This article explains the modified version of Shewhart control charts for monitoring the mean level of the Gamma lifetimes under the Type-I censored data. Shewhart control chart based on the conditional expected values (CEV) is developed which can efficiently monitor the Type-I censored. The results of the proposed control chart are compared with simple/traditional Shewhart control chart using different censoring rates (Pc). The main focus is the stability of the mean level for which we have considered the specified parameter(s) as well as the unspecified parameter(s) cases (where Maximum Likelihood Estimates (MLE) has been considered). It is observed that in the presence of Type-I censored observation the CEV Shewhart X Control chart outperforms traditional Shewhart X control chart. The proposed censoring control charts always outperform when known parameters are used rather than the MLE estimate cases. The proposed charting methodology is also illustrated by an example.

Keywords: *conditional expected values (CEV), Gamma lifetimes,outperforms, Shewhart control charts, Type-I censored.*

6. **Raza, S. M. M., & Butt, M. M.** (2018). New Shewhart and EWMA Type Control Charts using Exponential Type Estimator with Two Auxiliary Variables under Two Phase Sampling. *Pakistan Journal of Statistics and Operation Research, 14*(2), 367-386.**(Syed Muhammad Muslim Raza (Quantitative Method /SBE),Muhammad Moeen Butt) (SJR)**

Abstract: In this paper, two new control charts have been proposed, one is shewhart-type and other one is EWMA type control chart. The proposed control charts are based on the exponential type estimator for mean proposed by Noor-ul-Amin and Hanif (2012). We name them as DS-Shewhart control chart and DSEWMAcontrol chart. The results shows that the DS-Shewhart control chart shows more efficient results to traditional/simple Shewhart and EWMA control charts whereas, the DS-EWMA control chart shows more

efficient results to traditional Exponentially Weighted Moving Average (EWMA) and Cumulative Sum (CUSUM) control charts because they uses the information from two phase sampling with two auxiliary variables. The proposed control charts can be used for efficient monitoring of the production process in manufacturing industries. The control limits of the proposed chart are based on estimator, its mean square errors and bias. A simulated example has been used to compare the proposed and traditional/simple EWMA and CUSUM control charts performance based on the average run length-out of control (ARL1). It is observed that the proposed chart performs better than existing EWMA and CUSUM control charts. At the end of the paper a real life implementation of the proposed control charts is also provided.

Keywords: *EWMA, two-phase sampling, two auxiliary variables, Average run length.*

7. Qureshi, S., Shafeeq, A., Ijaz, A., & **Butt, M. M.** (2018). Development of Algae Guard Façade Paint with Statistical Modeling under Natural Phenomena. *Coatings, 8*(12), 440.**(Muhammad Moeen Butt (Quantitative Method /SBE)** JCR Listed(IF:2.350)
Abstract: Algaecides are chemicals that cause serious health problems. Conventional paints contain algaecides to improve the algae resistance on the paint film. Present research has suggested an environment-friendly paint formulation that focuses on developing algae resistance without having algaecides. In this research, algae growth on newly developed paint is modeled by incorporating dirt resistance of paint and natural phenomena including humidity, temperature, and time, respectively. The fitted Model revealed explained variation of 59.65% in the average algae growth, of which, dirt resistance, humidity, temperature, and some of their interactions play significant role in this variation. The model suggests that the proposed newly developed paint without algaecidesis more resistant to algae growth and significantly decreased the average algae growth rate by 0.53% as compared to conventional paints. Keeping the effect of all other factors constant, if dirt resistance of paint (Dc value) increases by one percent, average algae growth decreases by 12.98%; when temperature increases by 1 C, average algae growth decreases by 22.4%; a positive unit change in the joint linear effect of dirt resistance, temperature, and humidity caused a decrease in average algae growth by 0.0031%. It was also observed that the individual effect of the humidity variable was inversely related with average algae growth. However, the combination of humidity and temperature, humidity and dirt resistance, humidity and time, and the quadratic effect of humidity were found to increase the average algae growth rate. The cubic effect of temperature variable by one degree centigrade resulted in decrease of average algae growth by 0.000907%.

Keywords: *algaecides, dirt, humidity, resistant, temperature, time.*

8. Khan, N., Aslam, M., **Raza, S. M.** M., & Jun, C.-H. (2018). A new variable control chart under failure-censored reliability tests for Weibull distribution. *Quality and Reliability Engineering International, 35*(2), 572-581. doi: doi:10.1002/qre.2422.**(Syed Muhammad Muslim Raza (Quantitative Method /SBE)**JCR Listed (IF: 1.604)
Abstract: In this paper, we propose a new variable control chart under type II or failure-censored reliability tests by assuming that the lifetime of a part follows the Weibull distribution with fixed and stable shape parameter. The purpose is to monitor the mean and the variance of a Weibull process. In fact, the mean and the variance are related to the scale parameter. The necessary measures are given to calculate the average run length (ARL) for in-control and shifted processes. The tables of ARLs are presented for various shift constants and specified parameters. A simulation study is given to show the performance of the proposed control chart. The efficiency of the proposed control chart is compared with a control chart based on the conditional expected value under type II censoring. An example is also given for the illustration purpose.

Keywords: *average run length, control chart, failure-censored, life test, the Weibull distribution.*

Department of Marketing

Research Articles

1. **Bashir, S., Anwar, S., Awan, Z., Qureshi, T.W.,** & Memon, A. B. (2018). A holistic understanding of the prospects of financial loss to enhance shopper's trust to search, recommend, speak positive and frequently visit an online shop. *Journal of Retailing and Consumer Services, 42*, 169-174. doi: 10.1016/j.jretconser.2018.02.004.**(Shahid Bashir(Marketing/SBE),Saiqa Anwar, Zohaib Awan, Tariq Waheed Qureshi)**JCR Listed (IF: 2.919)(SKT Campus)

Abstract: While studying Internet-based consumer's perspective, there appears to be no direct research on the mediating role of trust in the relationship between perceived financial risk and purchase intention. The existing literature is limited to fewer items of construct to measure perceived financial risk, which means that a comprehensive study is required on this topic. In this regards, this study measured perceived financial risk using 12 different items such as loss of credit card information, error-based purchases, no money-back guarantee, hidden charges, monetary loss, sales fraud, over-charged for product delivery fees, product delivery loss, over-charged online payments, high prices in comparison to traditional stores, low discounts in comparison to traditional stores, and wrong purchases. The study's proposed model is to highlight the role of trust in web vendors in the relationship between online consumers' perceived financial risk and their purchasing intention. To test that proposed model, an online survey based on empirical study was conducted on Malaysian online consumers. From the sample size of 400, the results of this study revealed that perceived financial risk of online consumers does influence their trust in web vendors and online purchase intention. A consumer's intention to purchase online is also influenced by their trust in the web vendor. And there exist a mediating role of trust in web vendors in the relationship between perceived financial risk and online purchase intention. Such results offer evidence that e-business managers should consider their consumer's perceived financial risk while establishing their trust and purchasing intentions.

Keywords: *perceived financial risk, Online purchase intention, Trust in web vendors, Online shopping, E-business.*

2. **Mehmood, S., Rashid, Y., & Zaheer, S.** (2018). Negative Word of Mouth and Online Shopping: Examining the Role of Psychological Contract Violation, Trust and Satisfaction. *Pakistan Journal of Commerce and Social Sciences, 12*(3), 886-908.**(Sana Mehmood(Marketing/SBE),Yasir Rashid, Salman Zaheer)**HEC Y CAT

Abstract: In a highly competitive e-retailing world, service provision fulfilling the customer's expectations plays a crucial role in survival and sustainability of buyer-seller relationship. However, service failure could result in negative outcomes due to destruction of this relationship. From buyer-seller relationship perspective in online shopping context, the research regarding negative word of mouth (NWOM) resulting from psychological contract violation (PCV) is scarce and demands attention. Therefore, building on Stimulus Organism-Response (S-O-R) model and PCV theory, this study examined the direct impact of PCV on NWOM through the mediating mechanism of trust and satisfaction. Data were collected using structured questionnaire and results were analyzed through structural equation modeling. The findings emphasized that PCV, due to unmet expectations of consumers in online shopping experience, positively influence NWOM directly and as well through satisfaction and trust. Both satisfaction and trust partially mediated the relationship between PCV and NWOM. These findings mainly contribute in the field of online retailing and suggest ways such as avoiding delivery delay of product, variation in quality of product, making it easy for customer to claim refund, non-delivery of product or out-of-stock items on online catalogs etc. Avoiding these can strengthen the buyer-seller relationship proactively via service provision in order to minimize the destructive negative outcomes.

3. Zahra, K., Khan, M. J., & **Warraich, M. A. (2018).** CEO Characteristics and the Probability of Financial Distress: Evidence from Pakistan. *NUML International Journal of Business & Management,* 13(2), 117-129.**(Muhammad Akib Warraich(Marketing/SBE)**HEC Y CAT

Abstract: We empirically test whether various characteristics of the CEO have an impact on the corporate survival of firms in Pakistan. The corporate governance literature suggests that various characteristics of the CEO have an impact on various aspects of firm performance as a whole. Ultimately these characteristics of the CEO must also have implications for the firm's overall survival. Moreover, Pakistan, being a developing country with a corporate governance landscape that is in its infancy, provides a natural setup to see how CEO characteristics link with firm survival in developing countries. Using Panel FGLS Regression and Panel Logistic Regression Analysis over a sample of 42 non-financial firms from the KSE-100 index for the period 2009-2013, it is the finding that CEO Ownership and Tenure are significant determinants of a firm's survival probability. The results suggest that a one year rise in CEO tenure and a 1% rise in CEO Ownership may reduce the distress probability by 2% and 17%, respectively. The study also finds that trade debt and interest coverage ability are also related to a firm's distress risk. These findings suggest that the CEOs should be given more ownership such as share-based compensation in the firm which does not only help reducing agency conflicts but also improves the firm's financial health.

4. **Rashid, Y., & Zeeshan, M.** (2018). Customer Attitude towards Online Ads of Smartphone Brands: A Netnographic Analysis of User Generated Comments on YouTube. *Journal of Management Sciences*, 5(2), 40-64. **(Yasir Rashid, (Marketing/SBE), Muhammad Zeeshan)** HEC Y CAT

Abstract: Today ads are no more one-sided communication but a mixture of online and offline channels developed for the sake of direct interaction with the communities. YouTube in specific and other online video platforms in general have shifted paradigm of TV commercials altogether for many brands.Just like other product brands, smartphone brands have also their presence on social media including YouTube and have their channels at it. The smartphone online ads on YouTube gain millions of views, thousands of likes, and dislikes, comments and replies to these comments. However, these quantitative metrics cannot necessarily be seen as an indicator of effectiveness of online video ads. There is a need to have some qualitative and exploratory evaluations to know about viewer's attitude toward the online brands of smartphones. This netnographic (ethnographic) research study is examining viewers' attitude toward smartphone brands ads. 13 video ads of 4 popular smartphone brands (Samsung, Huawei, Oppo, and Q Mobile) in Pakistan have been taken with 2926 viewer's comments and their replies. The findings are helping in the assessment of viewers (consumers) comments on the basis of cognitive and emotive processing and supportive and antagonistic stance toward online smartphone ads as well as brands. The research outcomes have implications for marketing managers specifically of smartphone brands to use smartphone video ads as a part of their viral marketing campaign. The research paper is also discussing the limitations and future research directions.

Conference Papers

1. Zahra, N., Qayyum, A., & **Rashid, Y.** (2018). *Travelers empowering Travelers: Website Quality, User-Generated-Content and Hotel Booking Behavior*. Paper presented at the 2nd ASIA International Multidisciplinary Conference (AIMC), Malaysia. http://connectingasia.org/aimc-2018/.**(Yasir Rashid(Marketing/SBE)**

Abstract: *Not found*

2. **Rashid, Y.,** & Nazir, M. (2018). *An Empirical Study of the Consumers' Attention towards Emotional Social Media Advertisements Using Electroencephalography (EEG).* Paper presented at the 7th Asian Management Research and Case Conference, Pearl Continental Resort, Bhurban. https://irc.iba.edu.pk/pdfs/CallforPapers7thAsianManagementResearchandCaseConferenceAMRCatPCBhurban.pdf. **(Yasir Rashid(Marketing/SBE)**
Abstract: *Not found*

3. Manzoor, A., **Yasir, R.,** & I., S. (2018). *Paperless Pakistan: Identifying the drivers of Cryptocurrency Awareness among Digital Banking Users*. Paper presented at the 1st International Conference on Management and Commerce, Pakistan, University of Gujrat, Pakistan. **http://uog.edu.pk/en/conferences/icmc/**. **(Yasir Rashid(Marketing/SBE)**
Abstract: *Not found*

4. **Warraich, M. A.**, Rashid, Y., & Hussain, D. (2018). *Franchising in social sectors in emerging markets: Insights from education service franchise in Pakistan*. Paper presented at the 9th International Research Meeting in Business and Management, IPAG Business School, Nice, France. **(Muhammad Akib Warraich(Marketing/SBE)**
Abstract: *Not found*

Department of Information System

Research Articles

1. **Awais, M., Naeem, F., Rasool, N., & Mahmood, S.** (2018). Identification of sex from footprint dimensions using machine learning: a study on population of Punjab in Pakistan. *Egyptian Journal of Forensic Sciences, 8*(1), 72. doi: 10.1186/s41935-018-0106-2.**(Muhammad Awais (Information System/SBE),Farzana Naeem, Nouman Rasool, Sajid Mahmood)(SJR)**
Abstract: Background: Likewise the fingerprints and palm prints, footprints are also helpful in solving a crime puzzle; however, very few studies have been reported targeting the identification of sex-based upon footprint features. Therefore, the present study aims at the identification of sex using footprint features from the population of Punjab, Pakistan. The foot measurements, i.e., toe length ratio, individual toe lengths, foot breadth, and foot index, are used as features for the identification of sex. Footprint samples were collected from 280 volunteers (142 males and 138 females) from all over Punjab (age range 18–50 years). A sex identification method is proposed in this study employing various machine learning algorithms, i.e., Naïve Bayes, J48, Random Forest, Random Tree, and REP Tree, and compared them.
Results: The designed model was cross-validated using 10-fold cross-validation. The results demonstrated the varying accuracy of the machine learning algorithms, using different combinations of footprint features. However, the Naïve Bayes algorithm demonstrated an accuracy of 87.8%, for sex identification, using the combination of toe length and foot indexes.
Conclusions: It is concluded that by using a combination of toe length and foot indexes and employing the Naïve Bayes algorithm, sex can be identified more accurately as compared to the other methods.
Keywords: *footprints, sex classification, pakistani population, naïve bayes, j48.*

2. **Sultana, K., Sabir, S. S., & Shah, N.** (2018). *Qualitative Study On Complementary Resource Integration: A Case Of Erp Implementation*. 5th International Conference on Education and Social Sciences (INTCESS). Istanbul, TURKEY. **(Khawar Sultana, Sana Sameen Sabir(Information System/SBE), Nauman Shah) ISI Web of Science(Proceedings Paper)**

Abstract: Digital transformation of firms needs to be brought in harmony with the pace at which technology is disrupting the industry. The initiative for technology adoption can better be taken with a commitment to develop the capability of reshaping the organizational resources. This competency is likely to influence successful conversion of such innovative technologies (InT) into business value. In developing countries, Enterprise Resource Planning (ERP) adoption is on rise; organizations are confronting technological, cultural and social factors which affect their capacity to succeed or fail in ERP adoption. The said factors are likely to influence organizational capability of integrating their resources into complementary relationships. To understand this, present study reports a qualitatively investigation of the cascading effect of these contextual factors which impacts the effectiveness of ERP implementation (hereafter ERPi) across its life cycle in two service organizations from private sector of Pakistan. Researchers took a grounded theory approach following critical realist paradigm to perform this study and found that resources, if integrated in complementary relationships, interact as a transformative measure and facilitate the intermediary outcomes to function as a part of the value chain of technology adoption. The explored CSFs were found influencing some important intermediary outcomes - functional alignment of ERP with business processes, users. motivation to use ERP - which can reduce technical, analytical and operational risk factors at ERP post implementation stage.

Keywords: *ERP life cycle, cascading effect, resources, complementary, interactive, intermediary outcomes*.

3. **Sultana, K., Sabir, S. S., Shah, N., & Nosheen, A**. (2018). *Intrinsic Motivation Inventory Applied In The Context Of Erp Adoption - Case Of An Higher Education Institution*. 5th International Conference on Education and Social Sciences (INTCESS). Istanbul, TURKEY.**(Khawar Sultana, Sana Sameen Sabir(Information System/SBE), Nauman Shah, Ammber Nosheen)** **ISI Web of Science(Proceedings Paper)**

Abstract: Intrinsic Motivation Inventory (IMI) is a multidimensional instrument originated from Self Determination Theory (SDT). It is used for the assessment of the subjective experiences of participants in a specific context as determinants of intrinsic motivation. The aim of this study is to assess the distinctive features of IMI among Enterprise Resource Planning users in a higher education institution (HEIs) through adaptation of original IMI instrument. The results of the study presented in the tabular and graphical form furnish that in general, majority of ERP users have positive attitude towards ERP usage and adoption. As this research is conducted at the early post implementation stage there might be further improvement in users attitude towards ERP usage is expected in later stages. The results give momentum to longitudinal investigation in order to understand different variables which may affect users. performance over the time. This will further help in devising suitable strategies for augmenting users. motivation to use ERP in order to improve the effectiveness of post-implementation ERP usage.

Keywords: *ERP Usage, Intrinsic motivation, self-determination theory, contextualization, users performance.*

School of Social Science & Humanities (SSSH)

Department of English Language and Literature

Research Articles

1. **Ali, N., Rafi, M. S.**, Ghayas Khan, M. S., & Mahfooz, U. (2018). The effectiveness of script training to restore lost communication in a patient with Broca's aphasia. *JPMA. Journal of the Pakistan Medical Association, 68*(7), 1070-1075. **(Nadir Ali (English Language and Literarure /SSSH) Muhammad Shaban Rafi)** JCR Listed (IF: 0.718)

   Abstract: Aphasia is considered as an acquired neurological disorder of communication, which is characterised by the symptoms on all levels of language dysfunction. The current study was planned to explore the outcomes of script training in a patient with Broca's aphasia through quantitative approach using a single-subject-multiple-baseline research design across behaviours. The probes were obtained during the baseline, treatment, maintenance and generalisation phases for tracking the spoken use of scripted content. All the probes were transcribed verbatim and no value of Cohen's Kappa Coefficient (K) was below 0.61, indicating robust inter-rater reliability. The subject learned all six scripts successively and over 80% of mastery level on all dependent variables was achieved. The largest effect size, above 10.1, was reported for the percent of intelligible scripted words (PISW). Script training was found to be an effective therapy for rejuvenating lost communication of patients with severe Broca's aphasia.

   Keywords: *stroke, aphasia, script training, language deficit, automatic speech, conversational context, patients with broca's aphasia, communication, rehabilitation, speech language pathology.*

2. **Maldonado Garcia, M.** (2018). Improving University Students' Writing Skills in Pakistan. *The European educational researcher, 1*. doi: 10.31757/euer.111. **(María Isabel Maldonado García (English Language and Literarure /SSSH)** (Not HEC Recognized)

   Abstract: The education system of Pakistan is not unified. Students mainly attend three types of schools with different languages as medium of instruction; private schools, public schools and religious schools (called locally madrassas). Even though mother tongue education is emphasized in education and literacy circles, Pakistan has not been able to implement policies that would allow all students to be taught in their mother tongue. Since mother tongue education (MLE) is not a reality, students have been facing many issues, especially in those regions of the country where Urdu is not spoken at home, rather a different regional language, dialect or language variety. A conference was held in Karachi, where data about the language situation of the country was collected at level one of the data collection and at level two, eighteen experts were interviewed, who provided a list of recommendations to address the matters found at level one, for the improvement of the writing skills of the students all over the country. The most important of these recommendations were to ensure that the students engage on enough writing practice and proper programs of instruction are set into place with properly trained instructors.

   Keywords: *additive bilingualism, language learners, writing skills, writing centers, urdu/english bilinguals, improving writing skills.*

3. **Isabel Maldonado García, M.** (2018). Politics of Immigration and Language: The Case of Pakistani Residents in Spain. *International Journal of English Linguistics, 8*(3), 36-46. doi: 10.5539/ijel.v8n3p36. **(María Isabel Maldonado García (English Language and Literarure /SSSH)** (Not HEC Recognized)

   Abstract: The new Spanish nationality law requires a certain level of Spanish language proficiency for the application of Spanish nationality. The law, which is on the Official State Bulletin (BOE-Boletin Oficial del Estado) N. 167, Section I, Page 58, 149 and which was drafted on the 14th of July, 2015, came in effect on the 15th of October, 2015. The new regulation outlined the new requirements for the immigrants to be able to become Spanish citizens. The law was mainly targeted towards the descendants of those Jewish people who were thrown out of Spain in 1492 in an effort of the Spanish government to normalize relations.

Nevertheless, all new applicants are somehow affected by it since a minimum knowledge of Spanish language is required, (level DELE A2 according to the Common European Framework of Reference for languages (CEF; Council of Europe, 2001 & Little (2005)) and a certain cultural and constitutional knowledge as well, to be measured by additionally passing the CCSE exam. These exams, according to the law, are to be administered by Instituto Cervantes, the official Institute of Spanish language of the Government of Spain. This paper aims to study the repercussions and new effects the law is having on the Pakistan Instituto Cervantes Examination Center in terms of enrollments as well as the effects on a specific group of immigrants themselves; the immigrants from Pakistan.

Keywords:_language policy, spanish language, immigration, instituto cervantes, new nationality law, pakistan._

4. **Garcia, M. I. M.** (2018). A Corpus Based Quantitative Survey of the Etymological Elements in the Basic Vocabulary of Urdu Language. *ALMAS,* 20. **(María Isabel Maldonado García (English Language and Literarure /SSSH)** HEC X CAT

Abstract: This article is the last of a series on the topic of the etymological components of the basic vocabulary of Urdu language aswell as their density within the language. Each of the articles was aimedto calculating the density of a particular etymological element in the basicvocabulary of Urdu. The research is significant since it is the first corpusbasedsurvey of the density of the etymological elements in the basicvocabulary of Urdu. The calculation is conducted utilizing a corpus of onethousand words of the basic vocabulary and extracting the origin of eachword through an etymological analysis. The words are then classified bylanguage of origin and the precise percentage of each language elementobtained. While the previous research (Maldonado García 2014, 2015,2015a, 2015b), dealt with the density of individual etymological elements,this one treats this topic as a whole, dealing with all of the language elements at one time and comparing the etymological analysis withhistorical facts. The study debunks the widespread theory that Urdu was alanguage of the armies, artificially created at some point in history whenthe Arab, Persian and Turkish armies met at an unidentified geographicallocation producing the birth of Urdu as a mixture of their languages. Afterthe identification phase of this project, it was revealed that from anetymological and historical perspective, Urdu derived from Sanskrit intothe Prakrit languages through a process of evolution and has receivedinfluence from Persian, Arabic and English during the period of theinvasions. No elements of Turkish language were found during theanalysis.

5. **Rehan, N.** (2018). Analyzing Literary Texts through Functional Grammar. *Linguistics and Literature Review (LLR)*, 4(2), 40-54. doi: https://doi.org/10.32350/llr.42.04. **(Naveed Rehan (English Language and Literarure /SSSH) (UMT Journal)**

Abstract: Functional Grammar (FG) or Systemic Linguistics was developed by Michael Halliday in the 1960s as a model of grammar to show how language functions in a text. Unlike formal grammar, FG focuses on the contextual functions of language. In this paper I analyze and compare two texts through the lens of Functional Grammar. I attempt to show that FG is a useful tool for analyzing literary texts. The texts I use are excerpts from two essays: "Love" by D. H. Lawrence, and "A Short History of Love" by Lawrence Stone. Canonical writers of English like D. H. Lawrence or James Joyce—to give but two examples—often depart from traditional grammatical rules in order to make their language express something that correct grammar is incapable of communicating. Functional Grammar uncovers fascinating details about how writers construct their texts in keeping with their purpose and audience. While both the texts I analyze talk about the same phenomenon (romantic love) and reach the same conclusions, the means by which they reach these conclusions are very different—Lawrence uses a highly subjective and rhetorical style, whereas Stone, a historian, presents a more objective and scientific argument. My aim is to show that language users have linguistic choices and that these choices are seldom neutral.

Keywords:_functional grammar, systemic linguistics, literary analysis._

6. **Ilyas, S.** (2018). War and Sexuality in Hemingway's 'A Farewell to Arms'. *Research Journal of English Language and Literature (RJELAL), 6*(4), 79-87. **(Sobia Ilyas (English Language and Literarure /SSSH)** **JCR Listed (IF:6.8992)**

Abstract: War is the most dynamic feature of Hemingway's "A Farewell to Arms". It is not merely a passive backdrop to a story which hinges on love, sexuality and disillusionment, on the contrary, it is the primary protagonist of the novel: humanized and empowered. The dual strands of love and sexuality run in accordance with the physical and moral magnitude of the war. This powerful depiction of war serves to highlight the undeniable importance of the outdoors, the wild and the natural in Hemingway's fiction. Though never glorified, war is presented parallel to the protagonists and it runs through the greater emotions of love, loss and suffering adding to the fierce beauty of the novel. The study will focus on Hemingway's interpretation of sexuality, not only as a decisive force in channelizing the life of the lost generation but also as generating love which resembles the war in its absurdity, unorthodoxy and futility. In doing so, various aspects of love and sexuality in "A Farewell to Arms" will be explored through the lens of war , emphasizing the role played by war in curbing the psychology, sensibility and sexuality of the characters and in lending vitality and passion to Hemingway's most celebrated lovers: Henry and Catherine. The study also aims to show how Hemingway's protagonists in "A Farewell to Arms" discover love and experience self awakening through the aggression of war and how war casts a catalytic effect on their feelings and emotions producing a love which is as intense and destructive as the war.

Keywords:*war, sexuality, love, lost generation.*

Conference Papers

1. **Tanvir, M. F.** (2018). *Limitations of Knowledge Mechanisms in Irshad-ul-Hasan's The Walls of Glass*. Paper presented at the 1st International Conference on English Language, Literature, Education and Society 2018 (ICELLES 2018), Lahore Garrison University, Lahore, Pakistan. **(Muhammad Furqan Tanvir (English Language and Literarure /SSSH)**

Abstract: This paper would analyze selected pieces from Irshad-ul-Hasan's collection of poetry tilted *The Walls of Glass* (published in 1978), with a focus on one of their recurrent themes: the evasive nature of representation owing to the parallelism of incomprehensibility and signification. The way in which the poet's belief "in professing truth / Vociferously" is subverted by his need "to keep pace / With Time . . ." ("Body and Soul"), and his faith in "the dynamic possibilities / Of fulfillment" ("Words, Idle Words") is thwarted by monistic thought-currents, would be given a general theoretical context of the postmodernist urge to equate "more and more information [with] less and less meaning." For example, the poet's introspective reappraisal of the common trend of "objectifying and transfixing / Others . . ." ("The Squint") would be aligned with Foucault's views on the ulterior undertones of power and suppression that inevitably inform representational apparatuses. Likewise, the poet's concern with the impact of the "machine and standardization" in "the denatured city" ("The Inscape") would be read in the light of Baudrillard's lament about how media and information "outwardly . . . produce more of the social [while] inwardly they neutralize social relations and the social itself."

Keywords:*Irshad-ul-Hasan, knowledge, postmodernism, representation, incomprehensibility.*

2. **Tanvir, M. F.** (2018). *School-Life and the Challenges of Genius: Some Historical-Literary Perspectives*. Paper presented at the Promoting Mental Health in Schools: A Way Forward, University of Management and Technology, Lahore. **(Muhammad Furqan Tanvir (English Language and Literarure /SSSH)**

Abstract: Drawing on the multiple procedural limitations of school-life that lead to the neglect, or in some cases even suppression, of exceptionally gifted intellect among some children, this paper aims at highlighting, through a brief analysis of some historical accounts as well as two twentieth century novels – James Joyce's *A Portrait of the Artist as a Young Man* (1916) and Tom Petsinis' *The French*

Mathematician (1997) –, some perspectives on the peculiar nature of challenges to which the extraordinarily sensitive psychology of a child prodigy is likely to be exposed. The paper shall demonstrate the ideological hostility that protagonists of the selected texts have to encounter in the cultivation of their poetic or scientific impulsions against the background of the volatile religio-political situations of their societies. Through a negotiation with the nineteenth century Romantic idealization of the role of instincts in education, the root of such dilemmas shall be located in Foucault's theory about the Enlightenment ethic of education that set up academic institutions with a view of disciplining trajectories of social formations.

Keywords:*school-life, child prodigy, genius, the Enlightenment, Romanticism, isolation, social discipline.*

3. **Tanvir, M. F.** (2018). *A Deleuzian Reading of Melancholia: Affects in Nasir Kazmi's Ghazal* Paper presented at the 4th Research Conference on Language and Literature, University of Sargodha, Mandibahauddin. **(Muhammad Furqan Tanvir (English Language and Literarure /SSSH)**
Abstract: *Not found*

Department of Islamic Thought and Civilization

Research Articles

1. **Khan, S. A.,** & Aslam, E. (2018). Partnership Based Microfinance in Islamic Banks: Need, Application and Commandments in Modern Age. *Journal of Islamic Thought & Civilization, 8*(1). **(Sulman Ahmad Khan (ITC /SSSH)** **(UMT Journal)**

Abstract: There is no doubt that through endorsing different Islamic modes of financing, Islamic banks are showing the right way to people to free themselves from the menace of interest. However, it is equally necessary for Islamic banks to invest on poor members of the society. A keen observation of Islamic banks reveal that their greatest shortcoming is their inability and lack of interest in financing as well as investing on poor individuals of the society. The term 'Islamic banking' not only reflects the transitional modes of financing but also highlights the ideal modes of financing. Welfare of underprivileged members of the society is an important goal of the Shari'ah. Dr. Muhammad Younus founded Grameen Bank with the aim of providing capital to the underprivileged segment of the society, giving two dollars each, which also earned him a Noble prize. Unfortunately, a banker with an interest-based background felt the dire necessity of providing loans to the poor, regardless of the fact that this loan was interest-based and prohibited by the Shari'ah. His efforts were also appreciated worldwide. On the contrary, Islamic banks promoting Islamic financing still hesitate to invest on poor people, accusing them of default. Historically, this is an erroneous assumption, as poor people have the lowest level of default, while rich industrialists, politicians etc. usually have the highest level of default. So, it is the need of the hour to initiate microfinance in Islamic banks and its immediate launch should be closer to the goals of the Shari'ah. This article discusses the potential of microfinance and also proposes practical methods of microfinance, especially the methods that focus upon partnership. If Islamic banks adopt these modes of microfinance they can speedily grow in this field as well.

Keywords: *Islamic banks, Partnership, Salam, Istisna, Maqasid-e-Shari'ah, Muzara'ah.*

2. Khalid, I., & **Mustafa, M. T.** (2018). ايکتحقيقيمطالعہ : واقعہتحويلقبلہکينظرياتيتحديات. *AL-ADWA, 23*(50), 73-102. **(Muhammad Tahir Mustafa (ITC /SSSH))** **HEC Y CAT**
   Abstract: *Not found*

3. Khalid, I., & **Mustafa, M. T.** (2018). جائزہ ایک وسلم علیہ اللہ صلی ماب رسالت بزبانِ نبوی خصائص. *Jihat-al-Islam*, 11(2), 51-70. **(Muhammad Tahir Mustafa (ITC /SSSH))** **HEC Y CAT**
   Abstract: *Not found*

Department of Political Sciences

Research Articles

1. **Pervez, M. S.** (2018). The normative structure of the European Union: a constructivist analysis. *Journal of European Studies, 34*(1). **(Muhammad Shoaib Pervez (Political Science/SSSH)** HEC Y CAT

   Abstract: This article discusses the normative structure of the European Union (EU) in line with the constructivist framework. This approach drifts from realism and studies international relations under a socially constructed context (norms, culture). It is divided into three sections. The first section elucidates the contours of a common European identity, which has come into being under the auspices of the EU. The penultimate section explains the normative structure of the EU by focusing on the membership negotiations it has had with Turkey, and how these talks between Ankara and Brussels, ultimately, broke down under the pressures exerted by this structure. The last section explores the norms promoted by the EU, and the role elitist rhetoric has played in the process of Europeanization.
   Keywords:*normative structure, exclusion, Turkey membership, Inclusion, European Union.*

2. **Pervez, M. S.** (2018). Strategic culture reconceptualized: the case of India and the BJP. *International Politics*. doi: 10.1057/s41311-017-0142-9.**(Muhammad Shoaib Pervez (Political Science/SSSH)**JCR Listed (IF:0.859)

   Abstract: In this paper I argue that strategic culture is shaped by the ideology of a political party and is carried through elites' practices. A state's decision to become a nuclear power is often explained by rational choice theories. These theories assume states as rational actors and explain their behavior by cost–benefit calculation, keeping in mind the material cost involved in such decisions. The problem with such approaches is that they usually underemphasize the impact of other influences like culture. One such variable is the role of a political party's ideology that influences the identities of state elites and helps shape their strategic behavior. Therefore, strategic culture is appropriately explained by looking at intervening variable of elite socialization that stems from the persuasive power of socially constructed norms of political parties.
   Keywords:*strategic culture,practices ideology, elites' socialization, norms, social constructivism.*

3. **Pervez, M. S.** (2018). The normative structure of the european union: a constructivist analysis. *Journal of European Studies, 34*(1).**(Muhammad Shoaib Pervez (Political Science/SSSH)**HEC Y CAT

   Abstract: This article discusses the normative structure of the European Union (EU) in line with the constructivist framework. This approach drifts from realism and studies international relations under a socially constructed context (norms, culture). It is divided into three sections. The first section elucidates the contours of a common European identity, which has come into being under the auspices of the EU. The penultimate section explains the normative structure of the EU by focusing on the membership negotiations it has had with Turkey, and how these talks between Ankara and Brussels, ultimately, broke down under the pressures exerted by this structure. The last section explores the norms promoted by the EU, and the role elitist rhetoric has played in the process of Europeanization.
   Keywords:*normative structure, exclusion, Turkey membership, inclusion, European Union.*

Conference Papers

1. **Pervez, M. S.** (2018). *US-Pakistan relation 70 years on, an Infidel relationship?* Paper presented at the International Conference organzied by USEFP, IBA Karachi.**(Muhammad Shoaib Pervez(Political Science/SSSH)**
   Abstract: *Not found*

2. **Qureshi, A., & Ahmad, S.** (2018). *Reserved Seats for Women in Pakistan: A Descriptive or Substantive Representation? (2002-2018)*. Paper presented at the International Conference on "Interactions and

Interchanges: Literature, Culture, and Globalization", Kinnard College for women, Lahore. **(Abeeda Qureshi, (Political Science/SSSH), Sara Ahmad)**

Abstract: Women across the world experience gender disparity and discrimination, though its intensity varies, depending on the local prevailing religious, cultural and social norms. A number of studies link women's social and economic position to their absence from the decision-making process; hence, the argument is for a higher representation of women in parliament through positive action. Pakistan is no exception, and reserved seats remain a permanent feature of all the constitutions in Pakistan. This article undertakes an in-depth analysis of a significant rise in the number of reserved seats for women (from 20 to 60) under the authoritarian government of President Musharraf in the lower house of Pakistan's parliament and critically examines its impact on women's empowerment using in-depth Elite Interviewing. The respondents in this research have been selected using the snowball technique. The interviews were later analysedusingthenarrativeanalysistechnique.

In line with the theorists of 'Politics of Presence' (Philips, 1995) and 'Critical Mass' (Dahlerup,1988), this study finds a positive correlation between the descriptive and substantive representation of women in parliament, as there has been a proliferation in women-related legislation in parliament, initiated mostly by women parliamentarians selected on reserved seats. Nevertheless, an increase in the number of women in parliament has not brought any changes to the male perception of women, considering a steady decline in the number of women elected on general seats from 13 in 2002 to 8 in the 2018 general election. This study links this decline to the patriarchal and misogynistic tendencies in Pakistani society and argues that without changing the mindset of this society, any action would fail to produce any results.

Keywords:*empowerment, pro-women legislation, patriarchy, representation, society.*

3. **Rashid, A.** (2018). *Rights of Transgender in Pakistan: Constitutional Guarantees and Clashes in Domestic Law*. Paper presented at the Towards Gender Equality: Clashes in Law Conference, Brighton, Sussex, UK. **(Amna Rashid (Political Science/SSSH)**

Abstract: *Not found*

4. **Sajjad, F.** (2018). *Education for Religious and Social Tolerance in Pakistan: Policy Review and Recommendations*. Paper presented International Conference on Human Rights: Challenges and Prospects 2018, Department of Political Science and Centre of Excellence China Studies, GC University, Lahore, on November 7-9, 2018 at GC University, Lahore.**(Fatima Sajjad (Political Science/SSSH)**

Abstract: In June 2014, the Supreme Court of Pakistan issued a special ruling for education sector in Pakistan, calling for the development of appropriate curricula at educational institutions 'to promote a culture of religious and social tolerance'. The court ruling appeared in the backdrop of increasing incidents of religious intolerance reported in the country. In keeping with the Supreme Court ruling, the government sent a directive to educational institutions recommending a revision of Social Science curricula to promote tolerance of religious, ethnic and cultural diversity in Pakistan. Prior to the aforementioned ruling by Supreme Court, the content of social, political and civic education in Pakistan was already a subject of debate amongst academics since 9/11, owing to its perceived link with religion based radicalization. A plethora of academic and policy papers scrutinized curricula and pedagogies in madrasas and public schools in Pakistan to identify the risk factors and suggest reforms to counter radicalization. More recently, this debate resurfaced in the media, with detection of alleged linkages between certain terrorist networks and students belonging to the mainstream and elite universities in the country. Drawing on a systematic review of policy literature, this study probes two key question; a)What is it in education that counters radicalization? b) What kind of education we are imparting on ground? The study uses the lens of critical pedagogy, particularly the ideas of renowned American cultural critic Henry Giroux ,to critically evaluate global education trends and their impact on local education policies in Pakistan .The current HEC higher education policy document

entitled 'Vision2025' is examined through critical pedagogy perspective. The study argues that an increasing emphasis on economic value of education is undermining the critical function of education that nurtures human intellect and helps build tolerance for diversity and resilience against extremism.

Keywords: *tolerance, extremism, fundamentalism, education, reform.*

Department of Sociology

Research Articles

1. Hussain, S. S., & **Waseer, W. A.** (2018). Knowledge management strategy and organizational creative performance nexus: a developing countries perspective. *International Journal of Management Sciences and Business Research, 7*(02). **(Wasif Ali Waseer (Sociology /SSSH)** **(Not HEC Recognized)**

Abstract: The extant literature evidently emphasizes that knowledge is a strategic asset in this competitive landscape. This strategic asset can manage the organizations which have to make competitive business strategies. There are two schools of thought exist in the literature while making any knowledge management strategy; the first one is a system-oriented approach which is hardly examined empirically in the literature. This research paper nonetheless, is an effort to investigate the impact of system-oriented KM strategy on the organizational creativity and performance. The integrative research model was used to test hypothesis empirically. It is to be noted that cross-sectional survey was carried out. The total sample size was (N 116), and data have filled out through questionnaires from 30 privately-run business organizations. Several hypotheses are tested, and it is observed that system-oriented approach is equally effective in the developing countries. It was recommended that researchers replicate the same study in other sectors in developing countries.

Keywords: *knowledge management, knowledge management strategy, organizational creativity, organizational performance, explicit-tacit knowledge.*

2. Ahmad, S., Maqsood, F., & **Waseer, W. A.** (2018). The role of apathy, personal insecurity, and socio-economic status in formation of risk-taking behavior among university students. *Journal of Human Behavior in the Social Environment, 28*(2), 221-239. doi: 10.1080/10911359.2017.1388757. **(Wasif Ali Waseer (Sociology /SSSH) (Not HEC Recognized)**

Abstract: The primary purpose of the current study was to explore the role of apathy and personal insecurity in risk-taking behavior among university students. Furthermore, it examined the influence of socio-economic factors (such as age, gender, and education) on risk-taking behavior. For this purpose, 882 university students elicited their responses through self-structured questionnaire. Factor analysis and reliability analysis were applied to test the reliability, validity, and robustness of scales. Bivariate analysis was used to test hypothesis, independent T-test was used to examine the differences in categories of risk-taking behavior, and multiple linear regression was used to scrutinize model fit. There was association between apathy, personal insecurity, socio-economic characteristics (such as gender, education, and father education) and risk-taking behavior of the university students. The current study would add to empirical foundation to build a theoretical framework of risk-taking behavior based on education, age, income, and residential background. This study contributes to the academic scholarship by explaining individual differences based on socio-economic status in prediction of risk-taking behavior. Furthermore, it provides a different theoretical insight and logical explanation of risk-taking propensity for constructs of apathy and personal insecurity. To the best knowledge of the researchers, it is first study to explain the association apathy, personal insecurity and risk-taking behavior through quantification of data among resourceful group of youth.

Keywords: *apathy, personal insecurity, socio-economic status, risk-taking behavior, university students, youth development, Pakistan.*

3. **Haq, I. U., & Rashid, U.** (2018). Masculinities: Tracing the Trajectories of Gender Performance in War Poetry. *Masculinities & Social Change, 7*(2), 110-123. **(Inam-Ul-Haq (Sociology /SSSH), Uzma Rashid)(SJR)**

Abstract: This paper critically examines the war songs and poems of men who fought in the post 9/11 Afghanistan war. The study locates the analysis within the socio-cultural influences that left an impact on the 'manly' soldiers, allowing a 'micro mapping' of masculinity to be revealed in these men's writings. Using thematic analysis techniques, fifty war songs and poemsfrom the years 2007 and 2008 are analyzed through the lens of masculinity and its performance. The critical investigation of the war songs and poems found that the performative dimension of masculinities in war spread around the themes of youth warriors; weapons; arms and war machinery; state of politics and need for an Islamic government; the motif of red color; and glorification of death. The religion Islam, their homeland Afghanistan and its traditional culture constantly act as a fuel to evoke overpowering emotions for the soldiers and their passion for fighting. It is furthermore found that the locally constructed masculinities informed the context ofthe Afghanistan War. This has implications for the way we understand masculinities especially in war poetry. As the paper demonstrates, the multiple ways in which the notion of masculinity is manifested in war poems point to the need to break free from the stereotypical understandings of warriors from conservative religious backgrounds.
Keywords:*masculinity, Afghanistan war, poetry, post 9/11.*

4. Ali, M., Lodhi, S. A., Raza, B., & **Ali, W.A.** (2018). Examining the impact of managerial coaching on employee job performance: Mediating role of work engagement, leader-member-exchange quality, job satisfaction, and turnover intentions. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 12*(1), 253-282.**(Wasif Ali Waseer (Sociology /SSSH) (SJR)**

Abstract: Coaching is turning into a vital area for human resource development experts. Human resource development professionals, researchers, training related experts and organizational psychologists have started to explore intensively the nature of managerial coaching and its outcomes. Managerial coaching has become a very popular human resource development and organizational development tool to improve various employees' attitudes and behavior at workplace. The managerial coaching lacks empirical evidence regarding its effectiveness. This study aims to examine the direct influence of managerial coaching on employee job performance as well as indirect influence through mediating effect of work engagement, leader-member-exchange quality, job satisfaction, and turnover intentions. The data were collected from a public-sector organization of Pakistan. The self-administered questionnaires were used to collect data from 183 respondents. The Partial Least Square - Structural Equation Modeling (PLS-SEM) analysis showed that managerial coaching directly influences employee job performance. The path analysis also revealed that managerial coaching indirectly effects job performance through work engagement, leader-member-exchange quality, job satisfaction, and turnover intentions. This study adds value to limited literature on managerial coaching, leader-member-exchange quality, work engagement, and job performance. Additionally, leader-member-exchange quality and work engagement have not previously been examined as mediators. The implications for research, theory, and practice are also discussed.
Keywords:*managerial coaching, job performance, work engagement, leader-member-exchange quality, job satisfaction, turnover intentions.*

Department of Psychology

Research Articles

1. **Jibeen, T.,** Baig, M. M. Z., & Ahmad, M. M. (2018). Fear of Negative Evaluation and Communication Apprehension: The Moderating Role of Communicative Competence and Extraversion Personality Trait in Pakistani Academia. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*. doi: 10.1007/s10942-018-0301-y.**(Tahira Jibeen (Psychology\SSSH)****JCR Listed (IF: 0.857)**

Abstract: This study examines the moderating role of communicative competence and extraversion personality traits on the relationship between fear of negative evaluation and communication apprehension in Pakistani academics teaching in their second (English) language. One hundred and twenty academics (aged 25–60) completed a demographic information sheet, the Brief Fear of Negative Evaluation Questionnaire (BFNE-11) (Leary in Pers Soc Psychol Bull 9:371–376, 1983), the Personal Report of Communication Apprehension (PRCA-24) (McCroskey in An introduction to rhetorical communication, Prentice-Hall, Englewood Cliffs, 1982), the Self-Perceived Communication Competence Scale (SPCC) (McCroskey and McCroskey in Commun Res Rep 5(2):108–113, 1988) and the Eysenck Personality Questionnaire Revised-Short Form (EPQRS-R) (1985). A sequence of moderated regression analyses showed that communicative competence significantly moderated the relationship between fear of negative evaluation and communication apprehension. The findings have implications for instructors, campus counselors and researchers and academic policy makers wishing to identify factors that may help academics cross communicative barriers, enrich the learning experience and enhance positive psychological functioning.

Keywords:*fear of negative evaluation, communication apprehension, communicative competence, extraversion academia.*

2. **Jibeen, T**. (2018).Subjective Well-Being of Afghan Refugees in Pakistan: The Moderating Role of Perceived Control in Married Men. *Community Mental Health Journal*. doi: 10.1007/s10597-018-0342-9. **(Tahira Jibeen (Psychology\SSSH)** **JCR Listed (IF: 1.159)**

Abstract: The purpose of this study was to examine the role of perceived control in moderating the effects of acculturative stress on the well-being of first generation Afghan married men refugees (N = 137, 25–50 years) residing in Lahore, Pakistan. The participants completed a survey questionnaire comprising a demographic information sheet, the Multidimensional Acculturative Stress Scale (Jibeen, Khalid, International Journal of Intercultural Relations 34:233–243, 2010), the Cognitive Stress Scale (Cohen et al., Journal of Health and Social Behavior 24:385–396, 1983), the Positive Affect & Negative Affect Schedule (Watson et al., Journal of Personality & Social Psychology 47:1063–1070, 1988), and the Satisfaction with Life Scale (Diener et al., Journal of Personality Assessment 49:1–5, 1985). The results of moderated regression analyses revealed that perceived control can reduce the effect of stressful circumstances on satisfaction with life and increase positive psychological affect. The results could have implications for developing social and clinical therapeutic interventions towards a greater sense of self-determination and positive well-being to improve the refugees' ability to take control of their lives.

Keywords:*Afghan refugees, acculturative stress, subjective well-being perceived control satisfaction with life negative affect.*

3. **Tariq, A., & Farooqi, R.** (2018). Effect of first low wages'job on the self-esteem of Pakistani middle-class fresh graduates. *PEOPLE: International Journal of Social Sciences, 4*(2). **(Amina Tariq (Psychology\SSSH) Rabia Farooqi)****(Not HEC Recognized)**

Abstract: In Pakistan, the number of educated people at graduate level is quite high but according to that number employments are limited. This causes job dissatisfaction and also abolishes the relationship with the co-workers (Farooq, Ahmad, & Ali, 2008). This study aimed to explore the effect of first low wages' job on self-esteem of Pakistani fresh graduates in terms of satisfaction level, hope level, productivity and wellbeing using a constructivist grounded theory approach (Charmaz, 2014). In this study qualitative approach is used.

For data collection, purposive sampling technique was used along with the semi structured interviewing from local private schools. Four female teachers with an age range of 20- 25 years were the sample of the study. One-to-one interviews with the participants were conducted after taking their permission to participate voluntarily in the research, and tape recording of their interviews for transcription of data. Grounded theory approach was used to analyze collected data as no work has been done in Pakistan in this context and I want to develop theory which will be helpful in employer's context and working satisfaction. For reliability check, triangulation method was used. The theory of self-esteem grounded here suggested that first low wages' job for the Pakistani fresh graduates has negative effect on the level of hope and satisfaction whereas their productivity and wellbeing has positive effect on them.

Keywords: *Self-Esteem, job satisfaction, low wages job, level of hope and wellbeing.*

Department of Gender Studies

Research Articles

1. **Salahuddin, A.** (2018). Usage of Religious Symbols in Fiction by Pakistani Women Writers. *Journal of Islamic Thought and Civilization, 8*(1). **(Ambreen Salahuddin (Gender Studies\SSSH) (UMT Journal)**

   Abstract: This paper is concerned with usage of religious symbols by seasoned women fiction writers of Pakistan. These writers have indulged in using significant symbols, metaphors and archetypes in their texts. Exploring the source of symbol is a meaningful study. In the current paper, it is seen how religion becomes a major source of symbols in literature. As far as religion is concerned, the usage of religious language is not seen in respect to its structure and function, rather it is understood by the context and pattern of text. It is also explored whether the traditional usage of these symbols is being retained by Pakistani women fiction writers or they have used symbols in newer meanings and connotations. Qualitative research methodology is applied in this current study. Thematic networks analysis is used and basic themes are extracted from text, which are in turn grouped under organizing theme, connected later with global theme.

   Keywords:*religious symbols, Pakistani fiction, women fiction writers, religion, symbolism.*

2. **Salahuddin, A.** (2018).'Farhang e Sinfi Mutaleyat' A glossary of gender studies in Urdu. Lahore: Urdu Science Board. **(Ambreen Salahuddin (Gender Studies\SSSH)(Book)**
   Abstract: *Not found*

3. **Salahuddin, A.** (2018). 'حقیقتکاجادو' *translation of Richard Dawkins' "Magic of Reality"* (R. Dawkins', Trans.). Lahore Urdu Science Board. **(Ambreen Salahuddin (Gender Studies\SSSH)(Book)**
   Abstract: *Not found*

4. **Rubab, I.**, & Usman, A. (2018). Women's Right of Inheritance: Choices and Challenges in Punjab. *Journal of Islamic Thought and Civilization, 8*(2). **(Iram Rubab (Gender Studies\SSSH) (UMT Journal)**

   Abstract: Women"s right of inheritance is an indispensable right which assures their socioeconomic and political empowerment. Although the Shari„ah law and the constitution of Pakistan safeguard this right, its denial is pervasive in Punjab. This paper explores the possible choices for women and subsequent challenges they confront in independently exercising these choices. The chosen methodology is qualitative in nature. The ontological stance of interpretive school and epistemological stance of social constructionist school of thought have been followed. Through theoretical sampling technique, thirty women were recruited as sample from Mianwali, Rahim Yar Khan and Lahore. Data was collected through an in-depth interview guide and the results have been derived through thematic analysis. The findings of the study portray the contemporary trend among women in Punjab to surrender their right of inheritance in favor of the male agnatic heirs. Among the socio-cultural determinants influencing the choices of women, patriarchal set-up, misinterpretation of divine commands, lack of awareness, stringent legal procedures and lower educational

levels are the most significant. The study recommends effective awareness about inheritance rights both through accessible legal procedures and with the promotion of female education so that females be able to make informed choices.

Keywords:*inheritance, right, women, surrender, claim, law, practice, Punjab.*

Conference Papers

1. **Rubab, I.** (2018). *Cultural Narratives Used for Denial of Women's Inheritance: Lived Experiences from   South Punjab.* Paper presented at the International Conference on 'Gender, Religion and Culture in Psychology' at GCU (17th - 19th December, 2018). **(Iram Rubab (Gender Studies\SSSH)**

Abstract: Globally culture has always been known as one of the most influential forces that shape people's lives. In many cases, people's choices stem from their cultural understanding of a particular phenomenon. This is why culture has the power to override laws and slowdown its implementation mechanism. This is quite evident in case of pervasive denial of female inheritance in South Punjab despite criminalisation of forceful denial in 2011. This study was an effort to explore the phenomenon of women's inheritance in South Punjab through their lived experiences. It further intended to investigate how cultural narratives are shaped to serve patriarchal interests. In context of female inheritance, it looked at how these narratives effectively deprived women from their rightful shares. The study was qualitative in nature and used phenomenological study design. Women in whose families' inheritance had been distributed after 2011 were the sample of this study. Twenty study participants from two districts of South Punjab were recruited through purposive sampling technique. Data was collected though in-depth interviews, and thematically analysed. Study results were analysed through the lens of the theory of patriarchy. The study revealed that cultural narratives like *'waris', 'dhej', 'paraya dhan', 'behra behna di kand', 'piyo day putar paraye putaran tou changay honday ne', dhiyan namaniyan nal,* etcwere being used to deprive women from their legally guaranteed shares of inheritance. Consensual surrender of their inheritance by women in favour of male heirs most effectively manifested the influence of these narratives, as it is indicative of internalisation of patriarchy by women. Study results suggested that there is a dire need to deconstruct these patriarchal narratives in order to empower women.

Keywords:*cultural Narratives, Women, Inheritance, Denial, South Punjab.*

2. **Rubab, I.** (2018). *Required standards for women shelter homes in Punjab, Pakistan*. Paper presented at the 2nd International Conference on Gender Perspectives, Realities and Challenges' organized by LCWU (3-5 December, 2018). **(Iram Rubab (Gender Studies\SSSH)**

Abstract: Violence against women is a global challenge. Shelter homes for women are an indispensable component of protection system. Various international documents regarding women rights are addressing this global issue. The present study is an attempt to explore the state of services offered by women shelter homes in Punjab through the lens of international standards. To execute the study plan, the researcher followed the ontological stance of interpretive school of thought. The study was epistemologically grounded in the social constructionist paradigm. By adopting qualitative research methodologies embedded case study design was used for this research. The study was twofold in nature. At first, through the extensive desk review, international standards required for women shelter homes were identified. To compare the services of women shelter homes against the international standers two shelter homes from Punjab, named Dastak and Darulaman Nawan kot, were selected as cases through purposive sampling technique. To analyze the services of selected shelter homes 15 women from each site were recruited as study participants. In-depth interview guide and self administrated checklist were used as tools of data collection. Data was analyzed through the technique of keyhole analysis. Ethical considerations like informed consent, anonymity and data security was the top most priority throughout the research. Study results highlighted the absence of the components of 24/7 services, freedom of movement and follow up mechanisms in the women shelter

homes. It was suggested on the basis of study results that government should take immediate action to abridge the highlighted gaps.

Keywords:*women shelter homes, required, international standers, Punjab.*

3. **Rubab, I.** (2018). *Empowering Women through Inheritance: Governmental initiatives and Institutional Impediments in Punjab*. Paper presented at the International Policy Conference "The Social Economy of Gender: Addressing Challenges, Seeking Solutions", PCSW, UN Women and UK aid (28-29 November, 2018). **(Iram Rubab (Gender Studies\SSSH)**

Abstract: In wake of the global feminist movements, a new awareness about equality of genders has permeated our collective consciousness. Many strategies were introduced and many dissipated; however, female economic autonomy remained an ever-elusive dream globally (Patel, 2010). While social and political capital is intrinsically tied to economic emancipation of women, Pakistan's traditional set-up does not afford many opportunities. Agarwal (1994) argues that legitimization of female share in inherited property can prove to be the single most critical entry point for women empowerment in South Asia.

Empirical evidence shows that inheritance (especially immovable) assures economic security to women (Jabeen, 2013). In Pakistan's agro-based economy where land invariably rests at the heart of all economic activity, the odds are stacked against the female gender (SDPI, 2008). An insignificant 10.6% of the female population of Punjab owns landed property, including women who have no control over their property (PCSW, 2016). While Pakistan's constitution and the Shariah law guarantee the female right to inherit, the ground reality is much different; forcible denial of this right is pervasive. This deprivation poses serious challenges to women empowerment and is a clear manifestation of patriarchal narratives that aim to restrict women. In fact, the government of Pakistan had to enact a criminal law amendment in 2011 to curb the endemic forcible denial.

The criminal law amendment at national level was followed by a provincial amendment in Punjab in 2012. Subsequent years saw computerization (LRMS) of the land records to expedite direct transfer of inheritance. Punjab Commission on the Status of Women was set up, among other things, to oversee cases of denial. Simultaneously, the right of inheritance featured prominently in all women empowerment packages. Changes were introduced in the revenue act to minimize the role of *patwaris*, who often colluded with male family members. Statistics reflect that the situation is changing for the better. However, an in-depth appraisal of the issue shows that women rarely gain access to, and control over the inherited land. Property is often transferred to females to evade taxes or to simply avoid the scrutiny of law enforcement agencies (Zaman, 2014). This discrepancy is evidenced in a recent study by PCSW; according to which, Mianwali witnessed second largest property transfers to females. The contradiction is inescapable as Mianwali is notorious for women rights violations and the limited role of women in public sphere.

The present study aims to investigate the hurdles women face once they decide to claim their inheritance, as well as the efficacy of the implementation mechanisms. The following questions were asked:
1. What kind of steps has the Government of Punjab taken to assure women's inheritance?
2. To what extent are the courts and revenue system in compliance with the government's initiatives?
3. How institutional mechanisms are reflective of problems as highlighted by women?

The study is qualitative in nature, and follows the interpretivist school of thought. Qualitative researches intend to focus on discovery, insight and understanding from the perspective of their subjects (Merriam, 2009). Most of the existing studies on right of inheritance are quantitative in nature. Data on Gender Management Information System (GMIS), women helpline records along with computerized records of Punjab LRMIS provide a statistical overview of the state of women's right of inheritance in Punjab. These studies while majestic in their sweeping grasp divest research of its human aspect. They fail to capture the impressionistic and fluid nature of these everyday conflicts. Therefore, the paper intends to untangle knots

that have been previously ignored. Theory of bureaucratic red tape and theory of patriarchy are utilized to strengthen the analysis.

Site Selection was based on PCSW's report on female inheritance published in 2016. The study's results declared Rawalpindi as the most female friendly region, whereas, Bahawalpur topped the list of gender discriminatory regions. Previous studies also gesture towards the deplorable situation in Bahawalpur. Thus, Bahawalpur and Rawalpindi were selected based on literature review.

Twenty women who had claimed their inheritance after 2011's amendment, ten from each site, were recruited through purposive sampling technique. To gain legal and institutional insight, five legal experts and five revenue officials were also interviewed. In the case of women, initial identification process was done through the revenue department of the respective region. Even though in all cases, the revenue department served as an initial gatekeeper, gatekeepers sometimes varied with each case. In some situations, the family patriarchs assumed this role; in others, it was the in-laws.

The researcher opted for both document analysis and individual interviews. Semi-structured interview guide was developed and data was collected from in-depth interviews. In-depth interviews winnow individual voices, hence are a preferred tool (Wengraf, 2001). Ethical considerations were a priority. Informed consent was taken before the interviews and participant anonymity and data security was ensured. The data was analyzed thematically.

Study results revealed that despite the enactment of the criminal law amendment almost six years ago, many officers at law enforcement agencies remain unaware of the legislation. Moreover, if women sought to file an FIR, police officers were reluctant to lodge complaints and preferred private resolution of the issue. Institutionalized sexism and notions of honor are rife in courtrooms. Additionally, women face multiple issues at revenue offices, which are overcrowded and lack women and children friendly spaces. Incorrect family trese in NADRA's records weakened the case petitioned by respondents. Legal experts argue that the legal system is frustratingly slow and over-burdened. It does not consider constraints of time and money and assumes support from male family members. Revenue officers highlight computer illiteracy as a major hurdle in maintaining records, and argue for a more severe punishment for the key perpetrators of the crime i.e. families. Policies should be reoriented to address the highlighted issues. Though government's efforts are well meaning, they tend to undermine the impact of unjust, and slow legal processes and a lack of female mobility on the ability of females to seek justice.

Keywords:*woman inheritance, economic empowerment, institutional mechanism.*

4. **Salahuddin, A.** (2018). *Cultural context of Gender: Symbols from folk wisdom and rituals in fiction by Pakistani women writers*. Paper presented at the Paper presented International Conference on "Gender, Religion, and Culture: Issues, Challenges, and Prospects". 17th- 19th December 2018. Department of Psychology, GCU. **(Ambreen Salahuddin (Gender Studies\SSSH)**

Abstract: In this current paper cultural context of gender in fiction by Pakistani women writers is explored. This paper looks at symbols that have origin in folk wisdom and rituals in these literary texts. It is contested how gender plays a role in creating symbols and metaphors by women writers. It is a qualitative research and uses theoretical sampling for sampling of texts from fiction under study. Through theoretical sampling, themes are extracted from texts. For the current study, organizing theme was source of symbols and metaphors and the basic themes were 'folk wisdom' and 'rituals'. It is concluded that women fiction writers have picked symbols from folk wisdom and rituals and used them in abundance in their works. They have not however deviated from the prevalent clichéd usage of such symbols and have mostly retained the traditional connotations.

Department of Education

Research Articles

1. **Qadir, M. J., & Hameed, A.** (2018). Perceptions of Students Regarding the Use of IT Labs in Schools of Punjab, Pakistan. *Pakistan Journal of Social Sciences (PJSS),* 38(2), 475-483. **(Muhammad Javid Qadir (Education\SSSH), Abdul Hameed)** HEC Y CAT

Abstract: Punjab IT Labs project was proceeded in the province of Punjab. In 2009 secondary schools were equipped with 4286 computer labs through this Project. The main purpose of the study was to find the perceptions of students regarding the use of IT Labs in secondary schools. Secondary and Higher Secondary Schools were included in the study. Six (6) districts were selected for sampling. Data were gathered through Qualitative and quantitative methods. Qualitative data was collected by five points Likert scale Questionnaire was developed for quantitative data. The researcher used interview technique for the purpose of qualitative data. It was found in this study, only those students were allowed to use computers who had adopted 'Computer Science' as a subject although labs were provided proper facilities. Computers were not being used by other teachers. Only IT teacher was teaching through computers. According to the recommendations of the study all teachers should be trained in computer.

Keywords:*IT, schools, secondary.*

2. Manzoor, A., **Hameed, A.,** & Nabeel, T. (2018). Voices of Parents about their Out of School Children with Disabilities. *Journal of Inclusive Education, 2*(1), 77-92. **(Abdul Hameed (Education\SSSH)** (Not HEC Recognized)

Abstract: In Pakistan, about six million children are out of school at primary level.30 percent of them are with disabilities. Such a huge number of children create a gigantic challenge for the government to meet the target of 100% school enrollment. A closer look at the levers of exclusion indicates that there are economic, cultural and structural barriers to keep children out of school. Unless these barriers are addressed, the dream of every child to be in school cannot come true. Any educational plan that discount children with disabilities will doom to fail. This study investigates the perceptions of parents about the value of education. The purpose of the study was to collect feedback from the prime stakeholders in their own context. 433 parents of children with disabilities were selected from two districts of Punjab to document their voices about the educational exclusion. Data was collected through the interview cum questionnaire. The results of the study revealed that the majority of the parents were positive towards education of their children. Lack of school readiness, distance from special schools and poverty were reported as major barriers to education. It was argued that inclusive education is the only way forward.

Keywords:*educational exclusion, children with disabilities, inclusive education.*

3. **Qadir, M. J., & Hameed, A.** (2018). Usefulness of Punjab IT Labs Project in Schools of Punjab, Pakistan. *Journal of Educational Research, Dept. of Education, IUB, Pakistan, 21*(2), 137-146. **(Muhammad Javid Qadir (Education\SSSH), Abdul Hameed)** HEC Y CAT

Abstract: The objective of the study was to investigate the usefulness of Punjab IT Labs Project. 4286 IT Labs were set up in schools of Punjab province. The population of research included all the teachers of public sector schools equipped with computer labs. Six (6) districts were selected randomly among all 36 districts for study. A survey questionnaire was developed to collect data. The questionnaire consisted of questions designed to collect data concerning the views of teachers about IT labs. Teachers were interviewed for qualitative data. It was concluded that most of the teachers had no knowledge of computer. Lack of time was another factor prohibiting teachers to the use of IT lab. The study recommended that the teachers should be providedtraining to use computer. There is also need to provide technical support and maintenance funds to get better results.

Keywords:*technology, secondary, teachers, schools, Punjab.*

4. Nizami, R., & **Rashid, K.** (2018). Academic Roles of Educational Leaders for Quality Learning Environment in the Public and Private Universities at Lahore. *Annals of King Edward Medical University Lahore Pakistan, 24*(4), 948-952. **(Khalid Rashid (Education\SSSH)** ISI Web of Science

Abstract: Background: Quality learning environments are innovative, transformative and collaborative thus facilitating the educational processes. This study was designed to figure out the academic roles of higher educational leaders for quality learning environment in the public and private universities at Lahore. The objective was to identify the gaps in the academic roles being played and entrusted to the educational leaders. Methodology: A cross-sectional study was conducted at Lahore, among the public and private sector universities. Stratified sampling technique was opted and universities having the faculties of natural sciences, arts & humanities, management sciences and social sciences were selected for study population. The educational leadership of the universities was categorized into senior and junior faculty and all the faculty members of sampled universities were invited for participation. The data was collected through the self-designed, validated and pilot tested five-point rating scale. The collected data was entered into the statistical package for social sciences. Chi square test was used to determine the association using p value < 0.05 as significant. Results: Findings of the research revealed that there was a significant difference between the academic roles among the faculty of public and private universities. Conclusions: The study concludes that higher educational leaders must identify and practice their roles to enhance the quality of the learning environment of universities.

Keywords: *academic roles, educational lleadership, quality learning environment, higher education, educational services*.

5. **Arif, S.** (2018). Learning for peace and coexistence: action research to improve student attitudes. *UMT Education Review (UER)*, 1(1), 23-36. **(Dr. Seema Arif (Education\SSSH)** (UMT Journal)

Abstract: Living in 21st century means living in a totally new world full of challenges both for the educators and the learners. The aim of a postmodern university is to enable human beings to live more meaningful and satisfying lives by promoting social justice, peace and harmony in the world. It can only be achieved by teaching students critical thinking or developing among students the capacity to look at problems from various perspectives and thus reduce the chances of conflict. Therefore, the aim of this study was to improve student's higher order thinking skills and attitude towards life and learning. For this purpose specific activities were designed for undergraduate students enrolled in the course 'Introduction to Psychology', so that they may become more aware of their cognitive processes, increase their perspective-taking, revisit their rational skills, and be able to establish new links with their society and culture.Innovations through visual media and psychological testing were introduced in four steps backed with formative assessment. Qualitative feedback was collected by the end of the course from the students about the course material, teaching methodology, and the innovations used describing how they personally relate to this experience. The results show that students like innovative technology used in the classroom and some even related to it as the most relevant and meaningful experience of their lives.

Keywords: *participatory action research, emancipation, teaching with technology,innovation, peace & coexistence.*

6. **Arif, S.** (2018). Dark Side of Leadership in Educational Setting. *Dark Sides of Organizational Behavior and Leadership*: IntechOpen. **(Dr. Seema Arif (Education\SSSH)**(Book Chapter)

Abstract: Einstein said that darkness is absence of light. It is assumed that absence of leadership or misappropriation of leadership characteristics and behaviors results in Dark leadership,and it is the system that produces a culture in which dark side of leadership becomesacceptable. In this chapter, I would be exploring the role of middle leadership (schoolheads, district education officers, and

administrative officers) of school education department in Punjab. The chapter is based upon a qualitative study with in-service school teachers and school heads. The critical incident technique was used to collect data, and interpretive analysis was used to interpret data at various levels from coding to themes generation and interpretation of the phenomenon, dark side of leadership. Goleman'Dark Triad comprising, authoritarian, narcissistic, and psychopathic, provide theoreticalbasis of the analysis. The results are shared in a story form progressively supplemented with the evidence generating discourse about the dark side of leadership in the educational settings of Punjab. The study acts like a mirror shedding lights into the deep and dark corners of leadership making them aware of their creepy existence and challenging them to create meaningful acceptance for themselves by coming into light and leaving the dark behind.

Keywords: *dark side of leadership, control, supervision, victimization, teachers rights.*

7. Awan, A. S., Gondal, I. A., & **Um-ul-Huda**., (2018). *Accommodating Diverse Learners Through Inquiry Along With Six Major Principles At Elementary Level*. 5th International Conference on Education and Social Sciences (INTCESS). Istanbul, TURKEY. **(Um-ul-Huda (Education\SSSH)** ISI Web of Science (Proceedinds Paper)

Abstract: Inquiry method is generally considered an effective teaching method for learning science. However, recent researches show that it is not as effective for students lacking motivation. Similarly, science educators have to face another major challenge of student diversity which emerges due to individual differences, group differences and certain exceptionalities. Therefore, this experimental research study focuses to accommodate the diverse learners at elementary level to teach General Science (related to Physics and Biology topics) through inquiry method along with additional six major principles. It means Big Ideas, Conspicuous Strategies, Mediated Scaffolding, Strategic Integration Primed Background Knowledge and Judicious Review. When inquiry method is implemented along with these six major principles, it becomes much more effective. Therefore, in order to find out its effectiveness, four trained prospective teachers voluntarily involved to conduct this experimental research in the form of two teams (two members in each group) to teach two classes of 8th grade, with the strength of 35 and 40 students comprising of diverse learners in two separate public schools at Lahore. Both the teams were trained to prepare 20 lessons each for Physics as well as Biology topics from 8th grade General Science group. This research was completed in six weeks. Two tests of equal nature were used, as Pre-test and Post-test. On the basis of the learning outcomes of both classes, it was concluded that the inquiry method along with six major principles at elementary level was successful in accommodating the diverse learners by achieving the high academic achievements in Post-test as compared to the pre-test. This also proved that teachers' training and lesson planning for diverse learners was also effective.

Keywords: *diverse learners, six major principles, inquiry method, teachers' training, lesson planning*.

Conference Papers

1. **Khawar, A., & Arif, S.** (2018). *Building World-class University in Pakistan: Opportunities and Constraints*. Paper presented at the International Conference on Innovation and Emerging Trends in Education & Social Sciences (ICIETESS 2018), Iqra University Karachi.https://www.researchgate.net/publication/322519788_Building_Worldclass_University_in_Pakistan _Opportunities_and_Constraints. **(Ayesha Khawar (Education\SSSH), Dr. Seema Arif)**

Abstract: The article will explore the issues of policy borrowing for academic excellence in higher education to pursue a position in the world class universities. Throughout the world, Higher Education Institutions (HEIs) are benchmarked against international quality standards. Following this agenda, the aspiring university will have to undergo some policy borrowing regardless of the fact that the borrowed policy matches with National agenda or not. A comprehensive framework has been adopted, quality standards of Characteristics

of Excellence, endorsed and approved by the Middle States Commission on Higher Education in January 2002, to address the quality issues faced by universities to meet the standards of excellence. Two universities in Pakistan have been chosen for the site of this qualitative study, National University of Science & Technology (NUST), and University of Management & Technology (UMT). NUST has been ranked among the first 500 universities according to QS Rankings, whereas, UMT is still striving to become a world-class university. The triangulation has been reached by document analysis of the quality reports submitted by the two universities, semi structured interviews with the senior and middle management of the universities, deans, director for Quality Enhancement Cells, and head of the departments of the selected universities. The primary data obtained has been compared and contrasted with the quality characteristics marked by standards for academic excellence. Unawareness of the international quality standards and ambiguity in following practical guidelines to follow the spirit of quality has been found the main issue. Once understanding and meaningfulness is created, it becomes easier to pursue standards. The findings of the study will be a unique contribution to the body of literature creating a point of interest to policy makers and quality assurance practitioners of the developing countries who are concerned about the academic excellence of HEIs to accentuate the significant areas which make any university, a world-class university.

Keywords:*academic excellence, developing countries, global rankings, higher education institutions, quality standards, world-class university.*

2. Yousaf, A., &   **Arif, S.** (2018). *Experiential Learning: A requisite for research skill development*. Paper presented at the IoBM, 3rd International Conference on Experiential Learning, Karachi. **(Dr. Seema Arif (Education\SSSH)**

Abstract: Learning and applying research skills is essential for effective professionals; however, many students do not see the value in understanding research as a professional skill. Experiential or work-based learning is deemed essential for the completion of formal higher education qualification like MPhil & PhD. Main goal of such research degrees is to build research capacity to improve the quality of research. A graduate research methods course used experiential learning to assess students' comfort and value in research methods. The continuous feedback from 30 PhD students was gathered via WhatsApp to know their level of involvement and engagement in PhD research enhanced courses over a year from Fall 2017-2018. The results show how much this effort has resulted into significant increase in both student interest and productivity in research. Phd/Mphil students will be population of the study. The study used mixed methods approach using discourse analysis for WhatsApp chat and in depth interviews in order to describe a quality progression in understanding and application of research methods and academic writing.

Keywords:*professional skills, experiential learning, teaching and learning, mixed methods.*

3. **Mukhtar, S., & Arif, S.** (2018). *Factors influencing the successful curriculum implementation in Secondary Schools of Punjab*. Paper presented at the 6th International Conference on Research in Education (ICORE2018), Punjab University, Lahore.**(Sajida Mukhtar (Education\SSSH) Dr. Seema Arif)**
Abstract: *Not found*

4. **Omer, I., & Arif, S.** (2018). *From epistemological pedagogical access to student success: New framework for studying access to higher education*. Paper presented at the 6th International Conference on Research in Education (ICORE2018), Punjab University, Lahore. **(Irfana Omer (Education\SSSH) Dr. Seema Arif)**
Abstract: Research in the area of access to higher education has often been critiqued by lack of theoretical grounding arguing it is restricted to the quality of infrastructure or pedagogic quality to some extent. The study proposes a conceptual framework for purposeful access to higher education for measuring the interactive effect of factors influencing pedagogical access (Teacher Pedagogic Quality, Teaching Learning Environment, and Teacher-student Relationship) upon factors leading to student success (student satisfaction and student engagement). The researchers assume that a meaningful and purposeful access is

created for diverse population entering higher education only by providing 'epistemological pedagogical access' to the students ensuring student success. The study was quantitative in nature and correlational research design was used following positivist paradigm. The researcher used multi-stage sampling technique and the study sample comprised 400 students from two universities (one public and one private) from Lahore, Pakistan. The data were collected using closed ended questionnaire and advanced statistical techniques like MANOVA, correlations, and regressions were applied using SPSS. The study concludes a model of epistemological pedagogical access leading to success for the university students of Pakistan. Furthermore, the results of this pilot study also share the predictive value of pedagogical access to ensure student success.

Keywords:*epistemological pedagogical access, student success, student-teacher relationships, teacher pedagogic quality, teaching and learning environment.*

5. **Khalil, U., & Arif, S.** (2018). *Impact of Punjab Government' Initiatives for Free & Compulsory Education on Student Enrollment* Paper presented at the 6th International Conference on Research in Education (ICORE2018), Punjab University, Lahore. **(Uzma Khalil (Education\SSSH) Dr. Seema Arif)**
Abstract: The constitution of Islamic Republic of Pakistan 1972, after its 18th amendment, under the article 25 (A) provides free and compulsory primary education as a fundamental right for Pakistanis and responsibility of the state. The government of Pakistan has therefore taken many initiatives to increase student enrolment in schools of Punjab. A correlational research was planned to know whether or not Punjab government has taken any proper measures to reduce home to school distance in primary schools in rural areas of Punjab to increase student enrolment. 300 parents were selected from two Tehsils of Sargodha districts through cluster sampling. Data was personally collected through self-developed questionnaire on five-point Likert type scale. The major findings of the study indicate that schools were spacious enough in order to accommodate the required number of students, but furniture and other facilities are lacking. Home to school distance also continues to pose major problems as the mean difference is also more than established international standards. Therefore, it acts as a major hazard and effective steps are needed to lessen it. Overall, the study concludes that initiatives taken by the government are positively effecting on the student enrollment in Punjab.

Keywords:*home to school distance, initiatives of the Government of Punjab, School facilities, student enrollment.*

6. **Arif, S., Mukhtar, S., & Faran, M.** (2018). *Leadership and Successful Curriculum Implementation in Secondary Schools of Punjab*. Paper presented at the 2nd International Conference on Education 2018 (WCEDU 2018), Sri Lanka. **(Dr. Seema Arif (Education\SSSH) Sajida Mukhtar, Muhammad Faran)**
Abstract: Curriculum implementation has the most significant role in achieving desired learning outcomes and the preset curriculum goals in schools. Curriculum implementation is one of the important functions of a School principals and it has been receiving the attention of educators, educationists and researchers across the world. Curriculum implementation cannot be achieved unless it has been made possible through the leadership role of the school principal. The principal does this through devising effective leadership strategies to make curriculum implementation a success. However, there are certain other factors as well which influence successful curriculum implementation, such as teacher preparedness and provision of facilities. A quantitative research was conducted to explore the factors influencing the successful curriculum implementation in Secondary Schools of Punjab. The data was collected from 600 teachers and head teachers across Punjab using multistage sampling. The data were cleaned, organized and recorded with SPSS 21. Both descriptive and inferential analysis was used to determine the influence of factors in curriculum implementation. The results indicate that both dissonant and resonant leaders achieve their objectives in different ways. Resonant leaders adopt more visionary and coaching style to be successful with progressive

teachers; whereas, dissonant leaders use more commanding style with traditional teachers. Path analysis has been used to identify paths of resonant and dissonant leaders towards successful implementation of curriculum.

Keywords:*curriculum implementation, leadership facilitation, dissonant leadership style, provision of facilities, resonant leadership style, and teacher preparedness.*

7. **Arif, S., & Alharbi, E.** (2018). *Leadership Governance and Faculty Engagement in Universities of KSA*. Paper presented at the 2nd International Conference on Education 2018 (WCEDU 2018), Sri Lanka. **(Dr. Seema Arif (Education\SSSH), Eman Alharbi)**
Abstract: *Not found*

8. **Shahzad, A., & Ahmad, S.** (2018). *Effectiveness of University Teachers with Visual Impairment: A Case Study*. Paper presented at the Paper presented in the 3rd International Higher Education Studies Conference, to be held at Abdullah Gul University, Kayseri, Turkey, on October 11-13, 2018.**(Ayesha Shahzad (Education\SSSH),Shahzad Ahmad)**
Abstract:"A Teacher is a Teacher" regardless of whether his sight is impaired, his gait is uneven, or his back is more arched than normal.It is the mind of the teacher that teaches, and it is the mind of the student that assimilates the concepts being taught. If physical impairment such visual impairment does not hamper a student to get education or higher education, it is equally possible for a visually impaired teacher to aspire to become an excellent teacher. Every teacher, blind or sighted, has a different method of displaying his abilities and possibilities. The emphasis in hiring blind teachers should be on how he/she uses these abilities and possibilities. The major premise of this research is to have an awareness of the perceptions of sighted students about the effectiveness of a teacher with visual impairment in one of the public universities of Lahore. Focusing on the actual pedagogical practices of a teacher with visual impairment in his/her teaching profession, this paper attempts to get the opinion of sighted students regarding their visually-impaired teacher. This research is an exploratory case study in its nature in which mix method approach has been adopted. For the qualitative method, both in-depth interviews of five students and one focus group of 3 students were conducted. For the quantitative method, a survey questionnaire was used and data was collected from 49 (47 females and 2 males) sighted students. Quantitative data was analyzed on SPSS 21 to get percentage and frequency while qualitative data was transcribed and predetermined themes were checked. Results were drawn from interpretation of both qualitative and quantitative data. Results indicated that sighted students had a very positive response towards their teacher with visual impairment and visual impairment of any person is not a hurdle in making him/her an ideal teacher.
Keywords:*effectiveness, perception,sighted students, visual impairment.*

9. **Shahzad, A., & Rasheed, R.** (2018). *Relationship of Teacher's Conflicts with Student's Engagement at Higher Education Level*. Paper presented at the Paper presented in International Conference on Innovation and Emerging Trends in Education & Social Sciences (ICIETESS-18) hosted by Iqra University Karachi 8-9 January, 2018.**(Ayesha Shahzad (Education\SSSH),Rumaisa Rasheed)**
Abstract: The research was about the effect of teacher's conflict on student's engagement. It was conducted to review and assess what type of conflicts occurs in educational organization and what is the major reason of conflicts occurrence in such institutions? This research is carried out to know the perceptions of the university students regarding teachers' conflicts, how do these conflicts effect teachers-students relationship and its impact on their academic engagement at higher education level in Pakistan. In this study the research paradigm was qualitative directed content analysis which was deductive in nature. The questionnaire was built with open-ended questions so that the participants had freedom to respond in their own words. Survey was conducted independently with the students of each university. For this purpose, four universities were

selected as the sample from Lahore divisions of Punjab. The study recommends that there is an urgent need of some serious, efficient and effective efforts on part of students, universities, faculty members, administrative agencies and authorities' regulators and the government to redesign the whole education system to compete in the international higher education market.

Keywords: *conflict, student engagement, higher education institutions, students' perceptions.*

10. **Masood, S.** (2018). *Investigating professional learning community in private schools of Lahore: Perspective of teachers*. Paper presented at the International Conference on Innovation and Emerging Trends in Business Management, Education &Social Sciences, 8, 9 January, 2018, Iqra University Karachi, Pakistan. **(Sajid Masood (Education\SSSH)**
Abstract: *Not found*

11. **Masood, S.** (2018). *High Stakes Examination and Curriculum Constriction in Pakistan*. Paper presented at the International Conference on Education 08-11 April 2018, Clute Institute Washington D.C. USA.**(Sajid Masood (Education\SSSH)**
Abstract: *Not found*

12. **Masood, S.** (2018). *Attitudes towards research: Perspective of post graduate students*. Paper presented at the 3rd International Conference on Research and Practices in Education, 16 - 17 February 2018, Allama Iqbal pen University, Islamabad, Pakistan.**(Sajid Masood (Education\SSSH)**
Abstract: *Not found*

13. **Masood, S.**, & Tatlahb, A. (2018). *Perception of students about service quality in a private university of Lahore:Perspectives of Teachers*. Paper presented at the International Conference on Research in Education (ICORE) 20-22 November 2018, Institute of Education & research, Lahore Pakistan.**(Sajid Masood (Education\SSSH)**
Abstract: *Not found*

14. Amjad, H., & **Muhammad, Y.** (2018). *Down Syndrome Students' Learning Difficulties: A Qualitative Case Study of Perspectives of Special School Teachers & Psychologists.* Paper presented at the 9th Post Graduate Students' Conference, Institute of Education and Research University of the Punjab, Quaid-e-Azam Campus, Lahore- Pakistan. **(Yaar Muhammad (Education\SSSH)**
Abstract: Down syndrome students have genetic disorders which delay their cognitive, motor and social skills and cause a range of physical abnormalities in them. Imparting education to Down syndrome students is a difficult process since it requires variety of pedagogical strategies to teach and manage issues and problems in it. Using qualitative case study methodology, this study aimed to develop an understanding of the learning difficulties faced by Down syndrome students through the perspectives of special schools' teachers and psychologists. This study also aimed to understand the pedagogical practices of teachers to overcome learning difficulties of Down syndrome students. Criterion sampling technique was used to select participants. Data were gathered through semi-structured interviews. Interview guide contained seven dimensions based on seven sub-research questions. Analysis of these seven dimensions clearly showed that teachers and psychologists perceived that Down syndrome students certainly face many problems and hurdles in their learning. The main reasons mentioned by participants for this were lack of skills, low IQ level, memory storage issues, communication problem, behaviour problems, passivity, distraction issues, and problem in identifying individual differences of Down syndrome students. Hurdles caused by these problem in choosing right teaching methodology and AV Aids were also mentioned. Communal effect was also one of the big problems creating hurdles for interest Down syndrome students have in learning. The findings of this study clearly showed that Down syndrome students need much care and attention in order to make them

good in learning. Participants mentioned that it isn't only teachers' job, but parents and society also have to perform certain role in order to make education of Down syndrome students better. Findings also revealed that Down syndrome students cannot live independently and need special focus. However, it was proposed that if certain and required care and skills are provided to Down syndrome students then their individual life and lifestyle can also be made well. Moreover, the findings also showed that these teachers and psychologists employ variety of pedagogical strategies to teach and manage Down syndrome students. However, certain aspects need to be addressed in order to make education of these students effective.

Keywords: *perspectives, qualitative case study, learning difficulties, down syndrome students, special school teachers.*

15. Anjum, M., & **Muhammad, Y.** (2018). *Minority Teachers' Problems in a Muslim Society: A Case Study of Christian School Teachers in Gujrat.* Paper presented at the International Conference on Peace Education, Department of Education, University of Sargodha, Sargodha. **(Yaar Muhammad (Education\SSSH)**

Abstract: Majority of the population in Pakistan belongs to Islam; however, diversities of religions also characterize this plural country. Constitution of Pakistan declares it as an Islamic state but since many other religions groups are also living in it, Constitution also stands for rights of each individual, no matter which religion, cast and creed he or she belongs to. State of Pakistan provides the security to ensure safeguarding of these rights at every level. On the other hand, minorities in Pakistan, especially, Christians are politically powerless, socially depressed and institutionally discriminated. Moreover, they are frequent victims of blasphemy persecutions-and forced conversions. In this context, this study was conducted to take a deeper look into the problems of Christian teachers in district Gujrat. To understand the problems of Christian school teachers, a framework comprising of six dimensions was developed: Difficulties in career as a Christian teacher, hurdles in teaching to different religions/classroom management, behavior of Muslim parents, behavior of Christian parents, behavior of society and perceived required support of Government for Christian teachers. Ten teachers were selected as sample for this study. Teachers agreed voluntarily to participate in this research. An interview guide with the help of previously published research studies was designed and semi-structured interviews were conducted for the collection of data. Interview of each participant was conducted individually in recorded form and was written in after. Analyses of the six dimensions revealed many aspects of problems related to Christian school teachers. They highlighted the issues which they face in Muslim society. Most of them were contented with working conditions and the behaviors of Muslims with them. But few of them highlighted their issues being a minority person and their sufferings in this society. Christian teachers also wished that state of Pakistan should take some initiatives to protect the rights of Christian teachers. Pakistani Constitution, Islamic values and human rights dictate equal rights-and fair dealing for all citizens of the country. Being members of this society, Christian teachers should be treated in a respectful way so that they can peacefully contribute to the development of a tolerant society.

Keywords: *minority teachers, Christians, case study, Muslim society.*

16. **Jamil, M., & Muhammad, Y.** (2018). *Critical thinking pedagogy for secondary school students: A qualitative study of teachers' perspectives*. Paper presented at the 6th International Conference on Research in Education, Institute of Education and Research University of the Punjab, Quaid-e-Azam Campus, Lahore- Pakistan. **(Muhammad Jamil (Education\SSSH) Yaar Muhammad)**

Abstract: In the theoretical literature of 21st century, there has been an increasing focus on the development of critical thinking in secondary school students. Moreover, literature also suggests certain pedagogical practices—which can help teachers in achieving the aim of critical thinking skill development. In Pakistani context, national curriculum policy (for example, Education Policies 2009 & 2017 and National Curriculum for Grades IX-X 2006) also emphasize on the development of critical thinking to make the

students logical and rational decision makers. The aim of current qualitative study was to explore the perceptions of secondary school teachers regarding development of critical thinking skills in students. Four secondary school teachers were purposively selected as cases using criterion sampling technique from a district in Punjab. For the collection of data, semi-structured interviews were conducted to get more in-depth understanding. Qualitative content analysis was used to analyze the interview data. According to the results, it was found that teachers' pedagogical practices in the classrooms were mainly focused only on getting good grades for the students instead of developing critical thinking in students. Teachers highlighted the issue that since the assessment and accountability system encourage rote memorization and regurgitation of the memorized material, it is hard for them to use pedagogical practices—which are helpful in the development of critical thinking in secondary school students. Therefore, it is suggested that assessment system should be overhauled to assess critical thinking—so that development of the higher order thinking skills of students could be ensured—and ultimately, they could be prepared to face the challenges of 21st century.

Keywords: *critical thinking, pedagogy, secondary level.*

17. **Jamil, M., & Muhammad, Y.** (2018). *Nurturing Critically Thinking Citizens: A Qualitative Study of Teachers' Perspectives.* Paper presented at the International Conference on Peace Education, Department of Education, University of Sargodha, Sargodha. **(Muhammad Jamil (Education\SSSH) Yaar Muhammad)**

Abstract: Critical thinking is considered as a 21st century skill-and an important trait of effective citizens in a democratic society. The National Education Policies (2009 & 2017) and National Curriculum for Grades IX-X (2006), all aim to develop students' critical thinking skills so that they can become logical, rationale, independent, lifelong learners as well as responsible members of society and global citizens. The purpose of the current qualitative study was to explore the teachers' perspectives regarding pedagogical practices for the development of critical thinking skills of secondary school students, the future citizens. Using multiple case study research design, four secondary school teachers from four types of secondary schools (provincial public, federal public, elite private and low fee private) were purposively selected as cases from a district in Punjab through criterion sampling technique. In-depth semi structured interviews-in which questioning and probing often continued for as long as an hour-were conducted for data collection. Qualitative content analysis was used to analyze interview data. Findings revealed that these teachers were using limited pedagogical practices in their classrooms to cultivate critical thinking skills. However, their main focus was only to get good grades for students instead of developing critically thinking citizenship. It is argued that teachers should play their role in engaging students in critical thinking so that these future citizens could effectively manage the complexity of contemporary as well as future citizenship rights and responsibilities.

Keywords: *pedagogy, critical thinking, citizenship education, secondary level.*

18. **Jamil, M., & Muhammad, Y.** (2018). *Developing critical thinking skills in secondary school science students: An analysis of curriculum policy documents*. Paper presented at the 6th International Conference on Research in Education, Institute of Education and Research University of the Punjab, Quaid-e-Azam Campus, Lahore- Pakistan. **(Muhammad Jamil (Education\SSSH) Yaar Muhammad)**

Abstract: Critical thinking is an important aspect of formal education and one of the 21st-century skills in contemporary literature. This study aimed to analyze the curriculum policy documents to understand the policy directives regarding pedagogy for the development of critical thinking skills among secondary school students in science education. Policy documents-Education Policies, 2009 & 2017 and National Curriculum for Physics, Chemistry and Biology, Grades IXX, 2006—were analyzed through qualitative content analysis. Findings revealed the focus on developing critical thinking skills with recommended diverse innovative pedagogical practices and assessment techniques. National Education Policy (2009) highlights the production of critical thinkers as the main aim of education with the importance of curriculum and assessment system.

National Education Policy (2017) discourages rote learning with focus on the curriculum-based exam. National Curriculum for all three science subjects, emphasize on conceptual, activity-based and critical thinking pedagogy. Cooperative learning, questioning, learning by doing and problem-solving techniques are suggested to be used to produce critical thinkers of the 21st century. Higher order thinking questions are suggested to be included as maximum part of the paper. The findings of this study have strong implications for the teaching practices in secondary schools for science education.

Keywords: *critical thinking, pedagogy, science education, policy documents analysis, secondary level.*

19. Khokhar, A., & **Muhammad, Y.** (2018). *Imagining the Nation: Analysis of Classes 4 and 5 Social Studies Textbooks Published by the Textbook Boards in Pakistan*. Paper presented at the 6th International Conference on Research in Education, Institute of Education and Research University of the Punjab, Quaid-e-Azam Campus, Lahore- Pakistan. **(Yaar Muhammad (Education\SSSH)**

Abstract: Education is considered a crucial element in shaping national identity and culture of a nation. In Pakistan, policy makers have been deliberately using education to form and reform society and Social Studies is an important tool employed by the state to redefine and reinvent Pakistani national identity. This study examined Social Studies curriculum and textbooks and employed qualitative content analysis to analyze the various contradictory and complementary discourses that inhabit the classes 4 and 5 Social Studies curriculum and textbooks published by the textbook boards in Pakistan by using the process of essentialization, mythification and romanticization of Pakistani history and society as given in the textbooks. This study finds aspects of cultural nationalism (an emphasis on a common Pakistani heritage), the textbooks highlight the richness of Pakistan's cultural and historical heritage. There is some evidence of presenting Pakistan as a cultural, religious and ethnic diversity. The visible symbols of national pride are presented through buildings which are considered a source of national pride, encapsulating history and tradition. The details of the historical periods have a transcendental appeal, transposing the nation to a realm outside that of ordinary existence and of bygone romantic age and connected to today's Pakistan, timelessness of Muslim rulers. It is a fact that the textbooks are produced by the state authorities with the aim to do away with the religious, ethnic and cultural underpinnings but this does not change the problematic nature of multicultural, multi-ethnic and multi-religious identity.

Keywords: *identity, social studies, content analysis, textbook.*

20. **Saleem, A., & Muhammad, Y.** (2018). *Effectively managing classroom: A case study of four novice elementary teachers in private schools.* Paper presented at the 9th Post Graduate Students' Conference, Institute of Education and Research, University of the Punjab, Lahore. **(Ayesha Saleem (Education\SSSH) Yaar Muhammad)**

Abstract: Novice elementary school teachers may have professional teacher education degrees but they may experience many difficulties in the actual classroom settings, especially while managing classrooms in the early years of their teaching. The aim of this study was to develop an understanding of lived experiences of novice elementary school teachers with respect to classroom management. More specifically, this study explored the needs and issues of novice elementary school teachers related to the class management in initial months of their job. This study used case study research design and conducted in-depth interviews to explore the experiences of the participants related to classroom management. Through purposive sampling technique, four information-rich-participants (novice elementary school teachers struggling with classroom management) for this research were selected from private elementary schools in Lahore. Semi-structed interviews were conducted to elicit the lived experiences of the participants. All interviews were audio-recorded and later transcribed for conducting qualitative content analysis of the data. Analysis revealed that the novice teachers face various challenges in managing their class-and use various pedagogical techniques to handle the day to day classroom issues. Being new, they rely on the official help with respect to methods,

planners, and other important interactions in the schools-in order to teach according to the requirements of the school. They, however, do not receive the support of experienced teachers and principals in this regard. This study contributes to contextual knowledge related to the issues and needs of novice private elementary school teachers faced by them in the start of their career.

Keywords: *private schools, effective classroom management, case study, novice elementary teachers.*

21. Zaka, S., & **Muhammad, Y.** (2018). *Research Students' Perceptions of Teachers' Effectiveness in a Public University: A Qualitative Case Study*. Paper presented at the 6th International Conference on Research in Education, Institute of Education and Research University of the Punjab, Quaid-e-Azam Campus, Lahore- Pakistan. **(Yaar Muhammad (Education\SSSH)**

Abstract: This qualitative case study was conducted to explore the perceptions of students about the effectiveness of university teachers. For case study method purposive sampling is the typical technique to select the sample. Therefore, seven M. Phil. students-who had completed their course work and were working on their research work in the Department of History of a university-were purposefully selected to conduct this study. Students were chosen as data sources because it was assumed that students are key stakeholders and keen observers of the effectiveness of university teachers; therefore, they understand their teachers' professionalism. Semi-structured interviews were conducted to collect data and qualitative content analysis (QCA) was used to analyze obtained data. Findings revealed that majority of students perceived that teachers vary in effectiveness. Moreover, teacher effectiveness varies with respect to four dimensions of the teacher effectiveness chosen for the analysis, that is, Students' Engagement, Instructional Strategies, Classroom Management and Research Supervision. The results also showed the need to develop mechanisms for the professional development of faculty members. This study recommends hiring of pedagogically trained teachers-well versed in understanding the complexities of university teaching as well as research supervision.

Keywords: *students perceptions, students' engagement, instructional strategies, classroom management, research supervision.*

School of Law and Policy (SLP)

Conference Papers

1. **Rashid, U.** & **Rashid, A.** (2018).*Judicial Activism in Pakistan and the Effect on State Institutions: the Constitution, Rule of Law and Separation of Power*.In 4 th International Conference 1973 Constitution: Status and Role of Institutions (At Department of History, University of Peshawar, Pakistan Organised by Department of History, University of Peshawar and Hanns Seidel Foundation, Pakistan Office, Islamabad 26 - 27 November 2018).**(Umar Rashid (SLP) Amna Rashid)**

Abstract: The debate surrounding the 2018 general elections in Pakistan posits that judicial activism is heavily influencing the elections. The label is being used to refer to the suo motu notices taken by the Supreme Court of Pakistan against various political leaders in wake of Panama Papers scandal, climaxing in the imprisonment of ex-prime minister Mr. Nawaz Sharif. However this current judicial activism can trace its origin to the Court of Justice (r) Iftikhar Muhammad Chaudhry, especially after March 2009. The so labelled judicial activism, especially by the Supreme Court, has decisively divided the people of Pakistan. For some it is an unjustifiable interference in the democratic system of the country by an unelected group viz.: weakening state institutions, adversely affecting voter's rights and sanctity of the vote, harming the principles of separation of power and rule of law, and ultimately undermining democracy in Pakistan. For others the actions taken by the judiciary, especially the Supreme Court, are justifiable use of the courts power to hold all individuals and institutions accountable, in line with the principles of rule of law and the spirit of the Constitution, and are considered essential for ensuring continued growth and development of the democratic system in Pakistan. This paper will analyse the relevant judgments of the appellant courts of Pakistan in corruption and accountability cases against current and former members of the legislature, in light of rule of law, separation of powers and constitutional principles of Pakistan. The purpose of this analysis will to be evaluate the role played by this so called judicial activism on state institutions, primarily the judiciary and legislature; and whether it has strengthened or weakened these institutions and the democratic system of Pakistan.

2. **Rashid, U.**(2018).*International Investment Law: Tension between State Sovereignty and Investor Protection*, at the 8 th Judicial Conference 2018 organized by the Supreme Court of Pakistan, Law and Justice Commission of Pakistan (LJCP) and National Judicial (Policy Making) Committee (NJPMC), 4-5 May 2018.**(Umar Rashid (SLP)**

Abstract: The current international law of foreign investment shows a marked tension between state sovereignty on the one hand and foreign investor protection on the other. This paper will look at the historical development of international investment law, both through investment treaties and through decision of international investment law tribunals. It argues that the current law favors investor protection over claims of state sovereignty. However, it can also be observed that where investment tribunals have provided a very generous and expansionist interpretation in favor of investor protection, subsequent development in both state practice and tribunals decision shows attempts to push back from such interpretation. However it remains to be seen whether international investment law would be able to provide a genuine balance betweeninvestor protection and other legitimate interests including sovereignty, human rights, environment, sustainable development and good governance.

School Of Health Science (SHS)

Department of Health Science

Research Articles

1. Fitzmaurice, C., Alsharif, U., El Bcheraoui, C., Khalil, I., Charara, R., Moradi-Lakeh, M., . . . **Bacha, U.**(2018). Burden of cancer in the Eastern Mediterranean Region, 2005-2015: findings from the Global Burden of Disease 2015 Study. *International Journal of Public Health,* 63, 151-164. doi: 10.1007/s00038-017-0999-9. **(Umer Bacha (SHS)** **JCR Listed (IF: 2.617)**

   Abstract: Objectives

   To estimate incidence, mortality, and disability-adjusted life years (DALYs) caused by cancer in the Eastern Mediterranean Region(EMR) between 2005 and 2015.

   Methods

   Vital registration system and cancer registry data from the EMR region were analyzed for 29 cancer groups in 22 EMR countries using the Global Burden of Disease Study 2015 methodology.

   Results

   In 2015, cancer was responsible for 9.4% of all deaths and 5.1% of all DALYs. It accounted for 722,646 new cases, 379,093 deaths, and 11.7 million DALYs. Between 2005 and 2015, incident cases increased by 46%, deaths by 33%, and DALYs by 31%. The increase in cancer incidence was largely driven by population growth and population aging. Breast cancer, lung cancer, and leukemia were the most common cancers, while lung, breast, and stomach cancers caused most cancer deaths.

   Conclusion

   Cancer is responsible for a substantial disease burden in the EMR, which is increasing. There is an urgent need to expand cancer prevention, screening, and awareness programs in EMR countries as well as to improve diagnosis, treatment, and palliative care services.

   Keywords:*eastern mediterranean region, cancer, mortality, incidence, disability-adjusted life years.*

2. Majeed, F., Malik, F. Z., Ahmed, Z., Afreen, A., **Afzal, M. N., & Khalid, N.** (2018). Ginseng phytochemicals as therapeutics in oncology: Recent perspectives. *Biomedicine & Pharmacotherapy*, 100, 52-63. doi: 10.1016/j.biopha.2018.01.155. **(Mohammad Naveed Afzal (SHS), Nauman Khalid)****JCR Listed (IF: 3.457) (Review)**

   Abstract: During the last few decades, cancer has mushroomed as a major health issue; and almost all drugs used for its therapy are very toxic with lethal side effects. Complementary and alternative medicines gain popularity among health professionals in recent era owing to its preventive mechanism against side effect chemotherapeutic drugs. Efforts are focused by scientists to isolate compounds from medicinal plant that have chemotherapeutic attributes; and ability to neutralize the side effects of chemotherapy. Ginseng is an oriental medicinal recipe from Araliceae family and Panax species. The chemotherapeutic effect of ginsenoside is resultant of its appetites, antiproliferative, anti-angiogenic, anti-inflammatory and anti-oxidant properties. The anticancer effect of ginseng is proven in various types of cancer, including; breast, lung, liver, colon and skin cancer. It increases the mitochondrial accumulation of apoptosis protein and downregulate the expression of anti-apoptotic protein. It also aids in the reduction of alopecia, fatigue and nausea, the known side effects of chemotherapeutic drugs. The aim of the present review is to provide the brief review of the recent researches related to mechanism of action of ginseng in different types of cancer as complementary and alternative medicine on different body organs.

   Keywords:*ginseng, phytochemicals, chemotherapy colon, liver, lung, skin cancer.*

3. Roth, G. A., Collaborotors, G. B. D. C. D., Abate, D., Abate, K. H., Abay, S. M., Abbafati, C.**Khalid, N.** . . .**Bacha, U.** (2018). Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries

and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet,* 392(10159), 1736-1788. doi: 10.1016/s0140-6736(18)32203-7.**(Umer Bacha (SHS), Nauman Khalid, JCR Listed (IF: 53.254)**

Abstract:

Background

Global development goals increasingly rely on country-specific estimates for benchmarking a nation's progress. To meet this need, the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2016 estimated global, regional, national, and, for selected locations, subnational cause-specific mortality beginning in the year 1980. Here we report an update to that study, making use of newly available data and improved methods. GBD 2017 provides a comprehensive assessment of cause-specific mortality for 282 causes in 195 countries and territories from 1980 to 2017.

Methods

The causes of death database is composed of vital registration (VR), verbal autopsy (VA), registry, survey, police, and surveillance data. GBD 2017 added ten VA studies, 127 country-years of VR data, 502 cancer-registry country-years, and an additional surveillance country-year. Expansions of the GBD cause of death hierarchy resulted in 18 additional causes estimated for GBD 2017. Newly available data led to subnational estimates for five additional countries—Ethiopia, Iran, New Zealand, Norway, and Russia. Deaths assigned International Classification of Diseases (ICD) codes for non-specific, implausible, or intermediate causes of death were reassigned to underlying causes by redistribution algorithms that were incorporated into uncertainty estimation. We used statistical modelling tools developed for GBD, including the Cause of Death Ensemble model (CODEm), to generate cause fractions and cause-specific death rates for each location, year, age, and sex. Instead of using UN estimates as in previous versions, GBD 2017 independently estimated population size and fertility rate for all locations. Years of life lost (YLLs) were then calculated as the sum of each death multiplied by the standard life expectancy at each age. All rates reported here are age-standardised.

Findings

At the broadest grouping of causes of death (Level 1), non-communicable diseases (NCDs) comprised the greatest fraction of deaths, contributing to 73·4% (95% uncertainty interval [UI] 72·5–74·1) of total deaths in 2017, while communicable, maternal, neonatal, and nutritional (CMNN) causes accounted for 18·6% (17·9–19·6), and injuries 8·0% (7·7–8·2). Total numbers of deaths from NCD causes increased from 2007 to 2017 by 22·7% (21·5–23·9), representing an additional 7·61 million (7·20–8·01) deaths estimated in 2017 versus 2007. The death rate from NCDs decreased globally by 7·9% (7·0–8·8). The number of deaths for CMNN causes decreased by 22·2% (20·0–24·0) and the death rate by 31·8% (30·1–33·3). Total deaths from injuries increased by 2·3% (0·5–4·0) between 2007 and 2017, and the death rate from injuries decreased by 13·7% (12·2–15·1) to 57·9 deaths (55·9–59·2) per 100 000 in 2017. Deaths from substance use disorders also increased, rising from 284 000 deaths (268 000–289 000) globally in 2007 to 352 000 (334 000–363 000) in 2017. Between 2007 and 2017, total deaths from conflict and terrorism increased by 118·0% (88·8–148·6). A greater reduction in total deaths and death rates was observed for some CMNN causes among children younger than 5 years than for older adults, such as a 36·4% (32·2–40·6) reduction in deaths from lower respiratory infections for children younger than 5 years compared with a 33·6% (31·2–36·1) increase in adults older than 70 years. Globally, the number of deaths was greater for men than for women at most ages in 2017, except at ages older than 85 years. Trends in global YLLs reflect an epidemiological transition, with decreases in total YLLs from enteric infections, respiratory infections and tuberculosis, and maternal and neonatal disorders between 1990 and 2017; these were generally greater in magnitude at the lowest levels of the Socio-demographic Index (SDI). At the same time, there were large increases in YLLs from neoplasms and cardiovascular diseases. YLL rates decreased across the five leading Level 2 causes in all SDI quintiles. The

leading causes of YLLs in 1990—neonatal disorders, lower respiratory infections, and diarrhoeal diseases—were ranked second, fourth, and fifth, in 2017. Meanwhile, estimated YLLs increased for ischaemic heart disease (ranked first in 2017) and stroke (ranked third), even though YLL rates decreased. Population growth contributed to increased total deaths across the 20 leading Level 2 causes of mortality between 2007 and 2017. Decreases in the cause-specific mortality rate reduced the effect of population growth for all but three causes: substance use disorders, neurological disorders, and skin and subcutaneous diseases.

Interpretation

Improvements in global health have been unevenly distributed among populations. Deaths due to injuries, substance use disorders, armed conflict and terrorism, neoplasms, and cardiovascular disease are expanding threats to global health. For causes of death such as lower respiratory and enteric infections, more rapid progress occurred for children than for the oldest adults, and there is continuing disparity in mortality rates by sex across age groups. Reductions in the death rate of some common diseases are themselves slowing or have ceased, primarily for NCDs, and the death rate for selected causes has increased in the past decade.

Funding

Bill & Melinda Gates Foundation.

Keywords:*public-health problem, united-states, alzheimers-disease trends, prevalence, prevention, dementia, registration, individuals barriers.*

4. Mokdad, A. H., Charara, R., El Bcheraoui, C., Khalil, I., Moradi-Lakeh, M., Afshin, A., . . . **Bacha, U.**(2018). The burden of mental disorders in the Eastern Mediterranean region, 1990-2015: findings from the global burden of disease 2015 study. *International Journal of Public Health, 63*, 25-37. doi: 10.1007/s00038-017-1006-1. **(Umer Bacha (SHS) JCR Listed (IF: 2.617)**

Abstract: **Objectives**

Mental disorders are among the leading causes of nonfatal burden of disease globally.

Methods

we used the global burden of diseases, injuries, and risk factors study 2015 to examine the burden of mental disorders in the Eastern Mediterranean region (EMR). We defined mental disorders according to criteria proposed in the diagnostic and statistical manual of mental disorders IV and the 10th International Classification   of   Diseases.

ResultsMental disorders contributed to 4.7% (95% uncertainty interval (UI) 3.7–5.6%) of total disability-adjusted life-years (DALYs), ranking as the ninth leading cause of disease burden. Depressive disorders and anxiety disorders were the third and ninth leading causes of nonfatal burden, respectively. Almost all countries in the EMR had higher age-standardized mental disorder DALYs rates compared to the global level, and in half of the EMR countries, observed mental disorder rates exceeded the expected values.**Conclusions**The burden of mental disorders in the EMR is higher than global levels, particularly for women. To properly address this burden, EMR governments should implement nationwide quality epidemiological surveillance of mental disorders and provide adequate prevention and treatment services.

Keywords:*mental health, eastern mediterranean region, burden of disease, depressive disorders, anxiety disorders.*

5. Mokdad, A. H., El Bcheraoui, C., Charara, R., Khalil, I., Moradi-Lakeh, M., Afshin, A., . . . **Bacha, U.**(2018). Danger ahead: the burden of diseases, injuries, and risk factors in the Eastern Mediterranean Region, 1990-2015. *International Journal of Public Health, 63*, 11-23. doi: 10.1007/s00038-017-1017-y. **(Umer Bacha (SHS) JCR Listed (IF: 2.617)**

Abstract:Objectives

The Eastern Mediterranean Region faces several health challenges at a difficult time with wars, unrest, and

economic change.

Methods

We used the Global Burden of Disease 2015 study to present the burden of diseases, injuries, and risk factors in the Eastern Mediterranean Region from 1990 to 2015.

Results

Ischemic heart disease was the leading cause of death in the region in 2015, followed by cerebrovascular disease. Changes in total deaths ranged from a reduction of 25% for diarrheal diseases to an increase of about 42% for diabetes and tracheal, bronchus, and lung cancer. Collective violence and legal intervention increased by 850% during the time period. Diet was the leading risk factor for disability-adjusted life years (DALYs) for men compared to maternal malnutrition for females. Childhood undernutrition was the leading risk factor for DALYs in 1990 and 2005, but the second in 2015 after high blood pressure.

Conclusion

Our study shows that the region is facing several health challenges and calls for global efforts to stabilise the region and to address the current and future burden of disease.

Keywords:*burden of disease, eastern mediterranean region, injuries risk factors, disability-adjusted life years.*

6. Mokdad, A. H., El Bcheraoui, C., Wang, H. D., Charara, R., Khalil, I., Moradi-Lakeh, M., . . . **Bacha, U.** (2018). Trends in HIV/AIDS morbidity and mortality in Eastern Mediterranean countries, 1990-2015: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health, 63*, 123-136. doi: 10.1007/s00038-017-1023-0.**(Umer Bacha (SHS)JCR Listed (IF:2.617)**

Abstract:Objectives

We used the results of the Global Burden of Disease 2015 study to estimate trends of HIV/AIDS burden in Eastern Mediterranean Region (EMR) countries between 1990 and 2015.

Methods

Tailored estimation methods were used to produce final estimates of mortality. Years of life lost (YLLs) were calculated by multiplying the mortality rate by population by age-specific life expectancy. Years lived with disability (YLDs) were computed as the prevalence of a sequela multiplied by its disability weight.

Results

In 2015, the rate of HIV/AIDS deaths in the EMR was 1.8 (1.4–2.5) per 100,000 population, a 43% increase from 1990 (0.3; 0.2–0.8). Consequently, the rate of YLLs due to HIV/AIDS increased from 15.3 (7.6–36.2) per 100,000 in 1990 to 81.9 (65.3–114.4) in 2015. The rate of YLDs increased from 1.3 (0.6–3.1) in 1990 to 4.4 (2.7–6.6) in 2015.

Conclusion

HIV/AIDS morbidity and mortality increased in the EMR since 1990. To reverse this trend and achieve epidemic control, EMR countries should strengthen HIV surveillance, and scale up HIV antiretroviral therapy and comprehensive prevention services.

Keywords:*HIV, HIV mortality, eastern mediterranean region, burden of disease.*

7. Mokdad, A. H., Khalil, I., Collison, M., El Bcheraoui, C., Charara, R., Moradi-Lakeh, M., . . . **Bacha, U.**(2018). Maternal mortality and morbidity burden in the Eastern Mediterranean Region: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health, 63*, 47-61. doi: 10.1007/s00038-017-1004-3. **(Umer Bacha (SHS) JCR Listed (IF: 2.617)**

Abstract:Objectives

Assessing the burden of maternal mortality is important for tracking progress and identifying public health gaps. This paper provides an overview of the burden of maternal mortality in the Eastern Mediterranean Region (EMR) by underlying cause and age from 1990 to 2015.

Methods

We used the results of the Global Burden of Disease 2015 study to explore maternal mortality in the EMR countries.

Results

The maternal mortality ratio in the EMR decreased 16.3% from 283 (241–328) maternal deaths per 100,000 live births in 1990 to 237 (188–293) in 2015. Maternal mortality ratio was strongly correlated with socio-demographic status, where the lowest-income countries contributed the most to the burden of maternal mortality in the region.

Conclusion

Progress in reducing maternal mortality in the EMR has accelerated in the past 15 years, but the burden remains high. Coordinated and rigorous efforts are needed to make sure that adequate and timely services and interventions are available for women at each stage of reproductive life.

Keywords:*maternal mortality, maternal health, eastern mediterranean, region burden of disease.*

8. Mokdad, A. H., Khalil, I., El Bcheraoui, C., Charara, R., Moradi-Lakeh, M., Afshin, A., . . . **Bacha, U.**(2018). Burden of diarrhea in the Eastern Mediterranean Region, 1990-2015: Findings from the Global Burden of Disease 2015 study. *International Journal of Public Health*, 63, 109-121. doi: 10.1007/s00038-017-1008-z. **(Umer Bacha (SHS)** **JCR Listed (IF: 2.617)**

Abstract:Objectives

Diarrheal diseases (DD) are an important cause of disease burden, especially in children in low-income settings. DD can also impact children's potential livelihood through growth faltering, cognitive impairment, and other sequelae.

Methods

As part of the Global Burden of Disease study, we estimated DD burden, and the burden attributable to specific risk factors and etiologies, in the Eastern Mediterranean Region (EMR) between 1990 and 2015. We calculated disability-adjusted life-years (DALYs)—the sum of years of life lost and years lived with disability—for both sexes and all ages.

Results

We estimate that over 103,692 diarrhea deaths occurred in the EMR in 2015 (95% uncertainty interval: 87,018–124,692), and the mortality rate was 16.0 deaths per 100,000 persons (95% UI: 13.4–19.2). The majority of these deaths occurred in children under 5 (63.3%) (65,670 deaths, 95% UI: 53,640–79,486). DALYs per 100,000 ranged from 304 (95% UI 228–400) in Kuwait to 38,900 (95% UI 25,900–54,300) in Somalia.

Conclusion

Our findings will guide evidence-based health policy decisions for interventions to achieve the ultimate goal of reducing the DD burden.

Keywords:*eastern mediterranean region, burden of disease, diarrheal diseases.*

9. Mokdad, A. H., Moradi-Lakeh, M., El Bcheraoui, C., Charara, R., Khalil, I., Afshin, A., . . . **Bacha, U.**(2018). Burden of lower respiratory infections in the Eastern Mediterranean Region between 1990 and 2015: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health, 63*, 97-108. doi: 10.1007/s00038-017-1007-0. **(Umer Bacha (SHS)** **JCR Listed (IF: 2.617)**

Abstract:Objectives

We used data from the Global Burden of Disease 2015 study (GBD) to calculate the burden of lower respiratory infections (LRIs) in the 22 countries of the Eastern Mediterranean Region (EMR) from 1990 to 2015.

Methods

We conducted a systematic analysis of mortality and morbidity data for LRI and its specific etiologic factors, including pneumococcus, Haemophilus influenzae type b, Respiratory syncytial virus, and influenza virus. We

used modeling methods to estimate incidence, deaths, and disability-adjusted life-years (DALYs). We calculated burden attributable to known risk factors for LRI.

Results

In 2015, LRIs were the fourth-leading cause of DALYs, causing 11,098,243 (95% UI 9,857,095–12,396,566) DALYs and 191,114 (95% UI 170,934–210,705) deaths. The LRI DALY rates were higher than global estimates in 2015. The highest and lowest age-standardized rates of DALYs were observed in Somalia and Lebanon, respectively. Undernutrition in childhood and ambient particulate matter air pollution in the elderly were the main risk factors.

Conclusion

Our findings call for public health strategies to reduce the level of risk factors in each age group, especially vulnerable child and elderly populations.

Keywords: *lower respiratory, infection incidence, mortality daly, eastern mediterranean region.*

10. Mokdad, A. H., Moradi-Lakeh, M., El Bcheraoui, C., Khalil, I., Charara, R., Afshin, A., . . . **Bacha, U.**(2018). Diabetes mellitus and chronic kidney disease in the Eastern Mediterranean Region: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health, 63*, 177-186. doi: 10.1007/s00038-017-1014-1.**(Umer Bacha (SHS)** **JCR Listed (IF: 2.617)**

Abstract:Objectives

We used findings from the Global Burden of Disease 2015 study to update our previous publication on the burden of diabetes and chronic kidney disease due to diabetes (CKD-DM) during 1990–2015.

Methods

We extracted GBD 2015 estimates for prevalence, mortality, and disability-adjusted life years (DALYs) of diabetes (including burden of low vision due to diabetes, neuropathy, and amputations and CKD-DM for 22 countries of the EMR from the GBD visualization tools.

Results

In 2015, 135,230 (95% UI 123,034–148,184) individuals died from diabetes and 16,470 (95% UI 13,977–18,961) from CKD-DM, 216 and 179% increases, respectively, compared to 1990. The total number of people with diabetes was 42.3 million (95% UI 38.6–46.4 million) in 2015. DALY rates of diabetes in 2015 were significantly higher than the expected rates based on Socio-demographic Index (SDI).

Conclusion

Our study showed a large and increasing burden of diabetes in the region. There is an urgency in dealing with diabetes and its consequences, and these efforts should be at the forefront of health prevention and promotion.

Keywords: *diabetes chronic, kidney disease, burden of disease, eastern mediterranean region.*

11. Mokdad, A. H., Safi, S., Ahmadieh, H., Katibeh, M., Yaseri, M., Ramezani, A., . . . Reg, **Bacha, U.**(2018). Burden of vision loss in the Eastern Mediterranean region, 1990-2015: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health, 63*, 199-210. doi: 10.1007/s00038-017-1000-7. **(Umer Bacha (SHS)** **JCR Listed (IF: 2.617)**

Abstract:Objectives

To report the estimated trend in prevalence and years lived with disability (YLDs) due to vision loss (VL) in the Eastern Mediterranean region (EMR) from 1990 to 2015.

Methods

The estimated trends in age-standardized prevalence and the YLDs rate due to VL in 22 EMR countries were extracted from the Global Burden of Disease (GBD) 2015 study. The association of Socio-demographic Index (SDI) with changes in prevalence and YLDs of VL was evaluated using a multilevel mixed model.

Results

The age-standardized prevalence of VL in the EMR was 18.2% in 1990 and 15.5% in 2015. The total age-standardized YLDs rate attributed to all-cause VL in EMR was 536.9 per 100,000 population in 1990 and 482.3 per 100,000 population in 2015. For each 0.1 unit increase in SDI, the age-standardized prevalence and YLDs rate of VL showed a reduction of 1.5% ($p < 0.001$) and 23.9 per 100,000 population ($p < 0.001$), respectively.

Conclusion

The burden of VL is high in the EMR; however, it shows a descending trend over the past 25 years. EMR countries need to establish comprehensive eye care programs in their health care systems.

Keywords:*eastern mediterranean region, global burden of disease, vision, impairment, vision disorder.*

12. Mokdad, A. H., Tehrani-Banihashemi, A., Moradi-Lakeh, M., El Bcheraoui, C., Charara, R., Khalil, I., . . . **Bacha, U.** (2018). Burden of cardiovascular diseases in the Eastern Mediterranean Region, 1990-2015: findings from the Global Burden of Disease 2015 study. *International Journal of Public Health*, 63, 137-149. doi: 10.1007/s00038-017-1012-3.**(Umer Bacha (SHS)**JCR Listed (IF: 2.617)

Abstract:Objectives

To report the burden of cardiovascular diseases (CVD) in the Eastern Mediterranean Region (EMR) during 1990–2015.

Methods

We used the 2015 Global Burden of Disease study for estimates of mortality and disability-adjusted life years (DALYs) of different CVD in 22 countries of EMR.

Results

A total of 1.4 million CVD deaths (95% UI: 1.3–1.5) occurred in 2015 in the EMR, with the highest number of deaths in Pakistan (465,116) and the lowest number of deaths in Qatar (723). The age-standardized DALY rate per 100,000 decreased from 10,080 in 1990 to 8606 in 2015 (14.6% decrease). Afghanistan had the highest age-standardized DALY rate of CVD in both 1990 and 2015. Kuwait and Qatar had the lowest age-standardized DALY rates of CVD in 1990 and 2015, respectively. High blood pressure, high total cholesterol, and high body mass index were the leading risk factors for CVD.

Conclusion

The age-standardized DALY rates in the EMR are considerably higher than the global average. These findings call for a comprehensive approach to prevent and control the burden of CVD in the region.

Keywords:*cardiovascular disease, burden of disease eastern mediterranean region.*

13. **Murtaza, G.,** Mehmood, S., Rasul, S., Murtaza, I., & Khan, E. U. (2018). Dosimetric effect of limited aperture multileaf collimator on VMAT plan quality: A study of prostate and head-and-neck cancers. *Reports of Practical Oncology and Radiotherapy, 23*(3), 189-198. doi: 10.1016/j.rpor.2018.02.006. **(Ghulam Murtaza (SHS) (SJR)**

Abstract:Aim

The aim of study was to evaluate the dosimetric effect of collimator-rotation on VMAT plan quality, when using limited aperture multileaf collimator of Elekta Beam Modulator™ providing a maximum aperture of 21 cm × 16 cm.

Background

The increased use of VMAT technique to deliver IMRT from conventional to very specialized treatments present a challenge in plan optimization. In this study VMAT plans were optimized for prostate and head and neck cancers using Elekta Beam-ModulatorTM, whereas previous studies were reported for conventional Linac aperture.

Materials and methods

VMAT plans for nine of each prostate and head-and-neck cancer patients were produced using the 6 MV photon beam for Elekta-SynergyS® Linac using Pinnacle3 treatment planning system. Single arc, dual arc and

two combined independent-single arcs were optimized for collimator angles (C) 0°, 90° and 0°–90° (0°–90°; i.e. the first-arc was assigned C0° and second-arc was assigned C90°). A treatment plan comparison was performed among C0°, C90° and C(0°–90°) for single-arc dual-arc and two independent-single-arcs VMAT techniques to evaluate the influence of extreme collimator rotations (C0° and 90°) on VMAT plan quality. Plan evaluation criteria included the target coverage, conformity index, homogeneity index and doses to organs at risk. A 'two-sided student t-test' ($p \leq 0.05$) was used to determine if there was a significant difference in dose volume indices of plans.

Results

For both prostate and head-and-neck, plan quality at collimator angles C0° and C(0°–90°) was clinically acceptable for all VMAT-techniques, except SA for head-and-neck. Poorer target coverage, higher normal tissue doses and significant p-values were observed for collimator angle 90° when compared with C0° and C(0°–90°).

Conclusion

A collimator rotation of 0° provided significantly better target coverage and sparing of organs-at-risk than a collimator rotation of 90° for all VMAT techniques.

Keywords:*VMAT, Treatment planning, Collimator rotation, Limited aperture MLC.*

14. Imran, S., &**Tanweer, A.** (2018). Nutritional Assessment of Celiac Patients of Pakistan. *Pakistan Journal of Zoology*, 50(2), 619-627. doi: 10.17582/journal.pjz/2018.50.2.619.627. **(Afifa Tanweer (SHS) (SJR)**

Abstract: The present study aimed to assess the association of various demographic and dietary factors with the nutritional status of Pakistani celiac patients. For this purpose 50 diagnosed celiac patients were selected from Shaikh Zayed Medical Complex and Mayo Hospital, Lahore. Nutritional assessment was carried out through anthropometric, biochemical and dietary evaluation of the participants. Results indicated that participants aged less than 18 years and those diagnosed within first year of life, had significantly healthier body dimensions. Higher family income, female gender and greater meal satisfaction was found to be associated with better biochemical indices. Most participants reported partial compliance to GFD. Compliant participants reported an increased consumption of junk food whereas, non-compliant patients, consumed significantly higher intakes of meat and fat. Regular intake of carbonated beverages, packaged juices and tea by the participants was associated with poor anthropometric measurements. Contrary to the study hypothesis, increased compliance to GFD and other demographic and dietary factors were not found to be associated with improved nutritional status of the study participants. Results of the present study clearly indicated that the nutritional status of celiac patients could not be predicted exclusively on the factors identified for the normal population. These findings call for an integrated interventional approach for the dietary management of celiac patients. Focusing on detailed nutrition education along with ensuring the availability of healthy and affordable gluten free choices, instead of merely emphasizing on compliance to gluten free diet, may ensure good nutritional status of Pakistani celiac patients.

Keywords:*celiac disease, gluten free diet, nutritional assessment, nutritional status, compliance.*

15. Sadaf, S., **Malik, A. A.,** Bilal, A., & Saeed, A. (2018). Patient Satisfaction Regarding Food and Nutrition Care in Hospitals of Lahore, Pakistan. *Progress in Nutrition*, 20, 248-256. doi: 10.23751/pn.v20i2-S.5855.**(AhmedAzam Malik (SHS)JCR Listed (IF: 0.323)**

Abstract: Background: Patient satisfaction surveys regarding nutritional services reflect an overall standard of health; and are necessary to highlight patient concerns. The objective of the current study was to assess patient satisfaction regarding food and nutrition care in hospitals of Lahore, Pakistan. Methods: A cross sectional survey was conducted at two purposefully selected Government tertiary care hospitals. Four hundred patients fulfilling inclusion criteria were enrolled consequently after taking written informed consent. Data on demography was collected through a pretested, structured questionnaire. A validated and reliable

instrument "Acute Care Patient Satisfaction Questionnaire" in local language was administered to the patients. Descriptive and inferential statistics were applied accordingly using SPSS version 17. Results: Majority of the patients was aged between 31- 50 years (n=200, 50%). 210 (52.6%) females and 129 (47.3%) male were included in the final sample. Overall 71% and 50 % patients were not satisfied in Sheikh Zayed Hospital and Mayo Hospital respectively (p = <0.001). Logistic regression analysis revealed the level of satisfaction; hospital food (OR=1.724, CI=1.11-2.69, p=0.016*), crockery (OR = 0.948, CI = 0.67-1.33, p=0.0760), staff hygiene (OR= 0.467, CI 0.27-0.80, p=0.006), hospital smell (OR = 0.712, CI 0.49-1.03, p=0.073), disturbance by noise (OR =1.083, CI = 0.76- 1.54, p=0.016*), cooking methods (OR = 1.310, CI = 0.91- 1.89, p=0.015*), meal taste (OR 1.198, CI= 0.79-1.81,p=0.394), staff behavior (OR =1.035, CI = 0.61-1.77, p=0.900), portion sizes (OR =0.996, CI= 0.73-1.35, p=0.979), temperature of food (OR = 1.065, CI = 055-1.83, p=0.851), quality of food (OR= 1.581, CI = 1.09- 1.46, p=0.160), satiety (OR = 0.956, CI = 0.61- 1.36, p=0.847). Conclusion: It can be concluded that patients were dissatisfied with food and nutritional services. Thus, hospitals must raise their standards of services as indicated by patient's feedback in these categories i.e. increased menu items, opportunity of food choice, improved quantity and quality of food, improved physical environment of the wards and staff hygiene.
Keywords: *patient satisfaction, food services, government and Pakistan.*

School of Architecture & Planning (SAP)
Department of Architecture & Planning
Research Articles

1. **Gulzar, S.**,& Burg, J.-P. (2018). Preliminary investigation of late Mughal period wall paintings from historic monuments of Begumpura, Lahore. *Frontiers of Architectural Research, 7*(4), 465-472. doi: 10.1016/j.foar.2018.08.001.**(Saima Gulzar (SAP)(SJR)**

Abstract: Deterioration of wall paintings caused by environmental pollution is a worldwide problem especially with reference to the present industrial era. The alarming incremental trend of pollution in Pakistan has threatened the cultural assets. The deposition of pollutants on historic fabric is the main source of chemical and mineralogical alterations of wall paintings. The present diagnostic study investigated the main deterioration mechanisms affecting wall paintings of the late Mughal period, in the Begumpura Complex, in Lahore. Micro samples were characterized by XRD and SEM-EDS to identify deterioration products and understand deterioration mechanisms prevalent at the heritage site. The results revealed that red ocher, green earth and calcium carbonate were initially used for red, green and white pigments, respectively. Sodium chloride (halite, NaCl) and gypsum ($CaSO_4 \cdot 2H_2O$) were identified as the main deterioration products.

Keywords:*deterioration, wallpainting, BegumpuraLahore.*

2. **Salman, M., Malik, S., Tariq, F., & Khilat, F.** (2018). Conservation analysis of Gali Surjan Singh: a study of architectural and social aspects. *Journal of Architectural Conservation, 24*(2), 134-151. doi: 10.1080/13556207.2018.1488203.**(Muhammad Salman(SAP), Sana Malik, Fariha Tariq, Faiqa Khilat)ISI Web of Science**

Abstract: Heritage sites and buildings are of vital importance. Study of such heritage sites unfolds exciting information about the history of early civilizations and, most importantly, the architecture of that era. Like other South Asian countries, Pakistan is also rich with heritage sites and buildings. Unfortunately, these heritage sites and buildings have mostly been ignored by the concerning authorities. Recently, a conservation program named as the Royal Trail at Dehli Gate section of Walled City, Lahore was launched through the collaboration of the Punjab Government and the Agha Khan Trust for Culture (AKTC), purpose of which was to revitalize the residential architecture and quality of social life of the Gali Surjan Singh by incorporating

community participation for conducting the conservation in a sustainable manner. Primarily data has been collected through questionnaires and informal interviews of the residents. An in-depth comparison of the area before, during and after conservation is also included in the layout of conducted research. The aim is to study changes in the physical and social dimensions of the constructed environment of Gali Surjan, which resulted from the intervention of the conservation program. The documented pre- and post-conservation changes mark the significance of the study.

Keywords:*conservation, social conditions, architecture, traditional housing, walled city Lahore.*

3. **Gul, A., Nawaz, M.,** Basheer, M. A., **Tariq, F**., & Raheel Shah, S. A. (2018). Built houses as a tool to control residential land speculation - A case study of Bahria Town, Lahore. *Habitat International,* 71, 81-87. doi: https://doi.org/10.1016/j.habitatint.2017.11.007. **(Areesha Gul (SAP),Minahil Nawaz, Fariha Tariq)JCR Listed (IF: 3.000)**

Abstract: Lahore City, on its way of becoming a Metropolis, has created serious urban problem of inadequate housing. In response to rapidly increasing housing deficit, the Government has now incorporated private developers. In this regard, Bahria Town has emerged as a big real estate brand causing land speculation. Land, which was used to bea resource, has now become a commodity. This paper investigates emerging trends, in the local real estate market by comparing speculation of residential serviced plots and built houses. In addition to that, it will also dig out respective causes and impacts on the price variances particularly in Bahria Town Lahore. The research presents that providing built houses instead of serviced plots in Bahria Town Lahore has been an effective tool in controlling residential land speculation and, hence, directly cutting down the demand for housing.

Keywords:*cities, housing real estate, land-use, urban sprawl, Bahria Town.*

4. **Tariq, F., Zafar, Z., Salman, M., Hasan, J.**, Nawaz, M., Gul, A., . . . Sheikh, N. B. (2018). Developing Countries Perspective on Housing Affordability: Recommendations for Pakistan. *Technical Journal (UET),* 23(02), 1-10.**(Fariha Tariq (SAP)Zunaira Zafar, Muhammad Salman, Javeria Hasan)HEC Y CAT**

Abstract: The rapid urbanization during the last few decades has created severe problems of housing especially in the major cities of Pakistan. Housing shortage and enormous rise in housing prices create unaffordability of housing. Most of the people in Pakistan are suffering from housing unaffordability even after allocating major portion of their incomes on housing. The focus of this paper is to identify the factors impeding housing affordability in different developing countries. Different parameters have been identified; these include location, design efficiency, construction material, infrastructure, services, neighborhood design and financial assistance. This paper highlights, how all these parameters could be made effective in order to realize the goal of making housing affordable.

Keywords:*housing affordability, housing need, housing supply, housing demand, affordability standards.*

5. **Gulzar, S.,** & Burg, J.-P. (2018). Investigations on Limestones used in Historic Monuments in Shahdara, Lahore-Pakistan. *Transylvanian Review, 1*(1). **(Saima Gulzar (SAP)(SJR)**

Abstract: The weathering of built heritage has always been attributed to the cumulative impact of natural and anthropogenic activities over the centuries. This complex interaction has resulted into the physical, chemical and biological deterioration of historic materials which need examination to understand the weathering factors, mechanisms and products. The conservation and restoration of these historic monuments revealed to be extremely difficult under the present days of activated deterioration, even more in developing countries like Pakistan, where the lack of information and research on historic materials is one of the major reasons for past failures in conservation and restoration efforts in Pakistan. The present investigation concerns the identification of various types of limestone's used in the historic monuments in

Shahdara, Lahore (Pakistan) including Jahangir Tomb, Asif Khan Tomb, Nur Jahan Tomb and Akbari- Serai. Materials and Methods: The sampled limestones were analyzed by optical microscopy and X-ray powder diffraction for the identification of mineralogical phases. Major elemental content in addition to trace elemental analyses were measured by X-ray fluorescence. Results: The analytical study characterized the sampled limestones into seven type's i-e nummulitic limestone, abri limestone, cloudy limestone, grey carbonaceous limestone, black carbonaceous limestone, cloudy limestone (local) and black limestone. Conclusions: This classification is the first step towards the formulation of effective conservation and restoration framework for the heritage site and hence the insurance for long-term survival of the Pakistani heritage.

Keywords:*safety Issues ATX 1, CAG repeat, CAT break, Heroic Epos, SCA1. BASNEF Model, Health Education, Mode of Delivery, Iran Direct Selling Entrepreneurship FDG PET-CT, FCH PET-CT, HER-ve, HER+ve, breast cancer Hypoxic-ischemic encephalopathy Image quality Independent PET Marketing strategies Newborn Occupational health Postpartum Depression Puerpera Quantification SUV Spain Sunshine Hours, Clouds, Rain, Pakistan Stock Returns ascites, broiler, nucleotide, excess salt e-Commerce weld bead geometry, GMAW, welding parameters, linear regression.*

6. **Gulzar, S.** (2018). Scientific examination of historic black stones from the 17th century Mughal architecture. *Transylvanian Review*.**(Saima Gulzar (SAP) (SJR)**

Abstract: The historic fabric should be preserved in their original styles and materials. The replacement materials should be carefully selected in terms of physical, chemical, mechanical and aesthetic compatibility. Therefore the present study characterized the historic black colored stones from the 17th century Mughal architecture. The collected samples were initially studied with optical microscopy and X-ray powder diffraction which was further supplemented by SEM-EDS. The chemical compositions were further elaborated with XRF and inductively coupled plasma atomic emission spectroscopy to measure the major element content in addition to trace elemental analysis. The results showed that there were two different groups of black stones (Group-I Limestones' and Group-II Slates) used in the historic structures of Shahdara-Lahore, Pakistan.

Keywords: *safety Issues ATX 1, CAG repeat, CAT break, Heroic Epos, SCA1. BASNEF Model, Health Education, Mode of Delivery, Iran Direct SellingEntrepreneurship FDG PET-CT, FCH PET-CT, HER-ve, HER+ve, breast cancer Hypoxic-ischemic encephalopathy Image qualityIndependent PET Marketing strategiesNewborn Occupational health Postpartum Depression Puerpera Quantification SUV SpainSunshine Hours, Clouds, Rain, Pakistan Stock Returns ascites, broiler, nucleotide, excess salte-Commerce weld bead geometry, GMAW, welding parameters, linear regression.*

7. Malik, S., **Khilat, F., Tariq, F.,**& Ariffin, K. (2018). NCIA-AMB Masuk kampung project: a paradigm of opportunities and challenges for sustainable rural development. *Planning Malaysia Journal, 16*(7).**(Faiqa Khilat (SAP), Fariha Tariq)(SJR)**

Abstract: Malaysian government is focused to accomplish world-class living standard of whole nation by year 2025 through sustainable development irrespective of regional, religious and ethnic boundaries. The Northern Corridor Implementation Authority (NCIA) is an organization set up for the implementation of Koridor Utara (Northern Corridor Economic Region, NCER) in Malaysia for achieving this vision. Such economic corridors are aimed to elevate the income levels through agriculture, manufacturing, logistics, education and tourism. The execution of development projects always impact the involved community in multiple dimensions. Masuk Kampung Project at Pantai Murni, Yan Kedah was one of the NCIA initiatives in collaboration with AMB (Akademi Binaan Malaysia). This paper draws out a conceptual framework of community perceptions associated with this project based on qualitative research. Viewpoints studied through interviews and participant observation helped in fabricating the opportunities and challenges

connected with rural development. Findings revealed that community perception is of key importance and their prime reflections can be beneficial to policy makers, stakeholders, academicians and civil society in shaping the policy agenda for future projects of same nature in Malaysia. Hence, the study is a contribution to understanding development projects aiming at rural areas on national and global channels.

Keywords:*sustainability, rural development, economic conditions, sustainable tourism, community perceptions.*

8. **Malik, A. M., & Awan, M. Y.** (2018). A Review of Energy Proficient Buildings as a strategy towards Energy conservation in Pakistan. *Technical Journal, University of Engineering and Technology (UET) Taxila*, 23(1). **(Ayesha Mehmood Malik (SAP), Muhammad Yusuf Awan)**HEC Y CAT

Abstract: With increasing population demands, there is a constant noticeable need for energy supply. In this scenario various methods have been devised to meet these energy demands to ensure its viable resource. There has been a noticeable energy crisis situation in many countries like Pakistan that has badly affected its financial and developmental stability. This paper aims to first review the efforts that are being made by the related departments to address this dilemma based upon the conservation policies and building bylaws followed by discussion on key areas like building design, layout and orientation, thermal insulation and day lighting as parameters to be addressed in this area of research. This study is an effort to highlight the need of energy proficient buildings, thus making our cities energy proficient cities and other solutions in Pakistan keeping in view of the energy preservation and proficiency as architectural design solutions. The research concludes that the devising energy proficient buildings thus developing energy proficient cities in Pakistan we can save significant energy for our daily use that will affect our economy directly.

Keywords:*energy crisis, building orientation, daylighting, energy proficient buildings.*

9. **Malik, A. M., Rashid, M., Haider, S. S., & Jalil, A.** (2018). A study of the conservation significance of pirzada mansion, Lahore, Pakistan. *Journal of Research in Architecture & Planning.* 24(1).**(Ayesha Mehmood Malik (SAP), Memoona Rashid, Syed Sajjad Haider, Adnan Jalil)** HEC Y CAT

Abstract: Built heritage is not merely about living quarters but they also reflect the living standards cultural norms and values of any society. These old built heritage give references to the past the way people used to live and their living arrangements. This is done by understanding the spatial layouts of that particular built heritage. This research aims to focus on documenting a historic building from the British colonial period located in the old historic walled city of Lahore to highlight the need and significance of conservation of these historical buildings of this time that are neglected and under threat. The method of research adopted in this paper was to document this building as descriptive and ethnographic analysis via photographic surveys, questionnaires, interviews from authorities(WCLA) and local residents and several site visits were done for a detailed documentation of the structure. The results show that like many old structures that are under threat of getting destroyed as by the will of the proprietors to get replaced with new structures with new needs. This papers aims to be helpful in identifying the aesthetics and structural threats and other aspects of the Pirzada Mansion which is a splendid example of the British colonial period yet is under threat of getting lost with time and with the new structures thus losing its identity and is in need for a proper conservation.

Keywords:*pirzada mansion, Lahore walled city, deterioration, damage, conservation significance.*

10. **Mahmood, T., Gulzar, S., & Awan, M. Y.** (2018). An Analytical Study of Colonial and Contemporary Bricks from the Buildings of Lahore, Pakistan. *Journal of Research in Architecture & Planning, 24*(1).**(Tahir Mahmood (SAP), Saima Gulzar, Muhammad Yusuf Awan)**HEC Y CAT

Abstract: The British colonial buildings in city of Lahore were mainly constructed with fair face bricks. The different forms and decorative styles of bricks were used in the building façade that formed the characteristic British Colonial Style. This study is focused on the comparative analysis of thecontemporary and colonial bricks for their durability and salt deposits in the present scenario. The representative brick samples were collected from the selected buildings for their physical, mechanical and chemical testing to generate data for comparative analysis in addition to the visual examination of buildings for the study of deterioration factors. The results clearly depicted that the contemporary bricks composition and manufacturing technique is different from the colonial bricks. The high content of soluble salts in the contemporary bricks was found to be responsible for salt deposits in contemporary bricks and one of the main cause of failure in the restoration works of the Colonial buildings.
Keywords:*colonial, contemporary, bricks, Lahore, Pakistan.*

11. **Tariq, F., Salman, M., Hasan, J., Zafar, Z.,** Malik, S., Nawaz, M., . . . Sheikh, N. B. (2018). Appraisal of National Housing Policy-A Case of Pakistan. *Technical Journal,* 23(03), 1-8.**(Fariha Tariq (SAP), Muhammad Salman, Javeria Hasan, Zunaira Zafar)**HEC Y CAT

Abstract: Housing backlog, being a global commonality, is the biggest outcome of continued urbanization. Land, infrastructure, finance, administrative bodies, real estate markets and most importantly role of government are most significant factors in this regard, and the tool through which the Governments intervene is usually known as housing guideline or housing policy. Through a critical study of housing policies of many countries, this paper emphasize the importance of a concrete housing policy and will develop the basis on which housing guidelines can be worked out. In case of Pakistan, National Housing Policy 2001 is analyzed. The factors that hindered the proper implementation are also highlighted. This paper attempts to put forward some recommendations that can be a part of Pakistan's housing policy. Hence, this research tries to shape up the housing guidelines in order to make housing more affordable.

Conference Papers

1. **Gulzar, S.** (2018). *Energy conservation in the traditional houses of the walled city Lahore, Pakistan*. Paper presented at the 250th International Conference on Science, Technology, Engineering and Management (ICSTEM), Oxford, United Kingdom. http://www.worldresearchlibrary.org/up_proc/pdf/1664-15349280857.pdf. **(Saima Gulzar (SAP)**

Abstract: The modern architecture employing the energy and resource intensive designs is one of the major environmental pollution contributors resulting into thedepletion of ozone layer and global warming around the world. The mechanical cooling, heating, lighting and ventilation systems commonly used in the modern architecture act as the micro climate modifiers and generate localized harmful environmental impacts. However,the integration of natural sources of heating, cooling, lighting and ventilation in the building designs through passive systems is the only solution forbuilding energy conservation. The traditional houses located in the historic Walled City of Lahore were studied for the natural energy flows through solar radiation, air, vegetation and landscaping etc. for the provision of thermal and visual comfort to the inhabitants. This research paper is focused on the Low Energy Architectural Techniques study and implementation in the Modern era to conserve energy for future generations.

2. **Gulzar, S.** (2018). *Creation of a public space: An expression of generosity and a catalyst for change in the built environment*. Paper presented at the Generosity:An international conference at the Welsh School of Architecture, Cardiff, Wales, UK.
https://www.cardiff.ac.uk/__data/assets/pdf_file/0006/1213449/Generosity_Abstract-Book.pdf. **(Saima Gulzar,(SAP)**

Abstract: This is also reflected in the deteriorated urban environment in the form of fragmented built spaces, isolated structures and conflicted open spaces. In the present scenario, there is a need to authenticate the environments through urban existence philosophy by creating generous spaces that acts as a network for exchange between the environment, culture and the built forms. This research is focused on the analytical study of generosity in architecture from historic to modern times. The interpretation of this concept is analysed through a project of Greater Iqbal Park, Lahore in the form of a large public space available to all people. This particular project changed the built environment of the area based on the principles of urban generosity including the pleasure-seeking, physically connecting, uniquely capable of forming relationships, vehicle for opening dialogues, vision and reality.

3. **Tariq, F.**, Nawaz, M., Gul, A., ... & Sheikh, N. B. (2018). *Highlighting Urban Planning Issues of Pakistan and Emphasizing the Role of Planners through Workshop Technique*. Presented at IASTEM. Washington DC, USA. 21-22 November, 2018. **(Fariha Tariq(SAP)**

Abstract: The urban planners, generally, focus on making a city physically resourceful, economically efficient, and environmentally sustainable. They analyze and research to improve already built environment and add new additions, if necessary. Unfortunately, in Pakistan, planners are not consulted before most of urban development projects, thereby ignoring and not coordinating with various planning departments, the decisions of government will become nothing but a blot on the future of already blighted cities. There is a dire need to empower the planning profession in order to improve urban contexts of our country. Sharing the field knowledge via hands-on workshops is a solution to better engage planners and help policy makers to internalize the findings. The Department of City and Regional Planning at University of Management and Technology, have gathered planners from all over Pakistan and asked for major planning issues and their subsequent suggestions to resolve these issues. Highlighted in the workshop, most of the core problems are related to housing, transportation and sustainable development. The paper is basically to channelize the findings of a workshop aiming at fostering discussions on urban issues among the professionals who are the ultimate stakeholders. Focusing on a multidimensional urban phenomenon, the paper aims to deepen the understanding of contemporary urban issues of Pakistan leading towards the solutions to be adopted by government officials to advance ultimately progress and sustainability.
Keywords:_built environment, decision making, planning, planning practices._

4. **Tariq, F.**, Salman, S. (2018). *Flood Disaster Management: A Case Study of Model Villages in South Punjab*. Presented at 4th Asia International Conference 2018. Langkawi, Malaysia. 8 December 2018. **(Fariha Tariq (SAP)**

Abstract: Natural disasters have caused massive destruction all over the Pakistan in recent years, among these disasters the Earthquake of 2005, Landslide in Hunza and Floods of 2010 are notable. Floods in 2010 affected hundreds of villages in Punjab, which resulted in 0.5 Million destroyed houses in South Punjab only. In response to these floods, 22 Model Villages were set up in affected Southern Districts and devastated communities were given shelter in these villages. This research focuses on district of Muzaffargarh and aims to study the deliverance mechanism of these shelter units, the impacts of providing these units on the lifestyle of inhabitants and if Model Villages are truly contributing towards disaster risk mitigation or not. Along with aforesaid purposes, this research also tries to address aspects of community participation, community empowerment and liberty given to end users, in designing and building their own houses, as these approaches ensure post disaster psychological recovery, reduced vulnerability towards disasters and reflect cultural and traditional character in final product. Data from both primary and secondary sources, available statistics, case studies, field surveys and interviews, has been used to carry out this research. Which

contains statistics of damage caused by floods before provision of model villages, the differences recorded after provision of model villages and role of communities in disaster mitigation and colonization data which reflects the current scenario of these units. Eventually, based on the performance of these model villages, the paper lists out the flaws present in this rehabilitation model and puts forward recommendation to govern the disaster risk and to boost the role of community in disaster preparedness and post disaster recovery.

5. **Tariq, F.**, Bagatt, K.F. (2018).*Affordable Housing: An Agenda of New Regime Challenges and the Way Forward*. Presented in 3rd IBCE on Architecture, Planning and Construction in Expo, 24th October,2018. **(Fariha Tariq (SAP)**

Abstract: Housing affordability is a global concern which is creating problems in key cities around the world in both developing and developed Countries. The key drivers include the rise in income growth and urbanization, driven by better job opportunities in the cities. According to World Bank, Pakistan is currently facing an overall housing backlog of 9 to 10 million units (of which 3.5 to 4 million units in urban areas), increasing approximately 400,000 units per annum. Estimates of annual new demand range between 400,000 and 700,000 units with only about 100,000 to 350,000 formal units being built annually. There is a dire need to formulate a policy framework to build affordable houses to manage and overcome this housing backlog. Affordable housing is defined as housing which is sufficient in quality and location, and is not so costly that it prevents its occupants from satisfying other basic living needs. There are many challenges that will be faced by government to implement this Imitative like affordability of vacant land, financial Implications and hinders, involvement of private and real estate sectors and developers, time frame and implementation, legal and institutional compliances etc. Beyond measures to improve households' income in the long run, a holistic approach is needed to effectively bridge the minimize supply-demand housing gap and provision of affordable houses in Pakistan.

School of Food and Agricultural Science (SFAS)

Department of Food and Agricultural Science

Research Articles

1. **Asghar, W., Nazir, W., & Khalid, N.** (2018). A Question Mark on Emerging Zinc-Related Nutritional Deficiencies in Pakistani Population. *Asia-Pacific Journal of Public Health, 30*(5), 500-502. doi: 10.1177/1010539518786519. **(Waqas Asghar (SFAS) Wahab Nazir, Nauman Khalid) (SJR)(Letter)**

2. Chen, Z., Shu, G., Taarji, N., Barrow, C. J., Nakajima, M., **Khalid, N.,** & Neves, M. A. (2018). Gypenosides as natural emulsifiers for oil-in-water nanoemulsions loaded with astaxanthin: Insights of formulation, stability and release properties. *Food Chemistry, 261*, 322-328. doi: 10.1016/j.foodchem.2018.04.054.**(Nauman Khalid (SFAS) JCR Listed (IF: 4.946)**

Abstract: The formulation, physicochemical stability and bioaccessibility of astaxanthin (AST) loaded oil-in-water nanoemulsions fabricated using gypenosides (GPs) as natural emulsifiers was investigated and compared with a synthetic emulsifier (Tween 20) that is commonly applied in food industry. GPs were capable of producing nanoemulsions with a small volume mean diameter (d4,3 = 125 ± 2 nm), which was similar to those prepared using Tween 20 (d4,3 = 145 ± 6 nm) under the same high-pressure homogenization conditions. GPs-stabilized nanoemulsions were stable against droplet growth over a range of pH (6–8) and thermal treatments (60–120 °C). Conversely, instability occurred under acidic (pH 3–5) and high ionic strength (25–100 mM CaCl2) conditions. In comparison with Tween 20, GPs were more effective at inhibiting AST from degradation during 30 days of storage at both 5 and 25 °C. However, GPs led to lower lipid digestion and AST bioaccessibility from nanoemulsions than did Tween 20.
Keywords: *astaxanthin, nanoemulsions, gypenosides, physicochemical, stability, bioaccessibility.*

3. Dicker, D., Nguyen, G., Abate, D., Abate, L. H., Abay, S. M., Abbafati, C., . . . Collaborators, **Khalid, N.**(2018). Global, regional, and national age-sex-specific mortality and life expectancy, 1950-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet, 392*(10159), 1684-1735. doi: 10.1016/s0140-6736(18)31891-9. **(Nauman Khalid (SFAS) JCR Listed (IF: 53.254)**

Abstract: Background Assessments of age-specific mortality and life expectancy have been done by the UN Population Division, Department of Economics and Social Affairs (UNPOP), the United States Census Bureau, WHO, and as part of previous iterations of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD). Previous iterations of the GBD used population estimates from UNPOP, which were not derived in a way that was internally consistent with the estimates of the numbers of deaths in the GBD. The present iteration of the GBD, GBD 2017, improves on previous assessments and provides timely estimates of the mortality experience of populations globally. Methods The GBD uses all available data to produce estimates of mortality rates between 1950 and 2017 for 23 age groups, both sexes, and 918 locations, including 195 countries and territories and subnational locations for 16 countries. Data used include vital registration systetns, sample registration systetns, household surveys (complete birth histories, summary birth histories, sibling histories), censuses (summary birth histories, household deaths), and Demographic Surveillance Sites. In total, this analysis used 8259 data sources. Estimates of the probability of death between birth and the age of 5 years and between ages 15 and 60 years are generated and then input into a model life table system to produce complete life tables for all locations and years. Fatal discontinuities and mortality due to HIV/AIDS are analysed separately and then incorporated into the estimation. We analyse the relationship between age-specific mortality and development status using the Socio-demographic Index, a composite measure based on fertility under the age of 25 years, education, and income. There are four main methodological improvements in GBD 2017 compared with GBD 2016: 622 additional data sources have been incorporated;

new estimates of population, generated by the GBD study, are used; statistical methods used in different components of the analysis have been further standardised and improved; and the analysis has been extended backwards in time by two decades to start in 1950. Findings Globally, 18.7% (95% uncertainty interval 18.4-19.0) of deaths were registered in 1950 and that proportion has been steadily increasing since, with 58.8% (58.2-59.3) of all deaths being registered in 2015. At the global level, between 1950 and 2017, life expectancy increased from 48.1 years (46.5-49.6) to 70.5 years (70.1-70.8) for men and from 52.9 years (51.7-54.0) to 75.6 years (75.3-75.9) for women. Despite this overall progress, there remains substantial variation in life expectancy at birth in 2017, which ranges from 49.1 years (46.5-51.7) for men in the Central African Republic to 87.6 years (86.9-88.1) among women in Singapore. The greatest progress across age groups was for children younger than 5 years; under-5 mortality dropped from 216.0 deaths (196.3-238.1) per 1000 livebirths in 1950 to 38.9 deaths (35.6-42.83) per 1000 livebirths in 2017, with huge reductions across countries. Nevertheless, there were still 5.4 million (5.2-5.6) deaths among children younger than 5 years in the world in 2017. Progress has been less pronounced and more variable for adults, especially for adult tnales, who had stagnant or increasing mortality rates in several countries. The gap between male and female life expectancy between 1950 and 2017, while relatively stable at the global level, shows distinctive patterns across super-regions and has consistently been the largest in central Europe, eastern Europe, and central Asia, and smallest in south Asia. Performance was also variable across countries and time in observed mortality rates compared with those expected on the basis of development. Interpretation This analysis of age-sex-specific mortality shows that there are remarkably complex patterns in population mortality across countries. The findings of this study highlight global successes, such as the large decline in under-5 mortality, which reflects significant local, national, and global commitment and investment over several decades. However, they also bring attention to mortality patterns that are a cause for concern, particularly among adult men and, to a lesser extent, wotnen, whose mortality rates have stagnated in many countries over the time period of this study, and in some cases are increasing.

Keywords: *estimating adult mortality, all-cause mortality, child-mortality, death, health, countries, trends, HIV.*

4. **Khalid, N.,** Kobayashi, I., Neves, M. A., Uemura, K., & Nakajima, M. (2018). Microchannel emulsification: A promising technique towards encapsulation of functional compounds. *Critical Reviews in Food Science and Nutrition, 58*(14), 2364-2385. doi: 10.1080/10408398.2017.1323724.**(Nauman Khalid (SFAS) JCR Listed (IF: 6.015) (Review)**

Abstract: This review provides an overview of microchannel emulsification (MCE) for production of functional monodispersed emulsion droplets. The main emphasis has been put on functional bioactives encapsulation using grooved-type and straight-through microchannel array plates. MCE successfully encapsulates the bioactives like β-carotene, oleuropein, γ-oryzanol, β-sitosterol, L-ascorbic acid and ascorbic acid derivatives, vitamin D and quercetin. These bioactives were encapsulated in a variety of delivery systems like simple and multiple emulsions, polymeric particles, microgels, solid lipid particles and functional vesicles. The droplet generation process in MCE is based upon spontaneous transformation of interfaces rather than high energy shear stress systems. The scale-up of MCE can increase the productivity of monodispersed droplets >100 L h−1 and makes it a promising tool at industrial level.

Keywords:*microchannel emulsification, delivery systems, encapsulation, emulsification, functional bioactives, monodisperse emulsion droplets, spontaneous transformation.*

5. Kyu, H. H., Abate, D., Abate, K. H., Abay, S. M., Abbafati, C., Abbasi, N., . . . **Khalid, N.**(2018). Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease

Study 2017. *Lancet, 392*(10159), 1859-1922. doi: 10.1016/s0140-6736(18)32335-3.**(Nauman Khalid (SFAS)** **JCR Listed (IF: 53.254)**

Abstract: Background: How long one lives, how many years of life are spent in good and poor health, and how the population's state of health and leading causes of disability change over time all have implications for policy, planning, and provision of services. We comparatively assessed the patterns and trends of healthy life expectancy (HALE), which quantifies the number of years of life expected to be lived in good health, and the complementary measure of disability-adjusted lifeyears (DALYs), a composite measure of disease burden capturing both premature mortality and prevalence and severity of ill health, for 359 diseases and injuries for 195 countries and territories over the past 28 years.

Keywords:*iron-deficiency, interventions, prevention, gender, disorders, outcomes, weights, style, AIDS, HIV.*

6. Lozano, R., Fullman, N., Abate, D., Abay, S. M., Abbafati, C., Abbasi, N., . . . **Khalid, N.**(2018). Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet, 392*(10159), 2091-2138. doi: 10.1016/s0140-6736(18)32281-5.**(Nauman Khalid (SFAS)** **JCR Listed (IF: 53.254)**

Abstract: Background: Efforts to establish the 2015 baseline and monitor early implementation of the UN Sustainable Development Goals (SDGs) highlight both great potential for and threats to improving health by 2030. To fully deliver on the SDG aim of "leaving no one behind", it is increasingly important to examine the health-related SDGs beyond national-level estimates. As part of the Global Burden of Diseases, Injuries, and Risk Factors Study 2017 (GBD 2017), we measured progress on 41 of 52 health-related SDG indicators and estimated the health-related SDG index for 195 countries and territories for the period 1990–2017, projected indicators to 2030, and analysed global attainment.

Keywords:*cardiovascular-disease, smoking prevalence, gender-differences, alcohol-use, suicide, perspective, consumption, prevention, transition, cessation.*

7. Murray, C. J. L., Callender, C., Kulikoff, X. R., Srinivasan, V., Abate, D., Abate, K. H., . . . Coll, **Khalid, N.**. (2018). Population and fertility by age and sex for 195 countries and territories, 1950-2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet, 392*(10159), 1995-2051. doi: 10.1016/s0140-6736(18)32278-5.**(Nauman Khalid (SFAS)** **JCR Listed (IF: 53.254)**

Abstract: Population estimates underpin demographic and epidemiological research and are used to track progress on numerous international indicators of health and development. To date, internationally available estimates of population and fertility, although useful, have not been produced with transparent and replicable methods and do not use standardised estimates of mortality. We present single-calendar year and single-year of age estimates of fertility and population by sex with standardised and replicable methods.
Keywords:*health, projections, Africa, consequences, policies, birth.*

8. Naveed, M., Chaudhry, Z., Bukhari, S. A., Awan, I., & **Khalid, N.** (2018). Dengue death tolls: A nightmare for Khyber Pakhtunkhwa, Pakistan. *Journal of Infection and Public Health, 11*(6), 898-899. doi: 10.1016/j.jiph.2017.12.002.**(Nauman Khalid (SFAS)** **JCR Listed (IF: 2.118) (Letter)**
Abstract: *Not found*

9. Naveed, M., Imran, K., Mushtaq, A., Mumtaz, A. S., Janjua, H. A., & **Khalid, N.** (2018). In silico functional and tumor suppressor role of hypothetical protein PCNXL2 with regulation of the Notch signaling pathway. *Rsc Advances, 8*(38), 21414-21430. doi: 10.1039/c8ra00589c.**(Nauman Khalid (SFAS)** **JCR Listed (IF: 2.936)**
Abstract: Since the last decade, various genome sequencing projects have led to the accumulation of an enormous set of genomic data; however, numerous protein-coding genes still need to be functionally

characterized. These gene products are called "hypothetical proteins". The hypothetical protein pecanex-like protein 2 Homo sapiens (PCNXL2) is found to be mutated in colorectal carcinoma with microsatellite instability; therefore, annotation of the function of PCNXL2 in tumorigenesis is very important. In the present study, bioinformatics analysis of PCNXL2 was performed at the molecular level to assess its role in the progression of cancer for designing new anti-cancer drugs. The retrieved sequence of PCNXL2 was functionally and structurally characterized through the web tools Pfam, Batch CD (conserved domain) search, ExPASy, COACH and I-TASSER directed for pathway analysis and design to explore the intercellular interactions of PCNXL2 involved in cancer development. The present study has shown that PCNXL2 encodes multi-pass transmembrane proteins whose tumor suppressor function may involve regulating Notch signaling by transporting protons across the membrane to provide suitable membrane potential for γ secretase function, which may liberate the Notch intracellular domain NICD from the receptor to inside the cell. Furthermore, domain A of PCNXL2 may exhibit nuclear transport activity of NICD from the cytoplasm to the nucleus through interaction with a nuclear localization signal that may act as an activator for Notch signaling in the nucleus. Conclusively, the tumor suppressor role of PCNXL2 by regulation of the Notch signaling pathway and its functional and structural characteristics are important findings. However, further studies are required to validate the putative role of PCNXL2 as a cancer biomarker in cancer development.

Keywords:*drosophila-melanogaster, structure prediction, target, cancer, gene, cysteine, classification, pecanex, binding, state.*

10. Pagano, A. P. E., **Khalid, N.,** Kobayashi, I., Nakajima, M., Neves, M. A., & Bastos, E. L. (2018). Microencapsulation of betanin in monodisperse W/O/W emulsions. *Food Research International, 109*, 489-496. doi: 10.1016/j.foodres.2018.04.053. **(Nauman Khalid (SFAS)** JCR Listed (IF: 3.520)

Abstract: Betanin is the main pigment of the food color beetroot red (E162). Due to the fair heat and light stability of E162, this pigment is mainly used in minimally processed packaged food products. Encapsulation increases the stability of betanin, but detailing on the effect of different sources of betanin on the properties and stability of multiple emulsions are scarce. Here we describe the encapsulation of E162, spray-dried beetroot juice and betanin in a monodisperse food-grade water-in-oil-in-water (W/O/W) emulsions by using microchannel emulsification. We compare the tinctorial strength of the encapsulated pigments and investigate the effect of temperature, storage period and pigment concentration on emulsion stability and color. Betanin increases the overall stability of the W/O/W emulsion, reduce the oil droplet size and improve size distribution when compared to the negative control without pigment and to emulsions containing betanin from other sources.

Keywords:*beetroots, betalain, betaninmonodisperse, emulsion, pigment, stabilization, microchannel emulsification.*

11. Purwanti, N., Zehn, A. S., Pusfitasari, E. D., **Khalid, N.,** Febrianto, E. Y., Mardjan, S. S., . . . Kobayashi, I. (2018). Emulsion stability of clove oil in chitosan and sodium alginate matrix. *International Journal of Food Properties, 21*(1), 566-581. doi: 10.1080/10942912.2018.1454946.**(Nauman Khalid (SFAS)**JCR Listed (IF: 1.845)

Abstract: Clove oil was emulsified in 1% w/w chitosan (CC emulsions) and 2.5% w/w sodium alginate matrix (CA emulsions) containing Tween 80 as the surfactant. Different homogenization speeds (5,000, 10,000, 15,000 and 20,000 rpm) were used to produce the emulsions, and the stability of the emulsions during storage (29 days) was determined. The stability of the emulsions containing clove oil prior to the solidification process was assessed when chitosan and sodium alginate were used as encapsulating materials. Different homogeniza- tion speeds resulted in polydisperse emulsions with a size of 2–3μm and 90% of stability after 29 days of storage. Different homogenization speeds did not significantly affect the concentrations of the active compounds contained in the emulsions. However, these concentrations changed

significantly after 29 days of storage when sodium alginate was used to make the emulsions and the homogenization speeds were≥10,000 rpm. High temperature caused by the high viscosity of the solution and high energy dissipation during homogenization suggested that the emulsions composed of sodium alginate were unstable. Chitosan enabled a longer processing time during the clove oil encapsulation process compared to sodium alginate, when emulsification by homogenization was used. The stability of the emulsion of the clove oil-in- chitosan matrix prior to the solidification step was superior.

Keywords:*clove oil, emulsions, chitosan, sodium alginate, emulsion stability.*

12. Rabelo, C. A. S., Taarji, N., **Khalid, N.,** Kobayashi, I., Nakajima, M., & Neves, M. A. (2018). Formulation and characterization of water-in-oil nanoemulsions loaded with acai berry anthocyanins: Insights of degradation kinetics and stability evaluation of anthocyanins and nanoemulsions. *Food Research International, 106*, 542-548. doi: 10.1016/j.foodres.2018.01.017.**(Nauman Khalid (SFAS) JCR Listed (IF: 3.520)**

Abstract: Açaí berry is the fruit of an Amazonian palm tree and rich in anthocyanins (ACNs). Scientific studies have proven the health benefits of açaí berry and declared this fruit as "super fruit". ACNs have high antioxidant activities, but they are unstable and can easily deteriorate during food processing. In order to protect ACNs and increase their applicability, food-grade water-in-oil (W/O) emulsions were successfully formulated with different concentrations of açaí berry extracts (AEs). The formulated W/O nanoemulsions were relatively stable, with no phase separation after 30 days of storage. The average droplet size varied between 146.8 to 814.8 nm, with higher values corresponding to samples without AEs. All W/O nanoemulsion samples exhibited antioxidant activity and high retention rates of polyphenols after 30 days of storage. ACN retention followed firstorder kinetics, with high protection of ACNs observed in emulsified samples. 2% AE encapsulated in a 30 wt% W/O nanoemulsion had an estimated half-life of 385 days. The results indicate that stable nanoemulsion systems with high ACN protection can be produced with possible applications in the food and pharmaceutical industries.

Keywords:*açaí berry, antioxidants, water-in-oil nanoemulsions, anthocyanins, retention. kinetics.*

13. Shu, G., **Khalid, N.,** Chen, Z., Neves, M. A., Barrow, C. J., & Nakajima, M. (2018). Formulation and characterization of astaxanthin-enriched nanoemulsions stabilized using ginseng saponins as natural emulsifiers. *Food Chemistry, 255*, 67-74. doi: 10.1016/j.foodchem.2018.02.062.**(Nauman Khalid (SFAS) JCR Listed (IF: 4.946)**

Abstract: In this study ginseng saponins (GS) were used as natural emulsifiers to formulate and stabilize O/W nanoemulsions loaded with astaxanthin (AST). GS were found to be highly effective at reducing the interfacial tension at the soybean oil–water interfaces, and were capable of producing nano-scaled droplets (d4,3 ≈ 125 nm) using a high-pressure homogenizer. The droplet size of the nanoemulsions decreased with increasing emulsifier concentration and homogenization pressure. The nanoemulsions were stable without droplet coalescence against thermal treatment (30–90 °C, 30 min), and over a narrow range of pH values (7–9). GS-coated droplets were unstable in acidic conditions (pH 3–6) and in the presence of salt (>25 mM NaCl). The formulated nanoemulsions showed slight change in d4,3 during 15 days of storage at 5, 25 and 40 °C. However, the chemical stability strongly depended on the storage temperature, with the lowest level of AST retained in nanoemulsions stored at higher temperature.

Keywords:*astaxanthin, nanoemulsions, ginseng saponins, stability, characterization.*

14. Shu, G., **Khalid, N.,** Tan, T. B., Zhao, Y., Neves, M. A., Kobayashi, I., & Nakajima, M. (2018). In vitro bioaccessibility of ergocalciferol in nanoemulsion-based delivery system: the influence of food-grade emulsifiers with different stabilising mechanisms. *International Journal of Food Science and Technology, 53*(2), 430-440. doi: 10.1111/ijfs.13601.**(Nauman Khalid (SFAS) JCR Listed (IF: 2.383)**

Abstract: The effect of emulsifier type on thein vitrobioaccessibility of ergocalciferol-loaded nanoemulsions wasexamined (mouth, stomach and small intestinal phases). Oil-in-water nanoemulsions were prepared

usingemulsifiers with different stabilising mechanisms: decaglycerol monooleate (MO7S; steric), modifiedlecithin (ML; electrostatic), sodium caseinate (SC; electrosteric) and ML-MO7S (combined electrostaticand steric). The droplet size, size distribution,f-potential and microstructure of nanoemulsions duringdigestion depended on the emulsifier type. The fate of lipid in the small intestinal phase also relied on theemulsifier type, with the free fatty acids release rate decreasing in the following order: MO7S>ML-MO7S>ML>SC. The ergocalciferol bioaccessibilities in nanoemulsions prepared using MO7S (62%),ML (64%) and ML-MO7S (65%) were similar and significantly higher than that stabilised by SC (12%).No significant loss of ergocalciferol was observed in all nanoemulsions after full digestion; they werechemically stable against digestion conditions, regardless of the emulsifier type.

Keywords:*bioaccessibility, digestion, emulsifier, ergocalciferol, nanoemulsions, stabilising mechanism.*

15. Stanaway, J. D., Afshin, A., Gakidou, E., Lim, S. S., Abate, D., Abate, K. H., . . . **Khalid, N.** (2018). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet, 392*(10159), 1923-1994. doi: 10.1016/s0140-6736(18)32225-6*.* **(Nauman Khalid (SFAS) JCR Listed (IF: 53.254)**

Abstract: Background The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017 comparative risk assessment (CRA) is a comprehensive approach to risk factor quantification that offers a useful tool for synthesizing evidence on risks and risk–outcome associations. With each annual GBD study, we update the GBD CRA to incorporate improved methods, new risks and risk–outcome pairs, and new data on risk exposure levels and risk–outcome associations.

Keywords:*cardiovascular-diseases, tobacco control, blood-pressure, metaanalysis, cholesterol, illness, trends, trial.*

16. Taarji, N., da Silva, C. A. R., **Khalid, N.,** Gadhi, C., Hafidi, A., Kobayashi, I., . . . Nakajima, M. (2018). Formulation and stabilization of oil-in-water nanoemulsions using a saponins-rich extract from argan oil press-cake. *Food Chemistry, 246*, 457-463. doi: 10.1016/j.foodchem.2017.12.008.**(Nauman Khalid (SFAS) JCR Listed (IF: 4.946)**

Abstract: In this study, we formulated and stabilized oil-in-water nanoemulsions using a crude extract from argan press-cake as sole emulsifier. Various extracts from argan press-cake were prepared in order to select the most surface-active one(s) foreseeing emulsions preparation. Fifty percent (v/v) ethanolic extract reduced the interfacial tension to a minimum value at both MCT oil and soybean oil interfaces (12.7 and 10.5 mN m−1 respectively). This extract was also effective at producing fine emulsions with small droplet sizes (d3,2 < 115 nm) and good physical stability using different oils such as soybean oil, MCT oil and fish oil and at conventional homogenization conditions (100 MPa for 4 passes). On the other hand, the emulsions were very sensitive to NaCl addition (≥25 mM) and to acidic pH (<3) indicating that the main stabilization mechanism is electrostatic, likely due to the presence of surface-active compounds with ionizable groups such as saponins.

Keywords:*argan press-cake, emulsifier, interfacial tension, nanoemulsions, saponins.*

17. Vladisavljevic, G. T., Ekanem, E. E., Zhang, Z., **Khalid, N.,** Kobayashi, I., & Nakajima, M. (2018). Long-term stability of droplet production by microchannel (step) emulsification in microfluidic silicon chips with large number of terraced microchannels. *Chemical Engineering Journal, 333*, 380-391. doi: 10.1016/j.cej.2017.09.141.**(Nauman Khalid (SFAS)JCR Listed (IF: 6.735)**

Abstract: A long-term production stability of oil-in-water emulsions by microchannel (step) emulsification was investigated using two cross flow silicon chips consisting of 540 or 1850 microchannels fabricated on 10 parallel terraces. Each terrace was 9.54 mm long and consisted of 54 channels with a depth of 5 μm and a width of 18 μm (chip 1) or 185 channels with a depth of 4 μm and a width of 8 μm (chip 2). The dispersed

phase was a mixture of 2 wt% polycaprolactone (PCL) and 1 wt% poly(d,l-lactic) acid (PLA) dissolved in dichloromethane and the continuous phase was 2 wt% poly(vinyl alcohol). After solvent evaporation, the droplets were transformed into highly uniform composite polymer particles with an average diameter of 8.8 or 4.9 μm. The percentages of active channels, droplet sizes and droplet generation frequencies at individual terraces were investigated in both chips to reveal any flow maldistribution. After 6 h of production in chip 1, overall 95% of the channels produced droplets and the percentage of active channels on each terrace was at least 91%. The percentage of active channels decreased by decreasing the size of the channels. The mean droplet size varied negligibly across individual terraces over 7 h. Slightly higher droplet generation frequencies and smaller percentages of active channels were observed at central terraces. The droplet generation frequencies at the channels located close to each other were similar, indicating that droplet formation dynamics was coupled. The droplet size was not affected by the dispersed phase flow rate.

Keywords:*microchannel emulsification, step emulsification, microfluidic scale up, composite polymer microparticles, synthetic biodegradable polymers, poly(d,l-lactic) acid.*

18. Yousaf, S., Kaukab, G., Gul, H., **Khalid, N.,** Kausar, R., Ahmed, H., . . . Gulfraz, M. (2018). Pharmacological and phytochemical analysis of Bergenia ciliata leaf and rhizome extracts. *Pakistan Journal of Pharmaceutical Sciences, 31*(5), 1911-1916*.* **(Nauman Khalid (SFAS) JCR Listed (IF: 0.804)**
Abstract: Antibacterial, antifungal, antioxidant, cytotoxic, and anti-haemolytic activity of various rhizome extracts of Bergenia ciliata were evaluated in this study. The results showed inhibition of the growth of all selected bacterial and fungal strains in comparison with standard antibiotics. The antioxidant activities of Bergenia ciliata extracts were evaluated against DPPH, H2O2, ABTS, total antioxidant capacity and reducing power assays. The order of antioxidantactivity of various extracts were methanol> ethanol>n-hexane> aqueous>chloroform. The cytotoxicity (brine shrimp assay) and anti-haemolytic activities of plant extracts were also promising and varies in dose depended manner. The phytochemical analysis of rhizome extracts of Bergenia ciliata revealed presence of various secondary metabolites which might be responsible for the antimicrobial, antioxidant, cytotoxic and anti-haemolytic activities.
Keywords:*bergenia ciliata, secondary metabolites, antimicrobial activity, antioxidant activity.*

19. Ahmad, A., & **Khalid, N.** (2018). Dietary Fibers in Modern Food Production: A Special Perspective With β-Glucans. In A. M. Grumezescu & A. M. Holban (Eds.), *Biopolymers for Food Design* (pp. 125-156): Academic Press*.* **(Nauman Khalid (SFAS) ISI Web of Science (Book Chapter)**
Abstract: Traditionally, dietary fibers are extracted from plant sources, but recent research showed potential advantages of dietary fibers from microbial sources. These dietary fibers may be classified either on the basis of source or solubility. The nature of these dietary fibers may vary in different sources and thus the physiological responses on the human health. For instance, insoluble dietary fiber is beneficial for better gut health, whereas soluble dietary fiber reduces cholesterol and other risk factors of cardiovascular disease to a significant level. There is strong evidence that chemistry and extraction process for these dietary fibers may affect the specific food applications and associated health implications. This chapter will focus on various types of dietary fibers that can be extracted from microbial and other sources and how it differs from conventional cereal source dietary fibers. Details on chemistry and extraction procedures will be highly useful for food processors, and researchers and may lead to new nutraceutical product development. Food product applications of microbial dietary fiber in relation to health will also be part of the discussion.
Keywords:*dietary fiber, chemistryextraction, health benefitsβ-glucans.*

20. Amin, A., Ahmed, I., **Khalid, N.**, Zhang, Y., Xiao, M., & Li, W. J. (2018). Insights into the Thermophile Diversity in Hot Springs of Pakistan. In D. Egamberdieva, N. K. Birkeland, H. Panosyan & W. J. Li (Eds.), *Extremophiles in*

Eurasian Ecosystems: Ecology, Diversity, and Applications (Vol. 8, pp. 1-28).**(Nauman Khalid (SFAS)ISI Web of Science (Book Chapter)**

Abstract: The hot springs are populated by mesophilic, thermotolerant, and hyperthermophilic bacteria. These populations are diverse, and some of them show combinations of other extreme conditions, for example, acidic, alkaline, high pressure, and high concentrations of salts and heavy metals. Anaerobes inhabiting hot springs are considered to be the closest living descendants of the earliest living forms on earth, and their study offers understandings about the origin and evolution of life. In this chapter, thermal spring bacterial diversity from Pakistani ecology is reviewed. The bacterial populations in Pakistani hydrothermal vent environments showed a great genetic diversity, and most members of these populations appeared to be uncultivated and unidentified organisms. Analysis suggested that some microorganisms of novel phylotypes predicted by molecular phylogenetic analysis were likely present in thermal spring environments. Libraries were predominantly composed of rare phylotypes that appeared to be unclassified, and the number and type of phylotypes observed were correlated with biogeography as well as biogeochemistry. These findings broaden our opinion of the genetic diversity of bacteria in hot water spring environments. The global-scale bacterial diversity of other hot water spring environments, on the other hand, may be beyond present proficiencies for authentic study.

Keywords: *thermophiles, thermal springs, bacterial diversity, taxonomy, biogeography, biogeochemistry, unculturable methods*.

21. **Tanweer, A.**, & Imran, S. (2018). Fiber content of bran breads. Discrepancy between reality and food label information in Lahore, Pakistan. *Progress in Nutrition, 20*, 53-56. doi: 10.23751/pn.v20i2-S.5449. **(Afifa Tanweer)JCR Listed (IF:0.323)**

Abstract: Background. Dietary fiber is known to have several physiological benefits. Wheat bran, which is added to bran breads, can be a good source of dietary fiber. Recently, the consumption of bran breads has increased tremendously in Pakistan, as consumers attempt to increase their fiber intake. But the discrepency of nutrition fact labels with the actual amounts of nutrition provided by a food product has always remained as a source of consumer's mistrust on commercial products. Aim of the study. This study was carried out to assess the fiber content of commercially available bran breads and to compare the extracted amounts with the content reported on food labels. **Methods.** Manual proximate analysis of six brands (three from industry and three from bakery) of breads locally available in Lahore, Pakistan was done. Three samples of each bread were analyzed for fiber content and the average content was calculated. **Results.** The findings showed that industry products on average contain a significantly larger fiber content compared to the bakery products. Significant differences in fiber extracted and that mentioned on the package label were revealed; the actual fiber content extracted was significantly less than that mentioned on the food labels. A serving of local bran bread was found to fulfill <1% of daily adequate intake for dietary fiber. **Conclusion and recommendations.** It is suggested that bran breads locally available in Lahore, Pakistan should not be relied upon as a sole source of dietary fiber. Also, the food industry is suggested to revise food labels and to justify their claims in order to help protect the consumer's rights.

Keywords: *bran, dietary fibre, proximate analysis, food labels, bread*.

School of Professional Advancement (SPA)

Deparrtment of Professional Advancement

Research Articles

1. **Haider, M., Yazdani, N., Zubair, T.,** Ellahi, N., Zafar, F., Tahir, T., & Haq, F. (2018). Healthcare Service Utilization and Burden of Communicable Disease among Internally Displaced Population in Lahore. *International Journal of Scientific & Engineering Research, 9*(2).**(Murtaza Haider (School of Professional Advancement\SPA), Naveed Yazdani, Talha Zubair Ahmad Khan)** **(Not HEC Recognized)**

   Abstract: The study conducted at the private health facility of the Union Council (Khan Colony), in Lahore. Objectives of the study are as follows; to determine the burden of communicable diseases (TB, Hepatitis B, Hepatitis C and HIV) among IDPs in Lahore. To determine association of TB, Hepatitis B, Hepatitis C and HIV with socio-demographic variables and to assess the health seeking behavior of internally displaced persons for health care service utilization. The study design is cross sectional prospective survey conducted by collection of data through semi structured questionnaire and taking blood samples for detection of anti-bodies for Hepatitis B virus, Hepatitis C virus, and HIV. The sputum samples collected for detection of tuberculosis (TB). The sampling technique used for this study is nonrandom convenient sampling. The study found that a significant majority (22.6%) of the IDP population is infected with Hepatitis C. The large majority of studied participants comprised of female (73.6%) population. The prevalence of HCV (75%) is more in female population than male. The IDPs mainly originated from Peshawar (42%) and Mardan (34%) divisions of KPK province. The IDPs are prone to bear the burden of communicable disease due to poverty and unfavorable living conditions such as unemployment (79%) and over crowdedness (83%). The IDPs are living in low socio-economic conditions as evidenced from mud houses (15%), low income (89.4%) and high illiteracy (68%) rate. The significant majority of the participants (43.4%) prefer to go to government hospitals for the recent onset of any illness then to Hakeem (15.1%) and traditional healer (13.2%) respectively for utilizing healthcare services. The study concluded that the prevalence of sera-positive Hepatitis C infection among the internally displaced population is 22.6%

   Keywords: *Internally displaced population, communicable disease, prevalence, health care service utilization, sera-positive, Hepatitis B, Hepatitis C, HIV, and TB.*

2. **Shuja, A.** (2018). The role of transformational leadership in organizational innovation through knowledge management practices intervention for increasing organizational resilience. *Journal of Social Sciences and Interdisciplinary Research (JSSIR), 6*(2). **(Aleena Shuja (School of Professional Advancement\SPA) HEC Z CAT**

   Abstract: The study aims to investigate the role of transformational leadership style in knowledge management and achieving goals of organizational resilience together with organizational innovation. Based on hypotheses, analyses have been performed including partial least square for in order to examine the hypotheses. The sample in the intended cross-sectional study comprised of primary data that has been collected from managerial employees in IT companies of Pakistan. There is empirical indication of mediating role of practices between transformational leadership styles and knowledge management in order to sustain resilience of technology oriented companies.

   Keywords: *transformational leadership, knowledge management, innovation, resilience, effectiveness, competitive advantage.*

3. **Munir, F.,** & Aboidullah, M. (2018). Gender Differences in Transformational Leadership Behaviors of School Principals and Teachers' Academic Effectiveness. *Bulletin of Education and Research, 40*(1). **(Farhat Munir(School of Professional Advancement\SPA)HEC Y CAT**

   Abstract: The aim of this study was to empirically investigate the gender differences in the transformational leadership behaviors of school principals and its impact on teachers' academic effectiveness. On the basis of

literature four transformational leadership behaviors (idealized influence, intellectual stimulation, individualized considerations & inspirational motivation) proposed by Bass in 1985 were selected to assess the gender differences in principals' transformational leadership behaviors. Multifactor Leadership Questionnaire (MLQ-5x-short form leaders & rater forms) was administered over 250 school principals and 2300 teachers from private and public secondary schools. The study reported no significant gender difference in practicing transformational leadership behaviors and found significant negative relationship between transformational leadership behaviors and teachers' academic effectiveness.

Keywords: *gender differences, transformational leadership behaviors, teachers' academic effectiveness.*

Conference Papers

1. **Shuja, A.** (2018). *A Post Merger Analysis of Warid-Mobilink Job Satisfaction.* Paper presented at the 1st International Conference on Action Research in Multidisciplinary Perspectives (ICARMP) UMT, Lahore. **(Aleena Shuja (School of Professional Advancement\SPA)**
Abstract: *Not found*

2. **Khan, T. Z. A.** (2018). *Reconceptulizing Consumer Buying Behavior within the Context of Digital Innovation*. Paper presented at the 2nd International Conference on Innvative Computing UMT, Lahore. **(Talha Zubair Ahmad Khan (School of Professional Advancement\SPA)**
Abstract: *Not found*

3. **Arbi, K. A**. (2018). *Conceptual Framework for Measuring Strength of UniversityIndustry-Government Linkages to Spur Innovation in a Country.* Paper presented at the 6th International Conference on Innovation and Entrepreneurship (ICIE 2018), Washington, DC, USA http://toc.proceedings.com/38825webtoc.pdf. **(Khalil Ahmed. Arbi (School of Professional Advancement\SPA)**
Abstract: *Not found*

Institute of Clinical Psychology (ICP)

Department of Clinical Psychology

Research Articles

1. **Rafiq, M.** (2018). Headache management through hypnosis: A case report. *Anaesthesia Pain & Intensive Care*, 22(2), 227-230. **(Muhammad Rafiq (ICPY)** HEC Y CAT

Abstract: Studies have shown impact of hypnosis on pain management. The current case report is focused to find the impact of a novel hypnotic technique for headache management. Unpublished data on old novel therapy has shown significant impact on pain management including headache. Our patient had gone through a complete physical examination and clinical interview. For the management of headache, a novel hypnotic intervention, Circle Therapy (CT), was applied. Before the induction of CT, the intensity of the headache was measured through a subjective rating scale (i.e. from 0 to 10) to be 9. Post-hypnosis rating was measured to be zero. This brief intervention provided an immediate relief from headache, however, this experience is limited to a single case. So, there is need to see the effect of CT on more cases and/or on different types of pain.

Keywords:*pain management, circle therapy, headache, suggestibility, hypnosis, psychotherapy.*

2. **Rafiq, M., & Ali, S.** (2018). Effect of Propofol on ERK1/2 expression during day times in the rat hippocampus. *Advancements in Life Sciences, 5*(3), 130-134. **(Muhammad Rafiq (ICPY),Sajed Ali)**ISI Web of Science

Abstract: Background: Anesthetics are responsible for imparting many effects on the central nervous system. We hypothesized that short duration anesthetics may have varied effects at different time of the day. Propofol (short duration anaesthesia) has showed circadian variation in loss of righting reflex during 24 hours of the day.

Methods: Characterization of the effects of propofol anaesthesia on ERK1/2 in hippocampus at two different times of the day was performed. Male rats received either an intra-peritoneal injection of 120 mg/kg of propofol to set short-duration anaesthesia state (20-30 minutes) or the equivalent amount of the lipidic solvent as controls. For both groups of animals, anaesthesia or control, the injections were performed either at ZT0 or at ZT12. One hour following the injection, the animals were euthanized; the brains were removed and immediately frozen. The amount of ERK1/2 was assessed by using immunohistochemistry on brain sections.

Results: The amount of ERK1/2 density was significantly decreased ($P<0.05$) in CA1, CA2 and CA3 areas of the hippocampus only when anaesthesia was performed at ZT12.

Conclusion: Our current results evidenced that the impact of propofol anaesthesia on hippocampus vary depending on the zeitgeber time.

Keywords:*extracellular signal, regulated kinase, (ERK1/2),immunohistochemistry,hippocampus, propofol, zeitgeber time.*

3. **Rafiq, M.,** Pain, L., & Ahmed, N. (2018). Effect of inflammation and anesthesia on brain-derived neurotrophic factor and cognition. *Anaesthesia Pain & Intensive Care, 22*(3), 318-322. **(Muhammad Rafiq (ICPY), Sajed Ali)**HEC X CAT

Abstract: Background: Some studies have evidenced the effect of inflammation and anesthetics on Brain Derived Neurotrophic Factor (BDNF) but there is still no data regarding theeffect of inflammation and anesthesia alone or in combination of inflammation and anesthesia on BDNF protein in rats' brain.

Objectives: To examine effect of lipopolysaccharides (LPS) alone or combined with propofol anesthesia at 3rd of injection on cortical and hippocampal BDNF.

Methodology: Male rats in four groups were treated with Intralipid® control, propofol anesthesia (120

mg/kg), LPS (1 mg/kg) and combined propofol with LPS respectively. The brains were removed and brain homogenates were prepared from hippocampus and cortex tissues. The amount of BDNF protein was assessed using ELISA on the brain supernatants.

Results: BDNF protein was increased when subjects were injected with propofol anesthesia alone (about 30%) or to LPS injection (about 400%) in both cortex and hippocampus samples. When anesthesia was injected combined with LPS, BDNF protein was decreased in both cortex and hippocampus samples ($p < 0.01$).

Conclusion: Our data evidenced the long term effect of propofol and LPS in increasing BDNF and propofol combined with LPS decreases BDNF protein in hippocampus and cortex.

Keywords:*lipopolysaccharide, bdnf protein, anesthesia, propofol, cortex, hippocampus, inflammation, cognition.*

4. **Sarwar, A., & Jabeen, A.** (2018). Neglectful Parenting: A Child Overdosed with Phenergan Syrup. *Journal of the Liaquat University of Medical and Health Sciences, 17*(3), 195-197. doi: 10.22442/jlumhs.181730577*.* **(Anila Sarwar (ICPY),Ayesha Jabeen)**HEC Y CAT

Abstract: Misuse of Over the Counter (OTC) medication is a common issue however, the long term consequences of this unchecked act are less stressed particularly in child care. The current case is of an eight years old boy studying in a Special Education School; referred for the Clinical assessment and intervention of academic and behavioral problems. The adaptive behavior assessment revealed that the child had moderate form of intellectual disability. It was found in anecdotal records that child had consumed heavy quantity of syrup Phenergan in his infant years. The focus of brief therapeutic intervention was to enhance his current adaptive behavior functioning. Multiple stakeholders including parents, physician pharmacist should drift their attention towards this very issue.

Keywords:*parenting, phenergan syrup, intellectual disability, PGEE.*

5. **Naeem Malik, F., Ali, F., Saleem, S., & Mahmood, Z.** (2018). Psychosocial issues and quality of life of women with post-menopausal osteoporosis. *Rawal Medical Journal, 43*(2)*.* **(Fatima Naeem Malik (ICPY),Farwah Ali, Sadia Saleem, Zahid Mahmood)**HEC Y CAT

Abstract: Objective: To determine the relationship between psychosocial stressors and quality of life in females with post-menopausal osteoporosis.

Methodology: A total of 100 females with age from 50-63 years (Mean 56.13±3.16) were selected from two government hospitals and one private clinic through purposive sampling strategy. The patients were given Psychosocial Stressor Scale for female with Post-Menopausal Osteoporosis World Health Organization Quality of Life brief questionnaire along with a demographic performa.

Results: There was a negative relation between psychosocial stressors and quality of life in female with post-menopausal osteoporosis. Psychosocial stressors like lack of self-regulation and lack of social support negatively predicted different dimensions of Quality of life physical, social, psychological, and environmental.

Conclusion: It is important to identify psychosocial problems of females with post-menopausal osteoporosis. Early identification will help providing counselling services and to work in collaboration with mental health practitioners, and medical professionals to provide comprehensive treatment plan keeping in mind bio psycho social model.

Keywords:*post-menopausal osteoporosis, quality of life, psycho social stressors, bio psycho social model.*

6. Rafiq, M., **Mahmood, Z.,** Ali, S., & Pain, L. (2018). Effect of minor surgery under propofol anaesthesia on brain BDNF and cognition. *Pakistan Journal of Neurological Sciences (PJNS), 13*(1), 6-9*.* **(Zahid Mahmood (ICPY)** (Not HEC Recognized)

Abstract: Brain Derived Neurotrophic Factor (BDNF) is a brain protein implicated in learning, memory and other cognitive functions. Changes in cellular brain functions as well as cognitive defects have been observed the days following anaesthesia, even for short-duration anaesthesia with/without surgery. Despite the role of neurotrophic factors in cognition, no data are still available on brain effects after anaesthesia. Purpose: To study the effect of minor surgery under short duration anaesthesia on cognition by investigating BDNF levels in plasma, hippocampus and cortex. METHODS: Male rats received an intra-peritoneal injection of either 120 mg/kg of propofol or intralipids solution or minor surgery was performed under propofol anaesthesia. The animals were euthanized at ZT5 (peak of the circadian profile of brain BDNF in rat) after 3 days and brain homogenates of prefrontal Cortex and Hippocampus were prepared and blood was also collected for plasma. The amount of BDNF was assessed using ELISA (Millipore) on supernatant.

Keywords: *anaesthesia, propofol, surgery, bdnf, cognition, memory, learning.*

7. Mukhtar, S., & **Mahmood, Z.** (2018). Moderating Role of Perceived Social Support between Perceived Parenting Styles and Relational Aggression in Adolescents. *Journal of Aggression Maltreatment & Trauma, 27*(8), 831-845. doi: 10.1080/10926771.2018.1468842.**(Zahid Mahmood (ICPY)** JCR Listed (IF: 0.698)

Abstract: This study examined the moderating role of perceived social support between perceived parenting styles and relational aggression (RA). A sample (N = 400) was selected through stratified sampling from public and private schools and colleges. Adolescents (n = 200 boys and n = 200 girls) completed (a) Demographic Performa, (b) Early Memories of Upbringing for Children to measure perceived parenting styles, (c) Social Support Questionnaire to measure perceived social support, and (d) Diverse Adolescent Relational Aggression Scale to measure RA. Statistical analyses showed that perceived social support moderated the relationship between perceived parenting styles and RA. Findings indicated that perceived social support strengthens the negative relationship between perceived father?s Overprotection parenting and RA. Results also showed that perceived social support strengthens positive relationship between perceived father?s Anxious Rearing parenting and RA. Moreover, perceived social support strengthens the positive relationship between perceived mother? Rejection parenting and RA. Results help in implementing interventions to promote the consolidation or increment of sources that constitute adolescents with concrete and feasible actions in the cultural, educational, and counseling implications.

Keywords: *adolescents, counseling implication, cultural issues, parenting styles, relational aggression, social support.*

8. **Mahmood, S. N., & Bashir, U.** (2018). Development and Validation of Neuro-Cognitive Assessment Battery for Stroke Patients (NCABS) in Pakistan. *Pakistan Journal of Medical Sciences, 34*(5), 1164-1171. doi: 10.12669/pjms.345.15083.**(Syeda Namrah Mahmood (ICPY), Umaiza Bashir)** JCR Listed (IF: 0.719)

Abstract:

Background & Objective: Post Stroke Cognitive Impairments (PSCI) occur frequently in stroke survivors resulting in devastating consequences affecting daily living of survivors. Currently, there exists scarcity of sound assessment tools for the evaluation of PSCI as most of the commonly used scales offer a number of clinical (requires motor and linguistic skills) and cultural limitations (requires academic exposure). Therefore, current study was aimed at evaluating the efficacy of Neuro-Cognitive Assessment Battery for Stroke patients (N-CABS) in Pakistan.

Methods: The participants were randomized in two groups including clinical and non-clinical group. N-CABS was administered on 61 clinical and 60 non-clinical participants (mean age=45 years; SD=5.55). Both groups were matched on all demographic variables including; age, gender, education and occupation. The psychometric properties of N-CABS were established through a number of robust measures of validity (construct, concurrent and discriminant validity) and reliability (internal consistency and test retest reliability).

Results: The factor analysis suggested a two-factor solution (labeled as Verbal Cognitive Abilities and Visual Cognitive Abilities) for N-CABS explaining 67% of total variance. A significant test-retest reliability was found (α = 0.92, ***p<0.001). The findings of concurrent validity recommended a significant correlation between N-CABS and Montreal Cognitive Assessment (MoCA) (α = 0.82, ***p<0.001). Similarly, discriminant validity also revealed significant group differences to exist on N-CABS (***p<0.001) suggesting N-CABS be able to discriminate between patients and healthy controls.
Conclusion: The results of the current study favor N-CABS as a psychometrically strong screening instrument to screen PSCI in our culture.
Keywords: *neuro-cognitive assessment battery, post stroke cognitive impairment, unilateral stroke.*

9. **Malik, F. N., Ali, F., Saleem, S., & Mahmood, Z.** (2018). Psychosocial issues and quality of life of women with post-menopausal osteoporosis. *Rawal Medical Journal, 43*(2), 272-275. **(Fatima Naeem Malik (ICPY) Farwah Ali, Sadia Saleem, Zahid Mahmood)** ISI Web of Science
Abstract: To determine the relationship between psychosocial stressors and quality of life in females with post-menopausal osteoporosis. Methodology: A total of 100 females with age from 50-63 years (Mean 56.13+-3.16) were selected from two government hospitals and one private clinic through purposive sampling strategy. The patients were given Psychosocial Stressor Scale for female with Post-Menopausal Osteoporosis World Health Organization Quality of Life brief questionnaire along with a demographic performa. Results: There was a negative relation between psychosocial stressors and quality of life in female with post-menopausal osteoporosis. Psychosocial stressors like lack of self-regulation and lack of social support negatively predicted different dimensions of Quality of life physical, social, psychological, and environmental. Conclusion: It is important to identify psychosocial problems of females with post-menopausal osteoporosis. Early identification will help providing counselling services and to work in collaboration with mental health practitioners, and medical professionals to provide comprehensive treatment plan keeping in mind bio psycho social model.
Keywords: *post-menopausal osteoporosis, quality of life, psycho social stressors.*

Conference Papers

1. **01:Subhan, S.** (2018). *Mental health problems of factory workers: A psychometric approach*. Paper presented at the International conference on "Re-defining mental health and well-being", University of Karachi. **(Sara Subhan,(ICPY)**
Abstract: *Not found*

2. **Subhan, S.**, Mahmood, Z., & Saleem, S. (2018). *Psychosocial Issues in Pakistani Domestic Cricketers: A Validation Study*. Paper presented at the Florida International University, Miami, USA, July 20, 2018. **(Sara Subhan(ICPY),Zahid Mahmood, Sadia Saleem)**
Abstract: The current paper highlights the development of a scale measuring psychosocial issues for domestic cricket players in Pakistan. This study was carried out in series of phases including item generation and establishing psychometric properties. A list of 55 psychosocial issues were generated through indepth interviews of 20 national and international male cricketers. The responses of participants were transformed into a 4-point rating Cricketer's Psychosocial Issues Scale (CPIS). The scale was given to 373 male cricketers with the age range of 16-28 (M=19.28; SD=3.14). The results highlights the exploratory and confirmatory factor analysis to identify the underlying psychosocial issues that tend to hamper the performance of cricketers. The psychometric properties, as well as the reliability and validity of Cricketers' Psychosocial Issues Scale (CPIS) were also established that were discussed in its cultural context and relevance. The implications of the study are discussed in terms of psychological counseling for performance enhancing of cricketers.

Institute of Islamic Banking (IIB)

Institute of Islamic Banking

Research Articles

1. **Hussain, T.,** Qureshi, M. H., & Nazir, M. S. (2018). Analysis of Islamic financing and related assets: a study of Islamic banks of Pakistan. *International Journal of Islamic Marketing and Branding, 3*(2), 116-143. **(Talat Hussain (IIB)**(Not HEC Recognized)

Abstract: The objective of the study is to identify and analyse different modes of financing offered by Islamic banks of Pakistan. For the analysis purpose, the study chosen four full-fledge Islamic banks which are currently operating in Pakistan for the period of 2010 to 2016. Audited annual financial reports of these Islamic banks are used to obtain the data related to different modes of financing each bank is offering to consumers. The findings of the study reported that, in year 2010, Murabaha and Ijarahwere were the most popular modes of financing for all sample banks, which become gradually less popular among Islamic banks of Pakistan as modes of financing and diminishing Musharakah financing is replacing Murabaha and Ijarah financing over the study period of 2010 to 2016. The study provides evidence that equity-based financing, which is the essence of Islamic banking, is strengthening its roots in Islamic banking industry of Pakistan. The study provides policy implications for regulators, especially for product development departments at different Islamic banks, for designing and pricing Islamic financial products. There is a need for innovativeness in developing the variants of popular modes of financing in order to remain viable in the industry.

Keywords: *islamic banks, financial instruments, financing, Pakistan.*

2. **Riaz, S., & Hussain, T.** (2018). What Determines The Financing Supply of Islamic Banks? A Multicountry Study. *International Journal of Economics and Financial Research, 4*(1), 22-29.**(Shakeel Riaz (IIB),Talat Hussain) (Not HEC Recognized)**

Abstract: Smooth functioning a bank depends on the stability of stream of returns that it gets from its financing decision. This study is an attempt to showcase the reason for idling or shortage of funds and the factors for the case of Islamic banking. This effort will determine the strategy which can boost the financing in the economy, for this, this study has used the panel data of full-fledged Islamic banks from countries Pakistan and Malaysia, spanning to several years and based on several banks. Based on the analysis of internal and external factors of Islamic banks, it can be seen that increase in the market rate leads to decrease in demand of financing while the increase in deposits and equity do not show a proportional increase in financing which hints that there is excess liquidity available in the Islamic banks. On the positive side, it is evident that increase in the economic activity boosts the demand for Islamic financing.

Keywords: *islamic banking, financing, excess liquidity.*

3. **Ayaz, M., Shakeel Shah, H.**, & Yusuf, J. B. (2018). Legal and Corporate Governance Framework for Islamic Banks in Pakistan. *Islamic Banking and Finance Review, 5*.**(Mohammad Ayaz(IIB),Hassan Shakeel Shah) (UMT Journal)**

Abstract: As custodians and trustees of public money, Islamic banking institutions (IBIs)must have a good reputation that cannot be achieved without a strong legal and corporate governance (CG) framework. The base for good governance inside financial institutions including IBIs in any jurisdiction is provided by the legal framework of the country,since the respective roles and responsibilities of corporate governance players inside IBIs are derived from the established law. In this study,the general legal and corporate governance framework for the banking sector in Pakistan is discussed.It is found that unfortunately the Islamic banking sector, which has great potential, is functioning without a proper legal cover which is a challenge for good

governance as well as transaction implementation of IBIs,especially for the unilateral promises by the counterparties and hence for their soundness in future. Therefore, proper law must be promulgated, wherein all the respective roles and responsibilities of different CG players are declared mandatory, followed by punitive consequences in instances of non-compliance by them. Also, all the transactions should be given legal validation, which should resolve the issue of breaching any of the different contracts by the counterparties, especially their unilateral promises.

Keywords:*legal, corporate governance framework, Islamic banks, Pakistan.*

4. Yusuf, J. B., **Shakeel Shah, H., & Ayaz, M.** (2018). Interest-Free Banking and Finance in Brunei Darussalam: Present Realities and Future Prospects. *Journal of Islamic Thought & Civilization, 8*(2).**(Hassan Shakeel Shah(IIB), Mohammad Ayaz)**(UMT Journal)

Abstract: Brunei is among the few countriesthat are vigorously pursuing interest-free banking. Looking at its current nature, there is no doubt that Islamic banking and finance is a governmental project. This paper examines the development or progress of this institution in Brunei highlighting the present experiences, future prospects, and imminent expectations. Islamic banking and finance has superintended a new economic order in the country. Although the system is still at its primary stages, it has been successful and, indeed, holds good prospects due to political cooperation. Political will is basic to the fruitful implementation of a new economic order and the efficient Islamization process in Brunei facilitated the establishment of sound socio-cultural and economic foundations that have vigorously promoted the essential values of Islam. Nonetheless, the 'call' for economic diversification has some implications for the interest-free banking institutions in the country because diversification invariably exposes an economy to international interest and, more importantly, empowers the private sector. These come withthe likelihood for promoting interest-based banking and financial practices.We, therefore, conclude that Islamic banking has been very successful in Brunei but it still remains very vulnerable to non-political future challenges subject mainly to the economic fortunes and prospects of the petro-dollar.

 Keywords:*brunei, Islamic banking, ribā, economy, economics, petro-dollar.*

Conference Papers

1. Umair Murtaza, M., & **Shakeel Shah, H.** (2018). *A Study on Customer Perception towards Islamic Banking Products and Services in Pakistan*. Paper presented at the Paper presented at the 3rd Global Forum on Islamic Economics, Banking and Finance, held on February, 20-21, 2018, at Faletti's Hotel, Lahore.**(Hassan Shakeel Shah(IIB))**

Abstract: Islamic banking majorly progressed in last two decades in Pakistan. It gives the edge to customers over conventional banking as it offers far better financing modes. Also, the risk is moderate in Islamic financing. The purpose of this study is to investigate the consumer preference in Pakistan towards Islamic banks over conventional banks. More precisely to rule out the factors that push customer to prefer Islamic bank over their conventional counterparts. A self-administered questionnaire is circulated in different areas of Lahore. Raw data collected is then analyzed using the SPSS software. Research findings reveal that customer is well aware of the Islamic banking products. One of the major factors that affect preference of customer is religion. This study also concludes that service quality is the key factor in bank selection criteria for customers. This study will be useful for bankers on consumer preference towards Islamic banking products and services. Hence, it will improve the product development and innovation in the Islamic banking market.

 Keywords:*customer preference, islam, islamic banking, consumer behavior, customer satisfaction.*

2. Azmat Shaheen, M., & **Shakeel Shah, H**. (2018). *Dependence of Sukuk Index on Conventional Stock Indices of Pakistan*. Paper presented at the Proceedings of the 3rd International Conference on Emerging Trends in Engineering, Management and Sciences. (pp. 127-134). Peshawar, Pakistan, City University of Science and Information Technology.**(Hassan Shakeel Shah (IIB)**

Abstract: Sukuk are a growing portion of the Pakistan Stock exchange and a source of Shariah compliant securities for faith conscious investors in Pakistan. Sukuk market started only a few years ago in Pakistan and is still in early phase of growth. For this reason, we need to focus our research on this growing segment of securities market and help to explore new growth opportunities along with influencing factors within Pakistan's Stock Market. In this research we tried to find out if a relation exists between Shariah Compliant stock market and other non Shariah compliant indices like KSE30 and KSEAll. We took 5 years of daily stock index returns data from these indices and used it under multiple linear regression analysis to find out existence of correlation among these markets and the strength of this correlation accordingly. Results were found consistent with provided hypothesis that there exists a significant relationship among KMI Index and the KSE Indices and the dependence of KMI 30 index over KSE indices was proven. The research suggested a multiple regression equation to calculate fluctuations in KMI30 index if the KSE 30 and KSE All index had a rise or fall.

Keywords:*customer KMI 30, KSE 30, KSE All, Sukuk, correlation.*

School of Textile Design (STD)
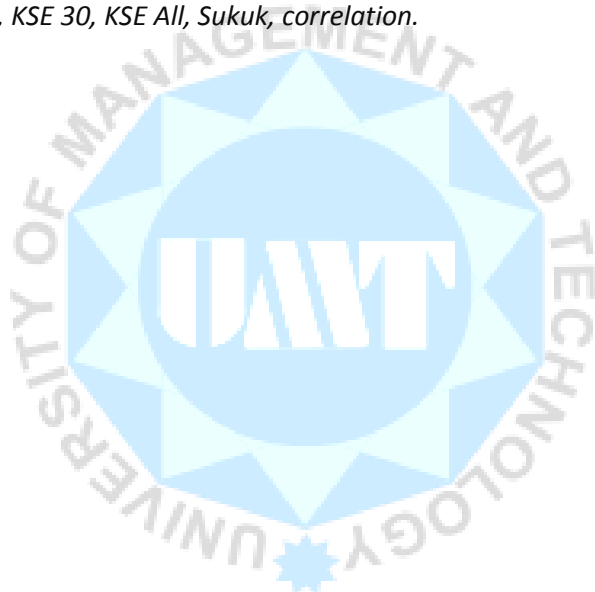
Department of Textile Design

Research Articles

1. Azeem, M., Ahmad, Z., Wiener, J., **Fraz, A.,** Siddique, H. F., & Havalka, A. (2018). Influence of Weave Design and Yarn Types on Mechanical and Surface Properties of Woven Fabric. *Fibres & Textiles in Eastern Europe, 26*(1(127)), 42-45. doi: 10.5604/01.3001.0010.7795. **(Ahmad Fraz (STD)** JCR Listed (IF: 0.577)

   Abstract: The purpose of this study was to examine the effect of spinning technologies and weave design on fabric mechanical and surface properties. For this purpose, ring spun (combed, carded) and open-end (OE) techniques were used to manufacture yarns of polyester cotton (50:50) which were used in the weft, and 100% cotton yarn in the warp. Plain, twill, and satin weave designs were selected to construct woven samples on a projectile loom. The variation in fabric tensile strength is obvious with respect to weave designs. Higher interlacing of yarn produces more crimp in the load bearing, which may cause lower breaking strength and fewer broad floats. The mechanical and surface properties of these fabric samples were investigated and statistical analysis was performed, which showed a significant effect of the spinning technique and weave design on these properties.

   Keywords:*pc yarn, ring spun, open-end, weave design, abrasion, pilling.*

2. **Zahra, Q., Mangat, A. E., Fraz, A., Hussain, S., Abbas, M., & Mukhtar, U.** (2018). Air, moisture and thermal comfort properties of woven fabrics from selected yarns. *Industria Textila, 69*(3), 177-182. **(Qurbat Zahra (STD), Ahmad Fraz, Sajid Hussain, Mudassar Abbas, Umair Mukhtar)** JCR Listed (IF: 0.438)

   Abstract: Air and moisture transport properties of plain woven fabric made from 20sNec cotton in warp and 20sNec pure yarns of tencel, modal, pro-modal, bamboo, polyester and cotton yarn inweft direction are studied. Major characteristics added for this study include water vapour permeability, air permeability, wettingtime and wicking speed. In comparison of six different samples of variously composed materials in weft direction, the air permeability of tencel was minimum and polyester was maximum, whereas the reverse results were observed for both the samples in case of water vapour permeability. Among the blends with cotton, thermal conductivity of bamboo and thermal absorptivity of polyester was found maximum whereas the minimum thermal resistance was observed for pro modal yarn in weft. Similar pattern was observed in spreading speed and wetting time of the polyester when observed from either side top or bottom. Air and moisture comfort properties of bamboo and pro modal, having nearly similar values are suggested to be used in garments used for golf players.

   Keywords:*moisture management properties, water vapour permeability, air permeability, wetting and thermal comfort properties.*

3. Raza, Z. A., & **Anwar, F.** (2018). Fabrication of poly (lactic acid) incorporated chitosan nanocomposites for enhanced functional polyester fabric. *Polímeros, 28*(2), 120-124. **(Faiza Anwar (STD)** JCR Listed (IF: 0.700)

   Abstract: This study dealt with the fabrication and analysis of poly (lactic acid) (PLA) mediated chitosan nanocomposite. Such a novel nanobiocomposite may get future applications in drug delivery, and nanofinising of textile and polymer surfaces. Herein, this nanocomposite has been considered as an antibacterial finishing agent for a hydrophobic textile fabric like polyester. The prepared nanocomposite was characterized for zeta size and morphology, and subsequently applied on a woven polyester fabric though a coross linker. The treated polyester fabric was analyzed for textile functionalcharacteristics as well asantibacterial activity. The spectral and optical properties demonstrated that the nanocomposite developed exhibited spherical morphologies with a mean nano particle size of ca. 88 nm. The treated fabric projected satisfactory antibacterial and fair fabric attributes. Hence, the nanofinished polyester fabric is a

potential biocompatible candidate as medical and antibacterial textiles in addition to be used in antibacterial water filtration and materials packing.

4. **Abbas, M.,** Neubauer, M., & Slugovc, C. (2018). Converting natural rubber waste into ring-opening metathesis polymers with oligo-1, 4-cis-isoprene sidechains. *Polymer Chemistry, 9*(14), 1763-1766. doi: 10.1039/C8PY00233A. **(Mudassar Abbas (STD) JCR Listed (IF: 4.927)**

Abstract:A chemical recycling of natural rubber waste *via* a degradation/polymerisation approach is described. The vulcanized rubber waste was degraded by cross metathesis with ethyl acrylate as the key-step yielding enoate end-capped oligo-*cis*-isoprenes, which were subsequently converted into norbornenes *via* a cycloaddition reaction with cyclopentadiene. Ring-opening Metathesis Polymerisation (ROMP) then yielded main-chain unsaturated polymers bearing oligo-1,4-*cis*-isoprene side chains with appealing thermal stability and a glass transition temperature of −60 °C.

5. **Abbas, M., Iftikhar, H., Malik, M. H.**, & Nazir, A. (2018). Surface Coatings of TiO2 Nanoparticles onto the Designed Fabrics for Enhanced Self-Cleaning Properties. *Coatings, 8*(1), 35. **(Mudassar Abbas (STD), Hina Iftikhar, Mumtaz Hasan Malik)**JCR Listed (IF: 2.350)

Abstract: Herein, the hydrophobic and self-cleaning properties of three different fabric surfaces have been evaluated after applying titanium dioxide (TiO2) nanofinishes. The nanoparticles were prepared by sol-gel techniques and were characterized by using X-ray diffraction (XRD), scanning electron microscopy (SEM) and dynamic light scattering (DLS) methods. The ultra-refined particles were applied over three different fabric substrates having similar weave of Z-twill (3/1). The yarns of 100% polyester, blend of viscose with mod-acrylic and high performance polyethylene containing 16 yarn count (Ne) and 31.496 and 15.748 ends/cm and picks/cm, respectively, were used for required fabric preparation. The different fabric structures were applied with self-cleaning finish of TiO2 nanoparticles prepared in our laboratory and the results were compared with commercially available finish Rucoguard AFR. The static contact angles, UV-protection factor, air permeabilityand hydrophobic activity of nanofinished fabric helped in evaluating their breathability and self-cleaning properties.

6. Qazi, A. M., Manzoor, A., Sitara, A., & Abbas, M. (2018). Importance of Draping in Fashion clothing Industry *Current Trends Fashion Technology Textile Engineering, 2*(2), 1-3. doi: 10.19080/CTFTTE.2018.02.555581.**(Adil Masood Qazi (STD),Amna Manzoor,Anika Sitara, Mudassar Abbas) (Not HEC Recognized)**

Abstract: Draping till date is a technique in fashion couture that has proven itself as an irreplaceable procedural step. The ready-to-wear collection involves a set pattern in a work flow, starting from visualization of conceiving an idea to presenting the final collection. The world today has intelligently added modern technology as the problem-solving solution. The integral part of draping in fashion couture has a proud and influential history. The modern designers understand draping as an essential methodology that leads to manufacture a flawless pattern. The article will explore the history of draping as an art-form that influences contemporary trends and usage.

7. Ahmad, F., Tausif, M., **Hassan, M. Z.**, Ahmad, S., & Malik, M. H. (2018). Mechanical and comfort properties of hydroentangled nonwovens from comber noil. *Journal of Industrial Textiles, 47*(8), 2014-2028. doi: 10.1177/1528083717716168.**(Mumtaz Hasan Malik (STD)**JCR Listed (IF: 1.283)

Abstract: Cotton is one of the most important commodity fibres and is widely employed in apparels. At present, the share of natural fibres in production of nonwoven fabrics is low and are used in opt applications. The cotton fibre is conventionally converted into woven and knitted fabrics by short staple spinning

methods. The comber noil is short fibre waste produced when cotton yarns are combed. The aims of the current study were to employ comber noil for the preparation of hydroentangled cotton nonwovens at varying water jet pressures and conveyor speeds. The effect of these parameters was studied with respect to mechanical and comfort properties of the prepared fabrics. The results showed that these variables can help to manufacture fibrous assemblies with engineered properties, according to required application area.

Keywords:*cotton, comber noil, hydroentanglement, nonwovens, mechanical, comfort.*

8. **Hussain, Z**., Arslan, M., **Malik, M. H.,** Mohsin, M., Iqbal, S., & Afzal, M. (2018). Integrated perspectives on the use of bacterial endophytes in horizontal flow constructed wetlands for the treatment of liquid textileeffluent: Phytoremediation advances in the field. *Journal of Environmental Management, 224,*pp 387-395. doi: 10.1016/j.jenvman.2018.07.057.**(Zahid Hussain (STD),Mumtaz Hasan Malik)** **JCR Listed (IF: 4.005)**

Abstract: Constructed wetlands (CWs) have emerged as cost-effective and sustainable treatment systems for the remediation of industrial wastewaters; nevertheless, their potential has mostly been evaluated in laboratory-scale studies. Likewise, endophytic bacteria can enhance plant growth and reduce phytotoxicity under polluted conditions, but their application with pilot-scale CWs has rarely been evaluated. The present study aims to evaluate on-site performance of endophyte-assisted pilot-scale horizontal flow constructed wetlands (HFCWs) for the remediation of effluent from a textile industry. The HFCWs were established by planting Leptochloa fusca in the presence of three endophytic bacterial strains with dye degrading, and plant growth promoting capabilities. We found that the system was able to remove a significant proportion of both organic and inorganic pollutants. Maximum reduction of pollutants was observed in endophyte-augmented HFCWs, where the COD and BOD reduced from 493 to 70 mg l−1 and 190 to 42 mg l−1, respectively, within 48 h. Additionally, survival of endophytic bacteria in different components of the HFCWs was also recorded. Treated wastewater was found to be non-toxic and the inoculated bacteria showed persistence in the wastewater as well as rhizo- and endosphere of L. fusca. Accordingly, a positive impact on plant growth was observed in the presence of bacterial augmentation. The system performance was comparable to the vertical flow constructed wetlands (VFCWs) as high nutrients reduction was seen in the presence of this partnership. This pilot-scale study is a step forward toward the field-scale application of phytoremediation coupled with bacterial endophytes as a cost-effective means of on-site wastewater remediation. To the best of our knowledge, this is among the first pilot-scale studies on use of HFCWs for improvement in quality of textile industry effluent as most previous studies are limited either in the context of engineering or lack effective interplay of plant and bacteria.

Keywords:*TiO2 nanoparticles, hydrophobic coatings, self-cleaning, air permeability and UV-protection factor.*

9. **Hussain, Z.,** Arslan, M., **Malik, M. H.,** Mohsin, M., Iqbal, S., & Afzal, M. (2018). Treatment of the textile industry effluent in a pilot-scale vertical flow constructed wetland system augmented with bacterial endophytes. *Science of the Total Environment, 645*, 966-973. doi: 10.1016/j.scitotenv.2018.07.163.**(Zahid Hussain(STD),Mumtaz Hasan Malik)**JCR Listed (IF: 4.610)

Abstract:A pilot-scale vertical flow constructed wetland (VFCWs) system was designed, implemented and operated for one year for the treatment of dye-rich real textile effluent. Brachiaria mutica was vegetated to develop VFCWs in which five different textile effluent degrading endophytic bacteria were inoculated. These bacteria were screened based on their dye degrading and plant growth promoting capabilities. The system's performance was evaluated by monitoring physicochemical parameters, nutrients removal, heavy metals reduction, detoxification potential, and persistence of endophytic bacteria in the plant rhizo- and endosphere. Although VFCWs were able to remove a majority of the pollutants from the wastewater, bacterial augmentation further enhanced the remediation efficiency. The system promoted an increase in dissolved oxygen up to 188% and, concomitantly, a substantial decrease in the chemical oxygen demand (81%), biochemical oxygen demand (72%), total dissolved solids (32%), color (74%), nitrogen (84%),

phosphorous (79%), and heavy metals [Cr(97%), Fe(89%), Ni(88%), Cd(72%)] was recorded. Wastewater treated with VFCWs augmented with bacteria was found to be non-toxic and inoculated bacteria showed persistence in the root and shoot interior of B. mutica. Conclusively, VFCWs proved to be an effective methodology for treatment of textile effluent whereas its smaller size with high efficiency is an advantage for field-scale applications.

Keywords:*endophytes, phytoremediation, pilot-scale, plant-bacteria partnership, textile industry, wastewater.*

10. Raza, Z. A., **Anwar, F.,** & Abid, S. (2018).Multi-response optimization in impregnation of chitosan nanoparticles on polyester fabric. *Polymer Bulletin*, 1-20. **(Faiza Anwar (STD)** JCR Listed (IF: 1.589)

Abstract:A Taguchi design was employed to optimize the recipe for in vitro antibacterial activity of polyester fabric treated with chitosan nanoparticles (CNPs), which were prepared using sodium tripolyphosphate as cross-linker under ionic gelation method. The CNPs treated polyester fabric with recommended recipe under Taguchi design showed about 5 mm zone of inhibition against E. coli and 5.5 mm against S. aureus. Scanning electron microscopy installed with an energy-dispersive x-ray detector was used to observe the morphology and presence of CNPs on the treated fabric. Based on statistical design, it was found that optimum process conditions were 15 g/l of CNPs, 90 g/l of cross-linker and 140 °C curing temperature. Analysis of variation indicated that the concentration of CNPs and cross-linker signifcantly afected the antibacterial properties of polyester fabric. Finally, a validation run confrmed the authenticity of proposed recipe. The polyester fabric showed good antibacterial activity with minimum loss of its inherent textile properties.

Keywords:*antibacterial, chitosan, polyester fabric, nanoparticles.*

11. Hussain, S., Glombikova, V., Akhtar, N., Mazari, A., Mansoor, T., &**Khan, A. H.**(2018).Liquid Moisture Transportation Properties of Functional Underwears: Part 1. *Autex Research Journal*. **(Haider Ali Khan (STD)** JCR Listed (IF: 0.957)

Abstract: This study investigates the effect of material composition on moisture management properties. Fiber type has significant influence on the moisture management properties of knitted fabrics. In this article, single jerseys knitted fabric samples with different yarn compositions were prepared. Liquid moisture transportation properties including wetting time, absorption rate, spreading speed, one-way transportation capability, and OMMC were evaluated by Moisture Management Tester (MMT) and vertical wicking was evaluated using thermography system and image analysis. Knitted sample having fine cotton yarns with coolmax and micro denier multifilament polypropylene showed best liquid transportation properties. There is a strong co-relation between OMMC and accumulative oneway transport index with vertical wicking of knitted samples.

Keywords:*moisture transportation breathability, moisture management tester, wicking.*

12. Azeem, M., **Fraz, A.,** & Javeda, A. (2018). Effect of Dyeing Temperature on the Shrinkage and Fastness Properties of Polyester/Acrylic Fabric. *Pakistan Journal of Scientific and Industrial Research Series A: Physical Sciences. 61*(2). **(Ahmad Fraz (STD)** (SJR)

Abstract: The dyeing rate of acrylic and polyester tends to start at 100 [degrees]C, and carriers are also used frequently to enhance the rate. Herein, the acrylic, polyester and polyester/acrylic blend of woven fabrics were dyed at different temperatures and by keeping the additional parameters constant. The ultimate effect of dyes-uptake observed favourable regarding colour fastness properties. With the increase in temperature, the variation in shrinkage was highly predicted. A significant effect was analysed by increasing the temperature of the dye through the fibre. The colour fastness of the dyed samples was also evaluated.
Keywords: *acrylic, polyester, polyester/acrylic blended fabric, shrinkage, fastness properties.*

Conference Papers

1. **Abbas, M., & Iftikhar, H.** (2018). *Synthesis of Advanced Textile Functional Materials Using Titanium Dioxide Nanoparticles for Self-cleaning Applications*. Paper presented at the 1st International Conference on Advances in Engineering and Technology (ICAET-2018), Quetta, Pakistan. **(Mudassar Abbas, (STD), Hina Iftikhar)**

Abstract: Due to their predefined size and shape, nanoparticles have gained much attention for material development in daily life applications. In textile industry, the modifying of conventional textile is required that can alter the entire property of the textiles. Therefore, it was need to develop a fabric which is antimicrobial and selfcleaning as well as protective against UV-irradiation without compromising the comfort of the fabric. Herein, the silver and titanium nanoparticles prepared via simple synthetic routes in a chemical laboratory are loaded in the commercial finishes for textiles to yield antimicrobial characteristics. The finished fabric constituted of 100% polyester, and blends of mod-acrylic and high performance polyethylene with viscose was generated by keeping in mind the upholstery applications. The product designed through this process can be used inmany domestic and commercial applications including medical textiles. The nanoparticles are characterized via X-ray diffraction and Dynamic Light scattering analysis and overall antimicrobial characteristics of textile materials are evaluated by using standard methods. The characterized nanoparticles of 68nm (on average) in presence of binders are coated over the fabrics with modified structures via pad-dry-cure method. The nano-coated functional textiles yielded good air-permeability, moisture comfort properties, hydrophobicity (evaluated through contact angle measurement) and UV-protection factor (for coloured fabrics only). The whole textile material was also evaluated against gram negative and gram positive bacteria for its antimicrobial characteristics. Novel textile finishes using common laboratory chemicals have been developed and it is believed that these finishes contain excellent fabric comfort properties.

School of Commerce and Accountancy (SCA)

Department of Commerce and Accountancy

Research Articles

1. **Rasheed, B., Arshed, N., Malik, Z. F., & Mahmood, M. T.** (2018). Impact of corporate social responsibility on firm's performance: evidence from non-financial sector of Pakistan. *Afro-Asian Journal of Finance and Accounting, 8*(2), 105-122. doi: 10.1504/aajfa.2018.091054.**(Burhan Rasheed (SCA), Noman Arshed, Zohair Farooq Malik, Mohyuddin Tahir Mahmood)(SJR)**

Abstract: The objective of this study is to examine the impact of corporate social responsibility (CSR) on firm's performance (FP). It is based on conceptual aspects of CSR and considers how CSR can be measured in order to investigate the firm's performance. The paper is exploratory in nature because CSR is measured as an investment and disclosure in the Pakistani non-financial sector. The empirical results of this study provide evidence of the positive impact of CSR on FP. It is further concluded that firms investing in CSR have better financial performance. This study is a pioneer in Pakistan regarding CSR as investment and disclosure simultaneously and therefore an addition to existing literature on CSR. This paper provides different new ways to investigate CSR, by encouraging a discussion about the importance of corporate social responsibility.
Keywords: *corporate social responsibility, CSR, firm's performance, FP, non-financial sector, simultaneous equation model, M40, Pakistan.*

Conference Papers

1. **Anwar, S.**, & Faran, S. (2018). *Workplace Politics and Employee Performance: An Empirical Study of Education Sector in Pakistan (Ref No.Icetems-18-174)*. Paper presented at the 3rd International Conference on

Emerging Trends in Engineering, Management and Scineces, October 18-20, 2018 (ICETEMS-2018) Peshawar, Pakistan. **(Saiqa Anwar(SCA)** **(SKT Campus)**

Abstract: Presence of intensely competitive and complex business environment has completely changed the way of organizations used to interact and conduct their businesses. As complexity in business globe is increasing, so is the competition in the companies to enhance their performance and meet their goals within defined timespan. However, it is considered that increase competition and lot of pressure on organizations is leading toward lot of organizational politics. This research paper completely revolves around investigating and examining the Impact of organizational politics on the performance of employee in educational sector. Johnson and Scholes Cultural Web Theory 1992 is used in this paper. The research is quantitative in nature, and after in-depth analysis and consideration, questionnaire has been adopted in order to collect data from the respondents. The respondents of the study are employees that are teachers and management staff of the colleges and universities of Lahore, Sialkot, and Gujranwala. Probability random sampling has been adoptedand the total sample size is 257 respondents. The data have been deeply analyzed through the implication of regression and correlation analysis for the model testing by using SPSS. Main predicators of model summary are organizational politics, political behavior, decision making and employee performance. The findings of this research highly recommend that by changing the attitudes and make the participatory role high for the employee gives them liberty to raise their voice, share their opinions and the transparency will take place which decrease the negative aspects of the organizational politics. Future recommendations are given in this research paper.

Keywords:*organization politics, political behavior, decision making and employee performanc.*

2. **Bashir, D. S., & Anwaar, S.** (2018). *Entrepreneurial Activities that Shaped Global Trade Success: A Case of Sialkot's Surgical Instruments Market*. Paper presented at the Conference paper presented in ICBEM 2018, IBA Sukkur University.**(Dr. Shahid Bashir (SCA) Saiqa Anwar)****(SKT Campus)**

Abstract: Sialkot City is the hub of largest global exporting country (i.e., Pakistan) of surgical instruments. Most of the surgical instruments business in Sialkot is originated as a result of successful entrepreneurial activities. However, the prior academic researchers are unable to provide enough data about those precise entrepreneurial activities that actually shaped such global trade success to Sialkot's surgical instruments market. This study is aimed to investigate the research issue as such. While interviewing five successful entrepreneurs of Sialkot's surgical instruments industry, the entrepreneurial activities are quality and standard, honesty, integrity, sincerity, devotion and consistency, in-time product delivery, certification of Quality (e.g., ISO 9001 and FDA), trained and skilled labor to manufacture products, adopting new technology, continuous development of lead team, carefully planned statement, efficient trade policies, no dodging, economical and quality products supplies, research and development on consumer choices, establishment of a product range, and quick, accurate and to-the-point in correspondence. Based on these findings, the stakeholders are recommended to follow the given benchmark standards to understand the difference in sense of production and export between Pakistan and other trade countries, and increase the exports in the major buying countries like US, Germany, UK, France, Italy, UAE, Japan, Brazil, Mexico, and Russia.

Keywords:*entrepreneurship, surgical instruments, market regional development.*

Institute of Communication and Cultural Studies(ICCS)

Department of Communication and Cultural Studies

Research Articles

1. **Safdar, M.,**& Ghani, M. U. (2018). Gender in Hamid's Fiction: A Reflection on the Cultural Paradigm Shift Brewing among Pakistani Women. *Asian Women, 34*(2), 89-109. doi: 10.14431/aw.2018.06.34.2.89**. (Muhammad Safdar (ICCS)**JCR Listed (IF: 0.171)

   Abstract: Modern women are not satisfied with the roles traditionally ascribed to them as obligatory; they rather feel stifled by them. Pakistani women, especially urban women with global exposure, are no exceptions. Hamid's two novels under study, Moth smoke (2000) and How to get filthy rich in rising Asia (2013), underline the evolving cultural transformation in Pakistan regarding female sexuality and gender in the wake of global cultural interactions. Based on the postmodern theories of fluid and performatively differential identity by cultural theorist Homi K Bhabha and feminist theorist Judith Butler, this study seeks to analyze the transformation of the urban Pakistani woman who is constantly exposed to global cultures by means of globalization and is influenced to redefine her sexuality and gender, through textual analysis of the major female characters of Hamid's two novels referenced above. The study also analyses how the modern Pakistani woman, embarked on her journey to self-fulfilment, defies the religio-culturally sacred institutions of wifehood and motherhood, finding them to be restrictive. However, the resisting impact of the place (i.e., Pakistan) is also obvious; these displaced women are not totally without feelings of anxiety. In addition to contributing to the contemporary discourse on the blurring of boundaries caused by the increasing connection between spatial scales, particularly the local and the global, this paper attempts to make a contribution in the areas of fluidity in sexualityand gender in Pakistani context.

   Keywords: *female sexuality, gender, culture, globalization, Mohsin Hamid, Pakistan.*

2. **Khan, A. A., & Khalid, A.** (2018). Pashto-English codeswitching: Testing the morphosyntactic constraints of the MLF model. *Lingua, 201*, 78-91. doi: https://doi.org/10.1016/j.lingua.2017.09.002.**(Arshad Ali Khan (ICCS),Amina Khalid)**JCR Listed (IF: 0.864)

   Abstract: This study examines the morphosyntactic constraints on Pashto-English codeswitching. The framework for the present research is based on the widely attested code-switching model, the Matrix Language Frame (MLF) Model and 4-M model (Myers-Scotton and Jake, 2000, Myers-Scotton and Jake, 2009). In order to investigate these constraints, 25 clips from the Pashto speech community have been transcribed and analyzed. The two constraints, the Morpheme Order (MO) constraint and the System Morpheme (SM) constraint of MLF Model are supported by the data. The Pashto-English bilingual data empirically support Myers-Scotton Matrix Language Frame Model and 4-M model (1993, 2002, 2009) and in the entire data set, not a single counter example has been recorded. The present study supports the idea that Pashto-English bilingual data is asymmetrical in structure, where English is the Embedded Language (EL) and Pashto is the Matrix Language (ML) responsible for the well-formedness and morphosyntactic frame. The study reveals that the subject-verb agreement, morpheme order, and the late system morpheme (bridge, outsider) play a crucial role to maintain the morphosyntactic frame of the Pashto language. The study validates the Differential Access Hypothesis (Myers-Scotton, 2006, Myers-Scotton, 2002; Myers-Scotton and Jake, 2009) in that the late system morphemes are triggered at the threshold level in order to uphold the structure.

   Keywords: *morphosyntactic constraints, light verb constructions, codeswitching, morpheme order principle, system morpheme principle.*

Conference Papers

1. **Abid, F., Sarfraz, R., Ashfaq, N., & Niazi, A.** (2018). *Multimodal analysis of the political posters before election campaign (2018) in Pakistan*. Paper presented at the (AIMC 2018) 2 nd ASIA International Multidisciplinary Conference, Social Sciences & Humanities (SSH 2018) Johor Bahru, Malaysia. **(Faiza Abid (ICCS) Rida Sarfraz, Naheed Ashfaq, Aisha Niazi)**

Abstract: The aim of this research paper is to analyze the key political posters made for the campaigns of Pakistani political parties like Pakistan Peoples Party (PPP), Pakistan Tehreek e Insaaf (PTI) and Muslim League Noon (PML-N). This research will focus on nine significant posters of Political parties in the elections that will take place in 2018 along with the election campaigns' that are rolling throughout the country. Moreover, the study will supremely focus on the representation of their leader through posters and later on it will pinpoint the similarities and possible differences between each of the poster especially emphasizing on what they denote. This is important in order to observe the main linguistic and visual strategies used to persuade the audience to vote that party and to highlight the power of the politician. While keeping in mind the cult of persuasion we must concentrate that how these parties grip the audience/ voters to an emotional extent that they actually get seriously attached with the concerned party. Critical discourse analysis tools will be helpful to identify the main discursive strategies employed to persuade the Pakistani population to vote in a certain direction. Van Leeuwen's (2008), social actor theory will facilitate the understanding of how participants are represented. Finally, the main tools of Kress and van Leeuwen's visual grammar (2006) will be applied for the analysis of the images. The study reveals that politicians are represented in a consistently positive way. These politicians have been symbolically treated as to inspire the masses and presented as warriors and saviors that can lift up the misery from people. These posters have chronic impact on the psychology of people that instigate them to vote or to support their respective party. People are persuaded to vote for the party they represent because they trust them as political leaders. The term leadership under the denotation of these posters has also elevated the gravity of the notion of patriotic streak mingled with specific political party's motto. The study, thus, points out that political posters are a powerful tool used in election campaigns to highlight the power of political parties. Furthermore, this study will also probe various tactics that have been implied by the political parties in their posters to create a powerful discourse that hit audience emotionally and provoke them for specific action.

Keywords:*posters, political discourse, critical discourse analysis, visual grammar, social actors.*

2. **Niazi, A., Abid, F., Ashfaq, N., Sarfraz, R., &Riaz, S.,**(2018). *Self Reflexivity and Style of Kishwar Naheed in Selected Poems.* Paper presented at the 4th International Conference of the Linguistic Association of Pakistan (ICLAP 2018).hosted by the Department of English, Fatima Jinnah Women University, Rawalpindi In collaboration with the Higher Education Commission of Pakistan 18-20 October 2018.**(Aisha Niazi (ICCS) Faiza Abid, Naheed Ashfaq , Rida Sarfraz, Sadia Riaz)**
Abstract:*Not found*

3. **Riaz, S., Niazi, A., Ashfaq, N., Sarfraz, R.,& Abid, F.,** (2018).*From Digital to Political: A Study of the Impact of Internet Memes in Political Discourse and Civic Participation*. Paper presented at theInternational Conference on Innovation in Teaching and Learning (ICITL-2018), International Islamic University Islamabad.**(Sadia Riaz (ICCS) Aisha Niazi, Naheed Ashfaq , Rida Sarfraz, Faiza Abid)**
Abstract:*Not found*

4. **Ashfaq, N., Abid. F., Sarfraz, R., Riaz, S., &Niazi, A.** (2018). *Language of the politicians of Pakistan, degerated to insult and name-calling.* Paper presented at the1st International Conference on English Literature, Linguistics and Teaching (ICELLT 2018) Interaction in English: Cross-Cultural Awareness and Communication. 13-15 December 2018.**(Naheed Ashfaq (ICCS) Faiza Abid, Rida Sarfraz, Sadia Riaz, Aisha Niazi)**
Abstract:*Not found*

School of Governance and Society (SGS)

Department of Governance and Society

Research Articles

1. **Azhar, A.,** & Yang, K. (2018). Workplace and Non-workplace Pro-environmental Behaviors: Empirical Evidence from Florida City Governments. *Public Administration Review, 0*(0). doi: 10.1111/puar.13003.**(Aisha Azhar (SGS)** JCR Listed (IF: 4.591)

Abstract: Public employees are expected to be good stewards of public resources and engage in pro-environmental behaviors (PEBs). Using different categorizations of PEBs, this article examines whether public employees perform these PEBs in workplace and non-workplace settings. The article further investigates how PEBs are influenced by salient characteristics of public organizations—that is, public service motivation (PSM) and civic participation categorized as civic engagement and cognitive engagement. Data were collected through a survey of public employees in two city governments in Florida. A structural equation model was employed to test the proposed model. Findings indicate that PSM has a positive influence on workplace PEBs and similar PEBs in the non-workplace settings. Civic engagement has a positive influence on both workplace and non-workplace PEBs. Barriers significantly moderate the effects of PSM and cognitive engagement on workplace and non-workplace PEBs.

Office of Information Systems

Research Articles

1. A lolaiyan, H. A., &**Abbas, M.** (2018). An Application of Stability of Fuzzy Hypergraphs in Medical Field. *Journal of Computational and Theoretical Nanoscience, 15*(4), 1247-1254. doi: 10.1166/jctn.2018.7211. **(Mujahid Abbas (Office of Information Systems) (SJR)**

Abstract: Doctors suffer from the problem of continuously exposing the patients to the risk of CT scans because this scan can cause many side effects. So, doctors tend to decrease the number of times they use CT scan for patients. However, decreasing the usage of CT scans would result in a difficulty in following up the evolution of the disease such as cancer, which would eventually lead doctors to a status of confusion. In this paper, our aim is to combine the concepts of fuzzy hypergraphs and stability of hypergraphs to develop a process of using CT scans to follow-up the status of cancer in a safe and scientific way.

Keywords: *fuzzy hypergraphs, hypergraphs, similarity measure, stability of fuzzy hypergraphs, x-ray ct computed tomography.*

Institute of Aviation Studies

Department of Aviation Studies

Conference Papers

1. **Asim, A.**, & Ashraf, M. (2018). *Design and Development of Secure Mobile Communication over GSM Network using Open Source Operating System (OS)*. Paper presented at the 2 nd International Conference on Innovative Computing, University of Management and Technology, Lahore, Pakistan. **(Arslan Asim (Aviation Studies)**

Abstract: With the rapidly advancing technology of today, exchange of information and data is a very pertinent matter. The world has just recently witnessed the effects of information leakage through the issue of WikiLeaks. There are huge amounts of data being shared over different platforms nowadays. Global System for Mobile Communication (GSM) is one of the most reliable platforms known to and used by almost all people in the world for text as well as voice communication. With the tools like Android Studio and NetBeans available, it is now possible to enrcypt the text that has to be sent over the GSM, so that it can be decrypted at the other end of the communication path. However, the encryption and decryption of voice being transmitted over the GSM network still remains a question. In the domain of real time voice encryption, much of the work being carried out pertains to the voice being exchanged through the Internet Protocol. As compared to the Voice over Internet Protocol (VoIP), voice over the GSM network has not seen much research work related to its security aspects. The purpose of this paper is to document the results of a project aimed at developing a platform for mobile phones in order to communicate over the GSM network in a secure manner. The most suitable method for achieving the above mentioned objective is to use an open source Operating System (OS), so that the source code is easily accessible and usable. In this paper, the Android OS will be under discussion, which is compatible with all the Android mobile phones. In this way, the maximum number of mobile phone users can be benefitted because Android cell phones are being widely used nowadays. The use of cryptographic algorithms for securing the voice communication over the GSM network is also a part of this paper. The work revolves around the Java programming language since the Android application development has been carried out in Java through the use of Android Studio. Also, NetBeans has been employed for developing algorithms for voice encryption.

Author Index

Keywords Index

W

Y

Z

School\Departments	Articles	Conference Papers	Proceeding Papers	Books/Book Chapter	Total
School of Sciences (SSC)					
Department of Chemistry	27	13		1	41
Department of Physics	15				15
Department of Life Science	22				22
Department of Mathematics	80				80
Total	**144**	**13**		**1**	**158**
School of Engineering (SEN)					
Department of Civil Engineering	7	1			8
Department of Electrical Engineering	14	7	1		22
Department of Energy Engineering	2	1			3
Department of Mechanical Engineering	5				5
Total	**28**	**9**	**1**		**38**
Institute of Communication and Cultural Studies (ICCS)					
ICCS	2	4			6
Total	**2**	**4**			**6**
School of System & Technology (SST)					
Department of Computer Science	23	1	2		26
Department of Software Engineering	2		1		3
Departments of Informatics &System	6	1			7
Total	**31**	**2**	**3**		**36**
Institute of Clinical Psychology					
ICPY	9	2			11
Total	**9**	**2**			**11**
Institute of Islamic Banking					
IIB	4	2			6
Total	**4**	**2**			**6**
School of Business and Economics (SBE)					
Department of Economics	11	3			14
Department of Finance	9	2		1	12
Department of Management	14	5			19
Department of Operations & Supply Chain	5			1	6
Department of Quantitative Methods	8				8
Department of Marketing	4	4			8
Department of Information Systems	1		2		3
Total	**52**	**14**	**2**	**2**	**70**
School of Social Sciences & Humanities (SSSH)					
Department of English Language & Literature	6	3			9
Department of Islamic Thought & Civilization	3				3
Department of Political Science	3	4			7

Department of Sociology	4				4
Department of Psychology	3				3
Department of Gender Studies	2	4		2	8
Department of Education	5	21	1	1	28
Total	**26**	**32**	**1**	**3**	**62**
School of Law and Policy (SLP)					
SLP		2			2
Total		**2**			**2**
School of Health Science (SHS)					
SHS	15				15
Total	**15**				**15**
School of Architecture & Planning(SAP)					
SAP	11	5			16
Total	**11**	**5**			**16**
School of Food and Agricultural Sciences(SFAS)					
SFAS	19			2	21
Total	**19**			**2**	**21**
School of Professional Advancement (SPA)					
SPA	3	3			6
Total	**3**	**3**			**6**
School of Governance & Society (SGS)					
SGS	1				1
Total	**1**				**1**
School of Textile & Design (STD)					
STD	12	1			13
Total	**12**	**1**			**13**
School of Commerce and Accountancy (SCA)					
SCA	1	2			3
Total	**1**	**2**			**3**
Office of Information Systems					
OIS	1				1
Total	**1**				**1**
Institute of Aviation Studies					
Department of Aviation Studies		1			1
Total		**1**			**1**
Grand Total	**359**	**92**	**7**	**8**	**466**

Table II

Pie Chart of School/ Center/ Departmentswise Publications

Legend:
- SSC 158
- SEN 38
- ICCS 6
- SST 36
- ICPY 11
- IIB 6
- SBE 70
- SSSH 62
- SLP 2
- SHS 15
- SAP 16
- SFAS 21
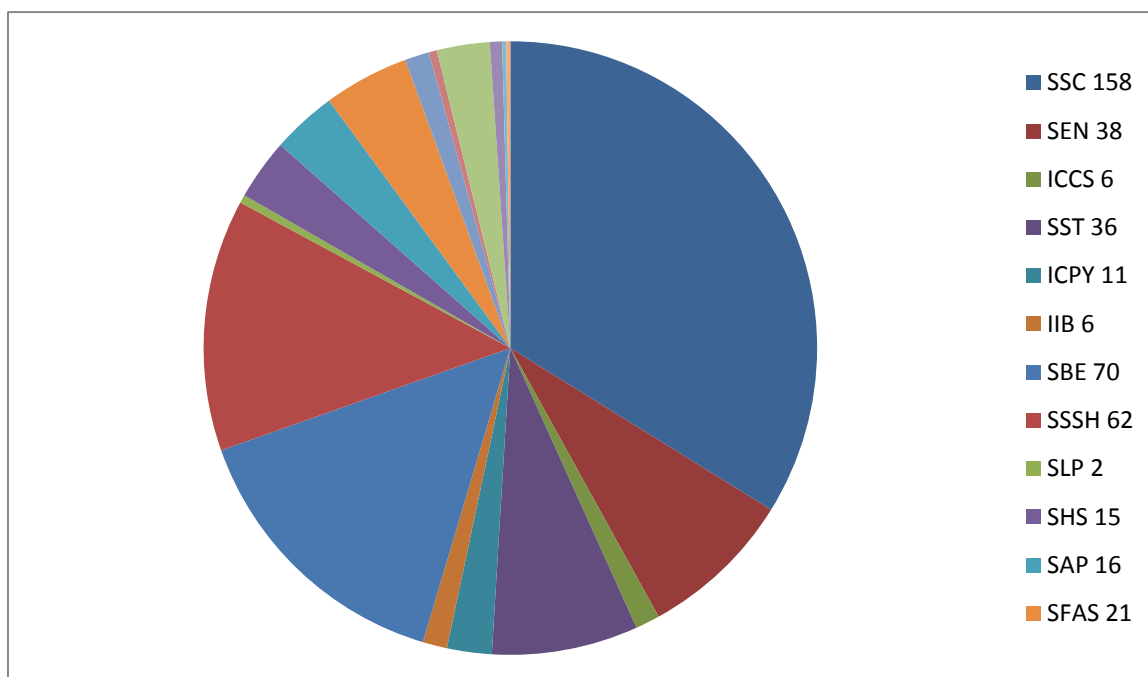
Table III

School/Department wise listing of Publications

School\Departments	JCR	SJR	HEC X-Cat.	HEC Y-Cat.	HEC Z-Cat.	NR	UMT	ISI web of Science	Total
School of Sciences									
Department of Chemistry	17	1				6	1	3	28
Department of Physics	14						1		15
Department of Life Sciences	19	2						1	22
Department of Mathematics	47	7	4	2		5	1	14	80
Total	**97**	**10**	**4**	**2**		**11**	**3**	**18**	**145**
School of Engineering									
Department of Civil Engineering	4			1	1		1		7
Department of Electrical Engineering	10	2	2					1	15
Department of Energy Engineering	2								2
Department of Mechanical Engineering	5								5
Total	**21**	**2**	**2**	**1**	**1**		**1**	**1**	**29**
School of System & Technology									
Department of Computer Science	16	1			1			7	25
Department of Software Engineering	2							1	3
Department of Informatics System	3	1	1					1	6
Total	**21**	**2**	**1**		**1**			**9**	**34**
School of Business and Economics									
Department of Economics	1		1	6					11
Department of Finance		4		4				1	9
Department of Management	6			6				2	14
Department of Operations & Supply Chain	3			1			1		5
Department of Quantitative Methods	4	2				1	1		8
Department of Marketing	1			3					4
Department of Information Systems		1						2	3
Total	**15**	**7**	**1**	**20**		**4**	**2**	**5**	**54**
Institute of Islamic Banking									
IIB						2	2		4
Total						**2**	**2**		**4**
School of Architecture and Planning									
SAP	1	4		5				1	11
Total	**1**	**4**		**5**				**1**	**11**

School of Social Sciences & Humanities									
Department of English Language & Literature	2		1			2	1		6
Department of Islamic Thought & Civilization				2			1		3
Department of Political Science	1			2					3
Department of Sociology		2				2			4
Department of Psychology	2					1			3
Department of Gender Studies							2		2
Department of Education				3		1	1	2	6
Total	**5**	**2**	**1**	**7**		**6**	**5**	**2**	**26**
School of Health Sciences									
SHS	13	2							15
Total	**13**	**2**							**15**
School of Food and Agricultutral Sciences									
SFAS	18	1						2	21
Total	**18**	**1**						**2**	**21**
School of Professional Advancement									
SPA				1	1	1			3
Total				**1**	**1**	**1**			**3**
Institute of Clinical Psychology									
ICPY	2		1	3		1		2	9
Total	**2**		**1**	**3**		**1**		**2**	**9**
School of Textile & Design									
STD	10	1				1			12
Total	**10**	**1**				**1**			**12**
School of Commerce and Accountancy									
SCA		1							1
Total		**1**							**1**
Institute of Communication and Cultural Studies									
IICCS	2								2
	2								**2**
School of Governance & Society									
SGS	1								1
Total	**1**								**1**
Office of Information Systems									
OIS		1							1
Total		**1**							**1**
Grand Total	**206**	**33**	**9**	**37**	**3**	**28**	**13**	**43**	**372**

Table IV

Author wise (Alphabetical) publications

Author	No. of Publications
Abaid ur Rehman Virk	3
Abdul Ghaffar	1
Abdul Hameed	3
Abdul Rafay	3
Abdullah Zafar	1
Abdullah Khalid	1
Abeeda Qureshi	1
Absar ul Haq	2
Adil Masood Qazi	1
Adina Asim	1
Adnan Abid	1
Adnan Amjad	1
Adnan Jalil	1
Afifa Tanweer	2
Agha Kashif	2
Ahmad Fraz	3
Ahmad Khan	2
Ahmed Bilal	1
Ahmed Azam Malik	1
Ahmed W. Ghauri	1
Aisha Azhar	1
Aisha Niazi	4
Akbar Ali	12
Aleena Shuja	2
Ali Ajwad	2
Ali Raza	1
Ambreen Salahuddin	4
Ammber Nosheen	1
Amna Manzoor	1
Amer Saeed	2
Amina Khalid	1
Amina Tariq	1
Amish Shafique	1
Amna Rashid	2
Anam Amir	1
Anika Sitara	1
Anila Sarwar	1

Areesha Gul	1	
Arhum Habib	1	
Arshad Ali Khan	1	
Arslan Asim	1	
Asad Mohi-ud-Din	1	
Asadur Rahman Wahla	1	
Asfa Javed	1	
Asghar Ali Shah	1	
Atif Hassan	6	
Atta ul Mohsin Lali	1	
Aun Haider	6	
Awais Saeed	1	
Ayesha Iqbal	1	
Ayesha Jabeen	1	
Ayesha Khaliq	1	
Ayesha Khan	1	
Ayesha Khawar	1	
Ayesha Mehmood Malik	2	
Ayesha Mohyuddin	2	
Ayesha Shahzad	2	
Ayesha Saleem	1	
Ayesha Wajid	1	
Ayesha Zafar	1	
Babar Azeem	1	
Babar Shahzaad	1	
Basit Kamal	1	
Braira Wahid	2	
Burhan Rasheed	1	
Eman Alharbi	1	
Faiqa Khilat	2	
Faiza Anwar	2	
Faiza Rasheed	1	
Fakhra Ashraf	1	
Fakhra Malik	1	
Farhat Munir	1	
Farheen Rizvi	1	
Fariha Tariq	8	
Farwah Ali	2	
Farzana Naeem	1	
Fatima Asif	2	
Fatima Naeem Malik	2	
Fatima Sajjad	1	
Fazal Dayan	4	
Faiza Abid	4	

Fiza Ahmed	1	
Fizza Miraj	1	
Fariha Tariq	8	
Ghulam Murtaza	1	
H. Khan	1	
Hafeez-ur-Rehman	7	
Hafiz Zaheer Hussain	1	
Haider Ali Khan	1	
Hamid Raza	3	
Haris Aslam	3	
Haroon Rasheed	1	
Hassan Shakeel Shah	4	
Hassan Tariq	1	
Hina Iftikhar	2	
Hira Fayyaz	1	
Huma Khan	1	
Humaira Khan	1	
Humera Bashir	1	
Ifra Noureen	3	
I. Hussain	1	
Ijaz Ahmad	1	
Ijaz Yusuf	1	
Imran Saleem	1	
Imtiaz Ahmad	2	
Inam-Ul-Haq	1	
Iqra Javed	1	
Iqra Naveed	1	
Iqra Qaddir	1	
Iqra Tariq	1	
Iram Rubab	4	
Irfana Omer	1	
Jameel Ahmad	4	
Javaid Ali	2	
Javeria Hasan	2	
K. S. Munawar	1	
Kamran Rashid	1	
Kamran Zeb	1	
Kashif Ishaq	1	
Khalid Ijaz	2	
Khalid Rashid	1	
Khalil Ahmed Arbi	1	
Khaliq Ur Rehman	1	
Khawar Sultana	2	
Khawar Siddique Khokhar	3	

Khizar Hameed	1	
Khuram Shahzad	1	
Khurram Shahzad Munawar	1	
Kinza Younas	1	
M. Bilal Anwar	1	
Muhammad Bilal Saddique	3	
M. A. Rehman	2	
M. A. Imran	1	
Muhammad F. Sajjad	1	
M. I. Shafiq	1	
M. Hussain	1	
M. Imran Jamil	4	
M. M. Kaleem	1	
M. Saeed	1	
M. Usman	2	
M. Usman Rashid	1	
M. Zaid	1	
M.Jawad	1	
Mahvish Kabir	1	
Malik Tahir Hassan	3	
Malik Umer Ayub	1	
Maqbool H. Sial	3	
Maqsood Ahmad	3	
María Isabel Maldonado García	3	
Maryam Aleem	1	
Memoona Rashid	1	
Minahil Nawaz	1	
Mohammad Ali Haider Chauhan	1	
Mohammad Ayaz	2	
Mohammad Mustafa Mirza	1	
Mohammad Naveed Afzal	1	
Mohsin Javed	5	
Mohyuddin Tahir Mahmood	1	
Momina Shaheen	1	
Mudassar Abbas	5	
Muhammad Adnan	2	
Muhammad Akib Warraich	2	
Muhammad Ali	6	
Muhammad Ali (SKT)	1	
Muhammad Ali Hashmi	1	

Muhammad Arif	1	
Muhammad Asim Butt	2	
Muhammad Awais	1	
Muhammad Azhar Iqbal	2	
Muhammad Aziz ur Rehman	2	
Muhammad Bilal Riaz	5	
Muhammad Bilal Siddique	1	
Muhammad F. Sajjad	1	
Muhammad Faisal Sajjad	2	
Muhammad Fahad Zia	1	
Muhammad Faran	1	
Muhammad Farhan Tabassum	1	
Muhammad Farhat Kaleem	1	
Muhammad Farooq	4	
Muhammad Furqan Tanvir	3	
Muhammad Imran	2	
Muhammad Imran Asjad	8	
Muhammad Ibraheem	1	
Muhammad Javaid	7	
Muhammad Javid Qadir	2	
Muhammad Kaleem	3	
Muhammad Khalil Anwar	2	
Muhammad Khurshid Azam	1	
Muhammad Latif	2	
Muhammad Luqman	1	
Muhammad Moeen Butt	4	
Muhammad Nadeem Ali	1	
Muhammad Noman	1	
Muhammad Rafiq	3	
Muhammad Rehan Faheem	1	
Muhammad Rizwan Younis	1	
Muhammad Saeed	4	
Muhammad Safdar	1	
Muhammad Salman	3	
Muhammad Shaban Rafi	1	
Muhammad Shahid Hassan	1	
Muhammad Shoaib Farooq	2	
Muhammad Shoaib Pervez	4	
Muhammad Shoaib Saleem	2	
Muhammad Sohail Afzal	12	

Name	Count	
Muhammad Tahir Mushtaq	2	
Muhammad Tahir Mustafa	2	
Muhammad Umair	1	
Muhammad Umer Azeem	5	
Muhammad Usman Rashid	3	
Muhammad Yusuf Awan	2	
Muhammad Zaid	1	
Muhammad Zulqarnain	2	
Muhammed Imran (SEN)	2	
Muhammad Jamil	3	
Muhammed Rizwan	1	
Muhammad Zeeshan	1	
Mujahid Abbas	1	
Mumtaz Hasan Malik	4	
Munim Shaukat	1	
Murtaza Haider	1	
Muzammil Hussain	3	
Nadir Ali	1	
Naeem Saeed	1	
Naheed Ashfaq	4	
Naseer Ahmad Asif	1	
Nauman Ahmed	1	
Nauman Khalid	22	
Nauman Shah	2	
Naveda Kitchlew	2	
Naveed Ahmed Noor	1	
Naveed Rehan	1	
Naveed Yazdani	1	
Naveed-Ul-Haq	3	
Nazam Ali	1	
Nisar Hussain	1	
Noman Arshed	6	
Noreen Zahra	1	
Nouman Rasool	12	
Qurbat Zahra	1	
Rabia Farooqi	1	
Rabia Nasir	1	
Raja Noshad Jamil	4	
Ramla Sadiq	1	
Ramna Khalid	1	
Rana Muhammad Mateen	1	
Reamsha Khan Malik	1	
Rida Sarfraz	4	
Roshaan Saqib	1	

Rubab Manzoor	3	
Rubeena Tashfeen	3	
Ruby Nasir	1	
Rukhsana Kalim	3	
Rumaisa Rasheed	1	
S. Belal	1	
Sadeeq ur Rahman	1	
Sadia Riaz	3	
Sadia Saleem	3	
Safia Nosheen	3	
Saima Ali	1	
Saima Gulzar	6	
Saima Shaheen	2	
Saiqa Anwar	3	
Sajed Ali	2	
Sajid Hussain	1	
Sajid Mahmood	2	
Sajid Masood	4	
Sajida Mukhtar	2	
Salman Mahmood	1	
Salman Zaheer	1	
Sami Ullah Bajwa	2	
Sammia Shahid	23	
Sana Malik	1	
Sana Mehmood	1	
Sana Sameen Sabir	2	
Sania Munir	1	
Saqib Farid	2	
Sara Ahmad	1	
Sara Subhan	2	
Saroosh Zahoor	2	
Seema Arif	9	
Shabnam Khan	1	
Shah Muhammad Haroon	3	
Shahid Bashir	2	
Shahid Imran	1	
Shahid Mehmood Awan	1	
Shahzad Ahmad	6	
Shahzad Faizi	7	
Shaista Habib	1	
Shaista Jabin	1	
Shakeel Ahmad Khan	8	
Shakeel Riaz	1	
Shakir Ahmad	1	

Shaukat Iqbal	4
Sheraz Naseer	2
Sobia Ilyas	1
Sohaib Khalid	1
Sohail Nadeem	1
Sohail Zafar	12
Somia Saeed	1
Sulman Ahmad Khan	1
Syed Ali Mardan Azmi	1
Syed Ammar Hussain	2
Syed Farooq Ali	3
Syed Khawar Nadeem Kirmani	1
Syed Muhammad Muslim Raza	3
Syed Rehan Ashraf	1
Syed Sajjad Haider	1
Syed Sikander Ali Shah	1
Syeda Namrah Mahmood	1
Syeda Shaima Sani	1
Tabassum Munir	1
Tabasam Rashid	16
Tahir Mahmood	1
Tahira Jibeen	2
Tahreem Yasir	2
Tahseen Mohsan Khan	3
Tala Bin Maqsood	1
Talat Hussain	2
Talha Zubair	2
Tariq Waheed Qureshi	1
Tashfeen Mahmood Azhar	4
Tayyaba Anees	1
Tipu Sultan	2
Toheed Akhter	1
Um-ul-Huda	1
Umair Mukhtar	1
Umaiza Bashir	1
Umar Ali	2
Umar Rashid	2
Umer Bacha	11
Umer Sajjad	1
Urooj Fatima	3
Usman Ilyas	1
Uzma Farooq	1
Uzma Khalil	1

Uzma Rashid	1	
Uzma Tahira	1	
W. Ahmad	2	
Wahab Nazir	1	
Waqar Hussain	3	
Waqar Uddin	1	
Waqas Asghar	1	
Waqas Farooq	2	
Waseem Iqbal	1	
Wasif Ali Waseer	3	
Yaser Daanial Khan	6	
Yaar Muhammad	8	
Yasir Rashid	5	
Zaheer Hussain Shah	2	
Zahid Ghulam Rasool	1	
Zahid Hussain	2	
Zahid Mahmood	5	
Zahid Ullah	4	
Zahra Ali	2	
Zain Ul Abideen	1	
Zeshan Ahmad	2	
Zohaib Awan	1	
Zohaib Zahid	6	
Zohair Farooq Malik	1	
Zunaira Nazir	1	
Zunaira Zafar	2	

Table-V

Number wise (Descending-order) publications by authors

Author	No. of Publications
Sammia Shahid	23
Nauman Khalid	22
Tabasam Rashid	16
Akbar Ali	12
Muhammad Sohail Afzal	12
Nouman Rasool	12
Sohail Zafar	12
Umer Bacha	11
Seema Arif	9
Fariha Tariq	8
Fariha Tariq	8
Muhammad Imran Asjad	8
Shakeel Ahmad Khan	8
Yaar Muhammad	8
Hafeez-ur-Rehman	7
Muhammad Javaid	7
Shahzad Faizi	7
Atif Hassan	6
Aun Haider	6
Muhammad Ali	6
Noman Arshed	6
Saima Gulzar	6
Shahzad Ahmad	6
Yaser Daanial Khan	6
Zohaib Zahid	6
Mohsin Javed	5
Mudassar Abbas	5
Muhammad Bilal Riaz	5
Muhammad Umer Azeem	5
Yasir Rashid	5
Zahid Mahmood	5
Aisha Niazi	4
Ambreen Salahuddin	4
Faiza Abid	4
Fazal Dayan	4
Hassan Shakeel Shah	4
Iram Rubab	4
Jameel Ahmad	4
M. Imran Jamil	4
Muhammad Farooq	4
Muhammad Moeen Butt	4
Muhammad Saeed	4
Muhammad Shoaib Pervez	4
Mumtaz Hasan Malik	4

Naheed Ashfaq	4	
Raja Noshad Jamil	4	
Rida Sarfraz	4	
Sajid Masood	4	
Shaukat Iqbal	4	
Tashfeen Mahmood Azhar	4	
Zahid Ullah	4	
Abaid ur Rehman Virk	3	
Abdul Hameed	3	
Abdul Rafay	3	
Ahmad Fraz	3	
Hamid Raza	3	
Haris Aslam	3	
Ifra Noureen	3	
Khawar Siddique Khokhar	3	
Muhammad Bilal Saddique	3	
Malik Tahir Hassan	3	
Maqbool H. Sial	3	
Maqsood Ahmad	3	
María Isabel Maldonado García	3	
Muhammad Furqan Tanvir	3	
Muhammad Jamil	3	
Muhammad Kaleem	3	
Muhammad Rafiq	3	
Muhammad Salman	3	
Muhammad Usman Rashid	3	
Muzammil Hussain	3	
Naveed-Ul-Haq	3	
Rubab Manzoor	3	
Rubeena Tashfeen	3	
Rukhsana Kalim	3	
Sadia Riaz	3	
Sadia Saleem	3	
Safia Nosheen	3	
Saiqa Anwar	3	
Shah Muhammad Haroon	3	
Syed Farooq Ali	3	
Syed Muhammad Muslim Raza	3	
Tahseen Mohsan Khan	3	
Urooj Fatima	3	
Waqar Hussain	3	
Wasif Ali Waseer	3	
Absar ul Haq	2	
Afifa Tanweer	2	
Agha Kashif	2	
Ahmad Khan	2	
Aleena Shuja	2	
Ali Ajwad	2	
Amer Saeed	2	

Amna Rashid	2	
Ayesha Mehmood Malik	2	
Ayesha Mohyuddin	2	
Ayesha Shahzad	2	
Braira Wahid	2	
Faiqa Khilat	2	
Faiza Anwar	2	
Farwah Ali	2	
Fatima Asif	2	
Fatima Naeem Malik	2	
Hina Iftikhar	2	
Imtiaz Ahmad	2	
Javaid Ali	2	
Javeria Hasan	2	
Khalid Ijaz	2	
Khawar Sultana	2	
M. A. Rehman	2	
M. Usman	2	
Mohammad Ayaz	2	
Muhammad Adnan	2	
Muhammad Akib Warraich	2	
Muhammad Asim Butt	2	
Muhammad Azhar Iqbal	2	
Muhammad Aziz ur Rehman	2	
Muhammad Faisal Sajjad	2	
Muhammad Imran	2	
Muhammad Javid Qadir	2	
Muhammad Khalil Anwar	2	
Muhammad Latif	2	
Muhammad Shaoib Farooq	2	
Muhammad Shoaib Saleem	2	
Muhammad Tahir Mushtaq	2	
Muhammad Tahir Mustafa	2	
Muhammad Yusuf Awan	2	
Muhammed Imran (SEN)	2	
Muhammad Zulqarnain	2	
Nauman Shah	2	
Naveda Kitchlew	2	
Saima Shaheen	2	
Sajed Ali	2	
Sajid Mahmood	2	
Sajida Mukhtar	2	
Sami Ullah Bajwa	2	
Saqib Farid	2	
Sara Subhan	2	
Saroosh Zahoor	2	
Shahid Bashir	2	
Sheraz Naseer	2	
Syed Ammar Hussain	2	

Tahira Jibeen	2	
Tahreem Yasir	2	
Talat Hussain	2	
Talha Zubair	2	
Tipu Sultan	2	
Umar Ali	2	
Umar Rashid	2	
W. Ahmad	2	
Waqas Farooq	2	
Zaheer Hussain Shah	2	
Zahid Hussain	2	
Zahra Ali	2	
Zeshan Ahmad	2	
Zunaira Zafar	2	
Abdul Ghaffar	1	
Abdullah Zafar	1	
Abdullah Khalid	1	
Abeeda Qureshi	1	
Adil Masood Qazi	1	
Adnan Abid	1	
Adnan Amjad	1	
Adnan Jalil	1	
Ahmed Bilal	1	
Ahmed Azam Malik	1	
Ahmed W. Ghauri	1	
Aisha Azhar	1	
Ali Raza	1	
Ammber Nosheen	1	
Amna Manzoor	1	
Amina Khalid	1	
Amish Shafique	1	
Anam Amir	1	
Anika Sitara	1	
Anila Sarwar	1	
Areesha Gul	1	
Arhum Habib	1	
Arshad Ali Khan	1	
Arslan Asim	1	
Asad Mohi-ud-Din	1	
Asadur Rahman Wahla	1	
Asfa Javed	1	
Asghar Ali Shah	1	
Atta ul Mohsin Lali	1	
Awais Saeed	1	
Ayesha Iqbal	1	
Ayesha Jabeen	1	
Ayesha Khaliq	1	
Ayesha Khan	1	
Ayesha Khawar	1	
Ayesha Saleem	1	

Ayesha Wajid	1
Ayesha Zafar	1
Babar Azeem	1
Babar Shahzaad	1
Basit Kamal	1
Burhan Rasheed	1
Eman Alharbi	1
Faiza Rasheed	1
Fakhra Ashraf	1
Fakhra Malik	1
Farhat Munir	1
Farheen Rizvi	1
Farzana Naeem	1
Fatima Sajjad	1
Fiza Ahmed	1
Fizza Miraj	1
Ghulam Murtaza	1
H. Khan	1
Hafiz Zaheer Hussain	1
Haider Ali Khan	1
Haroon Rasheed	1
Hassan Tariq	1
Hira Fayyaz	1
Huma Khan	1
Humaira Khan	1
Humera Bashir	1
I. Hussain	1
Ijaz Ahmad	1
Ijaz Yusuf	1
Imran Saleem	1
Inam-Ul-Haq	1
Iqra Javed	1
Iqra Naveed	1
Iqra Qaddir	1
Iqra Tariq	1
Irfana Omer	1
K. S. Munawar	1
Kamran Rashid	1
Kamran Zeb	1
Kashif Ishaq	1
Khalid Rashid	1
Khalil Ahmed Arbi	1
Khaliq Ur Rehman	1
Khizar Hameed	1
Khuram Shahzad	1
Khurram Shahzad Munawar	1
Kinza Younas	1
M. Bilal Anwar	1
M. A. Imran	1
Muhammad F. Sajjad	1

M. I. Shafiq	1
M. Hussain	1
M. M. Kaleem	1
M. Saeed	1
M. Usman Rashid	1
M. Zaid	1
M.Jawad	1
Mahvish Kabir	1
Malik Umer Ayub	1
Maryam Aleem	1
Memoona Rashid	1
Minahil Nawaz	1
Mohammad Ali Haider Chauhan	1
Mohammad Mustafa Mirza	1
Mohammad Naveed Afzal	1
Mohyuddin Tahir Mahmood	1
Momina Shaheen	1
Muhammad Ali (SKT)	1
Muhammad Ali Hashmi	1
Muhammad Arif	1
Muhammad Awais	1
Muhammad Bilal Siddique	1
Muhammad Fahad Zia	1
Muhammad Faran	1
Muhammad Farhan Tabassum	1
Muhammad Farhat Kaleem	1
Muhammad Ibraheem	1
Muhammad Khurshid Azam	1
Muhammad Luqman	1
Muhammad Nadeem Ali	1
Muhammad Noman	1
Muhammad Rehan Faheem	1
Muhammad Rizwan Younis	1
Muhammad Safdar	1
Muhammad Shaban Rafi	1
Muhammad Shahid Hassan	1
Muhammad Umair	1
Muhammad Zaid	1
Muhammed Rizwan	1
Muhammad Zeeshan	1
Mujahid Abbas	1
Munim Shaukat	1
Murtaza Haider	1
Nadir Ali	1
Naeem Saeed	1
Naseer Ahmad Asif	1

Nauman Ahmed	1
Naveed Ahmed Noor	1
Naveed Rehan	1
Naveed Yazdani	1
Nazam Ali	1
Nisar Hussain	1
Noreen Zahra	1
Qurbat Zahra	1
Rabia Farooqi	1
Rabia Nasir	1
Ramla Sadiq	1
Ramna Khalid	1
Rana Muhammad Mateen	1
Reamsha Khan Malik	1
Roshaan Saqib	1
Ruby Nasir	1
Rumaisa Rasheed	1
S. Belal	1
Sadeeq ur Rahman	1
Saima Ali	1
Sajid Hussain	1
Salman Mahmood	1
Salman Zaheer	1
Sana Malik	1
Sana Mehmood	1
Sana Sameen Sabir	1
Sania Munir	1
Sara Ahmad	1
Shabnam Khan	1
Shahid Imran	1
Shahid Mehmood Awan	1
Shaista Habib	1
Shaista Jabin	1
Shakeel Riaz	1
Shakir Ahmad	1
Sobia Ilyas	1
Sohaib Khalid	1
Sohail Nadeem	1
Somia Saeed	1
Sulman Ahmad Khan	1
Syed Ali Mardan Azmi	1
Syed Khawar Nadeem Kirmani	1
Syed Rehan Ashraf	1
Syed Sajjad Haider	1
Syed Sikander Ali Shah	1
Syeda Namrah Mahmood	1
Syeda Shaima Sani	1
Tabassum Munir	1
Tahir Mahmood	1

Tala Bin Maqsood	1
Tariq Waheed Qureshi	1
Tayyaba Anees	1
Toheed Akhter	1
Um-ul-Huda	1
Umair Mukhtar	1
Umaiza Bashir	1
Umer Sajjad	1
Usman Ilyas	1
Uzma Farooq	1
Uzma Khalil	1
Uzma Rashid	1
Uzma Tahira	1
Wahab Nazir	1
Waqar Uddin	1
Waqas Asghar	1
Waseem Iqbal	1
Zahid Ghulam Rasool	1
Zain Ul Abideen	1
Zohaib Awan	1
Zohair Farooq Malik	1
Zunaira Nazir	1
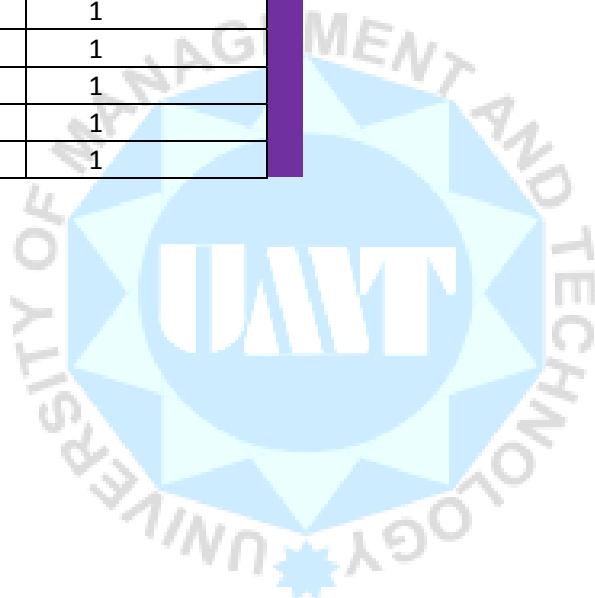
Table-VI

Number wise (Descending-order) JCR publications by authors.

Author	No. of Publications
Nauman Khalid	20
Tabasam Rashid	12
Umer Bacha	11
Nouman Rasool	10
Muhammad Sohail Afzal	8
Shakeel Ahmad Khan	8
Akbar Ali	7
Muhammad Ali	6
Sohail Zafar	6
Yaser Daanial Khan	6
Muhammad Imran Asjad	5
Sammia Shahid	5
Shahzad Ahmad	5
M. Imran Jamil	4
Muhammad Bilal Riaz	4
Muhammad Farooq	4
Muhammad Umer Azeem	4
Mumtaz Hasan Malik	4
Shahzad Faizi	4
Shaukat Iqbal	4
Aun Haider	3
Ifra Noureen	3
Jameel Ahmad	3
Muhammad Bilal Saddique	3
Mohsin Javed	3
Mudassar Abbas	3
Muzammil Hussain	3
Rubab Manzoor	3
Waqar Hussain	3
Abaid ur Rehman Virk	2
Absar ul Haq	2
Ahmad Fraz	2
Amer Saeed	2
Braira Wahid	2
Faiza Anwar	2
Malik Tahir Hassan	2
Muhammad Azhar Iqbal	2
Muhammad Imran	2
Muhammad Kaleem	2

Muhammad Khalil Anwar	**2**
Muhammad Latif	**2**
Muhammad Moeen Butt	**2**
Muhammad Usman Rashid	**2**
Muhammed Imran (SEN)	**2**
Raja Noshad Jamil	**2**
Syed Farooq Ali	**2**
Syed Muhammad Muslim Raza	**2**
Tahira Jibeen	**2**
Tipu Sultan	**2**
W. Ahmad	**2**
Zaheer Hussain Shah	**2**
Zahid Hussain	**2**
Zahra Ali	**2**
Zeshan Ahmad	**2**
Abdullah Khalid	**1**
Adnan Amjad	**1**
Afifa Tanweer	**1**
Agha Kashif	**1**
Ahmed Bilal	**1**
Ahmed Azam Malik	**1**
Ahmed W. Ghauri	**1**
Aisha Azhar	**1**
Amina Khalid	**1**
Anam Amir	**1**
Areesha Gul	**1**
Arshad Ali Khan	**1**
Ayesha Khan	**1**
Ayesha Zafar	**1**
Babar Shahzaad	**1**
Fariha Tariq	**1**
Fizza Miraj	**1**
Fariha Tariq	**1**
H. Khan	**1**
Haider Ali Khan	**1**
Haris Aslam	**1**
Hina Iftikhar	**1**
Huma Khan	**1**
Javaid Ali	**1**
K. S. Munawar	**1**
Kamran Rashid	**1**
Kamran Zeb	**1**
Khawar Siddique Khokhar	**1**
Khizar Hameed	**1**

M. A. Rehman	**1**
M. A. Imran	**1**
M. Hussain	**1**
M. Zaid	**1**
Mahvish Kabir	**1**
Maqbool H. Sial	**1**
Maryam Aleem	**1**
Minahil Nawaz	**1**
Muhammad Adnan	**1**
Muhammad Ali (SKT)	**1**
Muhammad Ali Hashmi	**1**
Muhammad Asim Butt	**1**
Muhammad Aziz ur Rehman	**1**
Muhammad Bilal Siddique	**1**
Muhammad Rizwan Younis	**1**
Muhammad Saeed	**1**
Muhammad Safdar	**1**
Muhammad Shaban Rafi	**1**
Muhammad Shoaib Pervez	**1**
Muhammad Shoaib Saleem	**1**
Muhammad Umair	**1**
Muhammad Zaid	**1**
Muhammed Rizwan	**1**
Nadir Ali	**1**
Naseer Ahmad Asif	**1**
Naveed Ahmed Noor	**1**
Noman Arshed	**1**
Qurbat Zahra	**1**
Rabia Nasir	**1**
Reamsha Khan Malik	**1**
S. Belal	**1**
Sadeeq ur Rahman	**1**
Saima Ali	**1**
Saima Shaheen	**1**
Saiqa Anwar	**1**
Sajid Hussain	**1**
Sajid Mahmood	**1**
Salman Mahmood	**1**
Sania Munir	**1**
Saroosh Zahoor	**1**
Shabnam Khan	**1**
Shahid Bashir	**1**
Shahid Imran	**1**
Shaista Habib	**1**

Shaista Jabin	**1**
Shakir Ahmad	**1**
Sheraz Naseer	**1**
Sobia Ilyas	**1**
Sohail Nadeem	**1**
Somia Saeed	**1**
Syed Ali Mardan Azmi	**1**
Syed Rehan Ashraf	**1**
Syed Sikander Ali Shah	**1**
Syeda Namrah Mahmood	**1**
Syeda Shaima Sani	**1**
Tariq Waheed Qureshi	**1**
Tashfeen Mahmood Azhar	**1**
Toheed Akhter	**1**
Umair Mukhtar	**1**
Urooj Fatima	**1**
Waqar Uddin	**1**
Waseem Iqbal	**1**
Zahid Ghulam Rasool	**1**
Zahid Mahmood	**1**
Zahid Ullah	**1**
Zohaib Awan	**1**
Zohaib Zahid	**1**

Table-VII

Sialkot campus

Departments	JCR	SJR	ISI web of Science	Conference Paper	Total
Department of Mathematics	13		4		17
Department of Electrical Engineering	4	1		3	8
Department of Computer Science	3				3
Department of Software Engineering			1		1
Department of Marketing	1				1
Department of Commerce and Accountancy				2	2
Total	**21**	**1**	**5**	**5**	**32**

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