ابحاث كلية العلوم

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Scopus

Title	**Synthesis, characterization and application of analcime to control nitrate ions from the ground water samples from Wadi El-Assiuti – Egypt as a low-cost and locally available adsorbent**
Authors	**Abdelmoneim A.A.a,Abdul-Moneim M.b,Geies A.A.c,Farghaly S.O.a**
Journal	**IOP Conference Series: Materials Science and Engineering**
Abstract	**In this study, the sorption behavior of synthetic (Analcime) zeolites with respect to nitrate ions has been studied in order to consider its application to purity ground water. Analcime or also can be called analcite ("weak") is a kind of grey, white or colorless tectosilicates minerals. It is hydrated sodium aluminum silicates which exist in cubic form in crystalline. Analcime was successively synthesized from kaolinite as a raw material using the fusion with NaOH method. The conditions of hydrothermal crystallization (zeolitization) were found to be at temperature of 170 C, and time span between 36 h and 72 h for kaoline with the molar composition of 6Na2O: 0.75Al2O3:30SiO2. 780H2O.The synthetic materials have been characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), Fourier transform infrared spectroscopy (FT-IR), thermo gravimetric (DTA/TGA) analysis and Surface area and porosity of synthesized analcime .The results indicate that the crystallization of analcime not affected by the hydrothermal reaction time. Also analcime was tested as adsorbents for the removal of nitrate ions from the ground water samples from Wadi El-Assiuti – Egypt .The adsorption capacities of nitrate ions by analcime, as a function of its concentration, were determined at room temperature by varying analcime concentration for each water samples. During the process, all the other parameters (pH and contact time) were kept constant with respect to the initial concentration of nitrate ions in the water samples. It was found analcime has good removal efficiency obtained at pH 6-7.6, adsorbent dosage 10-12 g/L, and contact time 60 min. The Langmuir constants model for NO3- ion sorption on the adsorption isotherms is fitted well. The RL value in the present investigation was equal or less than one, indicating that the adsorption of NO3-ion by analcime is favorable.**

Title	**Non-local correlation between two coupled qubits interacting nonlinearly with a two-mode cavity: Bell function, Trace norm and Bures distance quantifiers**
Authors	**Mohamed, A.-B.A., Khalil, E.M., Abdel-Khalek, S.**
Journal	**Physica Scripta 96(2),025103**
Abstract	**In this paper, we study the dynamics of two coupled qubits interacting with a two-mode parametric amplifier cavity through the nonlinear interactions of the photon processes under the intrinsic decoherence. The nonlinear unitary interactions lead to generating different types of nonlocal correlations via Bell nonlocality, trace-norm measurement-induced non-locality (MIN), and Bures-distance entanglement. Based on the intrinsic decoherence, the two-qubit states have stationary amounts of the MIN-correlation and Bures distance entanglement with more stability. It is found that the qubit-qubit interaction coupling is affected as additional decoherence. It leads to more oscillations and stability. The enhancement of the amount of the generated nonlocal correlations depends on the superposition of Barut-Girardello coherent states. The phenomenon of sudden birth/death and the Bell non-locality can be enhanced when the two-mode parametric amplifier cavity is initially prepared in the coherent states.**

Title	**Corrosion inhibition and adsorption features of novel bioactive cationic surfactants bearing benzenesulphonamide on C1018-steel under sweet conditions: Combined modeling and experimental approaches**
Authors	**Abd El-Lateef, H.M., Shalabi, K., Tantawy, A.H.**
Journal	**Journal of Molecular Liquids 320,114564**
Abstract	**In this report, three novel sulphonamides based cationic surfactants have been produced, and their structure configurations were clarified by various spectroscopic approaches (13C and 1H NMR). The corrosion protection characteristics of the as-prepared compounds for C1018-steel in carbon dioxide saturated 3.5% NaCl has been inspected and categorized by weight loss, Tafel polarization (PDP), electrochemical impedance spectroscopy (EIS), X-ray photoelectron spectroscopy (XPS), field emission-scanning electron microscopy (FE-SEM), and energy-dispersive X-ray spectroscopy (EDX) methods. Furthermore, conductivity and surface-active features were applied to examine their micellization and adsorption. The outcomes exhibited that these bioactive inhibitors at low doses had a worthy protection capacity on C1018-steel corrosion under sweet conditions ranged from 94.5 to 99.5% at 5 × 10−4 M additive concentration. PDP profiles display that the as-prepared surfactants were mixed inhibitors, and their adsorption followed the Langmuir isotherm model. FESEM, EDX, and XPS examinations demonstrated the formation of a protecting film adsorbed surfactant at metal/medium interface. DFT calculations, Monte Carlo (MC) simulations, molecular electrostatic potential (MEP), Fukui indices, and Mulliken atomic charges were accomplished to support empirical outcomes, and deliver suitable insight into the adsorption features and the corrosion inhibition mechanisms of the titled surfactants.**

Title	**Dependence of the magnetization process on the thickness of fe70 pd30 nanostructured thin film**
Authors	**Salaheldeen, M., Abu-Dief, A.M., Martínez-Goyeneche, L., (...), Álvarez-Alonso, P., Blanco, J.Á.**
Journal	**Materials 13(24),5788, pp. 1-12**
Abstract	**Fe–Pd magnetic shape-memory alloys are of major importance for microsystem applications due to their magnetically driven large reversible strains under moderate stresses. In this context, we focus on the synthesis of nanostructured Fe70 Pd30 shape-memory alloy antidot array thin films with different layer thicknesses in the range from 20 nm to 80 nm, deposited onto nanostructured alumina membranes. A significant change in the magnetization process of nanostructured samples was detected by varying the layer thickness. The in-plane coercivity for the antidot array samples increased with decreasing layer thickness, whereas for non-patterned films the coercive field decreased. Anomalous coercivity dependence with temperature was detected for thinner antidot array samples, observing a critical temperature at which the in-plane coercivity behavior changed. A significant reduction in the Curie temperature for antidot samples with thinner layer thicknesses was observed. We attribute these effects to complex magnetization reversal processes and the three-dimensional magnetization profile induced by the nanoholes. These findings could be of major interest in the development of novel magnetic sensors and thermo-magnetic recording patterned media based on template-assisted deposition techniques.**

Title	**Synthesis and Evaluation of Antioxidant, Antibacterial, and Target Protein-Molecular Docking of Novel 5-Phenyl-2,4-dihydro-3H-1,2,4-triazole Derivatives Hybridized with 1,2,3-Triazole via the Flexible SCH2-Bonding**
Authors	**Ashry, E.S.H.E., Elshatanofy, M.M., Badawy, M.E.I., (...), Elhady, O.M., Abdel-Sayed, M.A.**
Journal	**Russian Journal of General Chemistry 90(12), pp. 2419-2434**
Abstract	**Abstract: Synthesis of some new 5-phenyl-2,4-dihydro-3H-1,2,4-triazole derivatives as hybrids with 1,2,3-triazoles via a flexible bonding, and their antioxidant and antibacterial activity have been studied. IR, 1H and 13C NMR spectra have confirmed the chemical structures of the compounds. Antioxidant activity has been compared with BHA as a standard. Several tested compounds have demonstrated highly potent antioxidant activity. Antibacterial activity of the products has been evaluated against Gram-negative (Escherichia coli) and Gram-positive (Staphylococcus aureus) bacteria, and some of those have been characterized as the most potent against E. coli and S. aureus. Molecular docking to the active sites of VIM-2 Metallo-β-Lactamase (MBL) as a target protein has revealed that most compounds have displayed minimal binding energy and good affinity toward the active pocket.**

Title	**Descriptive pathological study of avian schistosomes infection in whooper swans (Cygnus cygnus) in japan**
Authors	**Ahmed, M.S., Khalafalla, R.E., Al-Brakati, A., Yanai, T., Elmahallawy, E.K.**
Journal	**Animals 10(12),2361, pp. 1-11**
Abstract	**Cercarial dermatitis, or Swimmer's itch, is one of the emerging diseases caused by the cercariae of water-borne schistosomes, mainly Trichobilharzia spp. Since the zoonotic potential of Allobilharzia visceralis is still unknown, studies on this schistosome would be helpful to add knowledge on its possible role in causing human infections. In the present study, 54 whooper swans (Cygnus cygnus) from rescue/rehabilitation centers in Honshu, Japan, were necropsied to identify the cause of death. Grossly, 33 (61.11%) swans were severely emaciated and 23 (42.59%) had multiple reddened areas throughout the length of the intestine with no worms detected in the internal organs. Microscopically, adult schistosomes were found in the lumen of the mesenteric, serosal, portal, and testicular veins, in the capillaries of the intestinal lamina propria, and in the sinusoids of the adrenal gland, spleen, and liver of 23 (42.59%) swans. Hypertrophy of veins containing adult worms was identified in 15 (27.77%) swans, and vascular lumen obliteration was observed in 8 (14.81%) swans. Mild to severe villous atrophy and superficial enteritis were observed in 8 birds (14.81%), whereas bile pigments and hemosiderin were detected in the livers of 14 (25.92%) and 18 (33.33%) swans, respectively. In three swans (5.55%), schistosome parasites were found in the subcapsular veins of the testes. The schistosomes in the present study were assumed to be A. visceralis based on the microscopical and histological evidence of adult schistosomes found in the lumen of veins as well as the infection pathology, which was very similar to the schistosome-induced pathology previously reported in swans infected by A. visceralis in Europe and Australia. The swans examined herein most likely died from obstructive phlebitis associated with A. visceralis, but further molecular confirmation is required for identification of this species. However, the present study does not provide new data on the zoonotic potential, but only on the pathogenic potential of this schistosome in swans. Furthermore, our study provides a novel contribution to the description of the pathological effects of avian schistosomes infection in whooper swans in Japan.**

Title	**Molecular identification and phylogenetic placement of rosa arabica crép. (rosaceae), a critically endangered plant species**
Authors	**El-banhawy, A., Acedo, C., Qari, S., Elkordy, A.**
Journal	**Life 10(12),335, pp. 1-13**
Abstract	**The Egyptian narrowly endemic and critically endangered plant species Rosa arabica Crép. was studied employing a taxonomic and molecular approach. Morphological investigations, distance analysis, and phylogenetic reconstruction revealed that R. arabica is a distinct species with great affinity to R. canina and differentiated from R. rubiginosa. Molecular identification based on the sequences of multiple markers single or in combination ITS, matK, rbcL, and trnL-F succeeded in identifying R. arabica at genus and species levels. We evaluated the potential of each marker and a combination of the nuclear ITS -Internal Transcribed Spacer- with one of the plastid markers, matK, rbcL, or trnL-F, to accurately identify Rosa species. All of them were successful in identifying R. arabica. Classification based on DNA sequences shows that R. arabica is placed within section Caninae in a clade comprising R. canina and R. rubiginosa. Moreover, R. arabica is closely related to other European Rosa species. In conclusion, our results indicate that the four DNA markers can provide species resolution in the context of the genus Rosa and relatives, aiming to characterize morphology and genetic diversity in the ecological and economically important genus Rosa.**

Title	**On the interaction between (low & high) frequency of (ion-acoustic & Langmuir) waves in plasma via some recent computational schemes**
Authors	**Khater, M.M.A., Attia, R.A.M., Mahmoud, E.E., (...), Mohamed, A.-B.A., Eleuch, H.**
Journal	**Results in Physics 19,103684**
Abstract	**Applying several latest theoretical techniques, the empirical description of the interaction between the high-frequency Langmuir and the low-frequent ion-acoustic waves, derived mathematically by Zakharov's non-dimensional (ZE) equation. These interactions are described in electromagnetic waves, plasma physics, signal processing through optical fibers, coastal engineering, and fluid dynamics. Three modern computing methods are being used to construct several solutions: the extended exp (ϕ)-expansion process,the popular Kudryashov process, and the modified Khather method. Centered on the properties of the Hamilton system, the stability properties of the solutions are investigated. The physical proprieties are illustrated using 3D plots. The originality of the obtained solutions is explored. We demonstrate that we retrieve the old known solutions and we obtain new solutions that have never been found before.**

Title	**Assessment the seasonal variability and enrichment of toxic trace metals pollution in sediments of damietta branch, nile river, egypt**
Authors	**Redwan, M., Elhaddad, E.**
Journal	**Water (Switzerland) 12(12),3359**
Abstract	**This work appraises the extent of toxic trace metals and seasonal pollution degree in Damietta branch sediments of the River Nile of Egypt. The toxic trace metals Fe, Mn, Cd, Co, Cu, Ni, Pb, and Zn were analysed in sediments from six sites during the summer and winter seasons. The metal concentrations and organic matter were determined using inductively-coupled-plasma mass spectrometry and loss-on-ignition, respectively. Multivariate statistical methods were used in order to allocate the possible metals sources and their relationships in sediments. The seasonal mean sequence of toxic trace metals was: Fe > Mn > Zn > Pb > Cu > Ni > Co > Cd. The mean Cd, Pb, and Zn values exceeded the sediment quality guidelines and average shale and they represent severe potential toxicity for aquatic organisms. Cu and Co were enriched during winter. The geo-accumulation index stipulated that metal pollution degree in the sequence of: Pb > Zn > Cd > Co > Cu > Mn > Ni > Fe. The highest metal pollution index reported in winter in sites S4/S5 and during summer in sites S4–S6. Different agricultural, wastewater discharge, fisheries, and industrial activities, as well as the effect of dilution/concentration during summer/winter seasons, are the main factors that contributed to metal accumulations in Damietta branch sediments. Continuous monitoring and evaluation of toxic trace metal concentrations of the Damietta sediments and similar localities worldwide can help to protect the ecosystem from harmful metal contaminations.**

Title	**The technique of quadruple fixed points for solving functional integral equations under a measure of noncompactness**
Authors	**Hammad, H.A., Khalil, A.A.**
Journal	**Mathematics 8(12),2130, pp. 1-21**
Abstract	**Under the idea of a measure of noncompactness, some fixed point results are proposed and a generalization of Darbo's fixed point theorem is given in this manuscript. Furthermore, some novel quadruple fixed points results via a measure of noncompactness for a general class of functions are presented. Ultimately, the solutions to a system of non-linear functional integral equations by the fixed point results obtained are discussed, and non-trivial examples to illustrate the validity of our study are derived.**

Title	**Geotechnical study on the utilization of Pleistocene Sands in Sohag Basin (Upper Egypt) as a construction raw material**
Authors	**El-Shater, A.A.-H., Mahran, T.M., Abu Seif, E.-S.S., Mahmoud, K.**
Journal	**Environmental Earth Sciences 79(24),534**
Abstract	**The Pleistocene Sands (Armant and Qena formations, Sohag Basin, Upper Egypt) had been evaluated texturally, minerologically and geotechnically as a construction raw material throughout intensive laboratory examinations. These Sands (fine aggregates) are classified into well-graded sands (SW). Texturally, the Pleistocene Sands are consisting mainly of equi-dimensional angular quartz grains. Rock fragments and feldspars are present with minor amounts. Few mineral grains (dolomite and gypsum) were recorded within the sands of Armant Formation. Whereas, few grains of basement rock fragments were identified in Qena Formation. Armant Formation has a higher content of TDS (total dissolved salts), sulfates, calcium carbonates and chlorides than Qena Formation. Additionally, Armant Formation has active chemically mineral grains (dolomite and gypsum). So, Armant Formation sand samples will be reacted harmfully when used as concrete, mortar and sandy bricks due to alkali-silica reaction (ASR) and alkali-carbonate reaction (ACR) that will be happened on long run of time. The absence of shrinkage in length and collapse failure modes indicates the absence of bleeding and segregation with the fresh mixtures (concrete, mortar and sandy bricks) before stiffness state.**

Title	**A minimal time-scale for the spectral states of GX 339-4**
Authors	**Sonbas, E., Mohamed, K., Dhuga, K.S., Tuncer, A., Göğüş, E.**
Journal	**Monthly Notices of the Royal Astronomical Society 499(2), pp. 2513-2522**
Abstract	**Black hole transients are known to undergo spectral transitions that form q-shaped tracks on a hardness intensity diagram. In this work, we use the archival Rossi X-ray Timing Explorer data to extract a characteristic minimal time-scale for the spectral states in GX 339-4 for the 2002-2003 and 2010 outbursts. We use the extracted time-scale to construct an intensity variability diagram for each outburst. This new diagram is comparable to the traditional hardness intensity diagram and offers the potential for probing the underlying dynamics associated with the evolution of the relevant emission regions in black hole transients. We confirm this possibility by connecting the minimal time-scale with the inner disc radius, Rin (estimated from spectral fits), and demonstrate a positive correlation between these variables as the system evolves through its spectral transitions. Furthermore, we probe the relation between the minimal time-scale and the break frequencies extracted from the power spectral densities. Lastly, we examine a possible link between the extracted time-scale and a traditional measure of variability, i.e. the root mean square, determined directly from the power spectra.**

Title	**Biochemical and histopathological alterations in different tissues of rats due to repeated oral dose toxicity of cymoxanil**
Authors	**Ahmed,M.S., Massoud, A.H., Derbalah, A.S., (...), Yanai, T., Elmahallawy, E.K.**
Journal	**Animals 10(12),2205, pp. 1-14**
Abstract	**Evaluating potential adverse health impacts caused by pesticides is an important parameter in human toxicity. This study focuses on the importance of subchronic toxicity assessment of cymoxanil fungicide in rats with special reference to target biochemical enzymes and histopathological changes in different tissues. In this regard, a 21-day toxicity study with repeated cymoxanil oral doses was conducted. It has been shown that low doses (0.5 mg/kg) were less effective than medium (1 mg/kg) and high (2 mg/kg) doses. Moreover, high dose dose-treated rats showed piecemeal necrosis in the liver, interstitial nephritis and tubular degeneration in the kidneys, interstitial pneumonia and type II pneumocyte hyperplasia in the lungs, gliosis, spongiosis, and malacia in the brain, and testicular edema and degeneration in the testes. Cymoxanil significantly increased AST, ALT, and ALP in serum and liver, indicating tissue necrosis and possible leakage of these enzymes into the bloodstream. Creatinine levels increased, indicating renal damage. Similarly, significant inhibition was recorded in brain acetylcholinesterase, indicating that both synaptic transmission and nerve conduction were affected. Importantly, these histopathological and biochemical alterations were dose-dependent. Taken together, our study reported interesting biochemical and histopathological alterations in different rat tissues following repeated toxicity with oral doses of cymoxanil. Our study suggests future studies on different pesticides at different concentrations that would help urge governments to create more restrictive regulations concerning these compounds' levels.**

Title	**A grey wolf-based method for mammographic mass classification**
Authors	**Tahoun,M., Almazroi,A.A., Alqarni, M.A., (...), Mahmoud, E.E., Eltoukhy, M.M.**
Journal	**Applied Sciences (Switzerland) 10(23),8422, pp. 1-17**
Abstract	**Breast cancer is one of the most prevalent cancer types with a high mortality rate in women worldwide. This devastating cancer still represents a worldwide public health concern in terms of high morbidity and mortality rates. The diagnosis of breast abnormalities is challenging due to different types of tissues and textural variations in intensity. Hence, developing an accurate computer-aided system (CAD) is very important to distinguish normal from abnormal tissues and define the abnormal tissues as benign or malignant. The present study aims to enhance the accuracy of CAD systems and to reduce its computational complexity. This paper proposes a method for extracting a set of statistical features based on curvelet and wavelet sub-bands. Then the binary grey wolf optimizer (BGWO) is used as a feature selection technique aiming to choose the best set of features giving high performance. Using public dataset, Digital Database for Screening Mammography (DDSM), different experiments have been performed with and without using the BGWO algorithm. The random forest classifier with 10-fold cross-validation is used to achieve the classification task to evaluate the selected set of features' capability. The obtained results showed that when the BGWO algorithm is used as a feature selection technique, only 30.7% of the total features can be used to detect whether a mammogram image is normal or abnormal with ROC area reaching 1.0 when the fusion of both curvelet and wavelet features were used. In addition, in case of diagnosing the mammogram images as benign or malignant, the results showed that using BGWO algorithm as a feature selection technique, only 38.5% of the total features can be used to do so with high ROC area result at 0.871.**

Title	**Mapping Asia plants: Current status on floristic information in Southwest Asia**
Authors	**Xu, X., Naqinezhad, A., Ghazanfar, S.A., (...), Seyfullayev, F., Ma, K.**
Journal	**Global Ecology and Conservation 24,e01257**
Abstract	**Mapping Asia Plants (MAP) is a comprehensive project that aims to build a detailed infrastructure for integrating Asian plant distribution data a global-scale array of knowledge for plant biodiversity conservation. Here, we provide a brief historical review of botanical research in Southwest Asia – an understudied botanical region with high conservation priority. Nineteen countries were included in this study (from west to east): Turkey, Cyprus, Palestine, Israel, Jordan, Saudi Arabia, Lebanon, Syria, Iraq, Georgia, Yemen, Armenia, Iran, Azerbaijan, Kuwait, Bahrain, Qatar, United Arab Emirates, and Oman. We reviewed 132 resources comprising 125 Floras and Checklists, of which we describe in some detail at least one of the most important Floras or Checklists for each country. Complete and published national Floras exist for 13 countries; three countries (Jordan, Israel and Bahrain) do not have a Flora but have annotated Checklists, and national Floras are at different stages of completion for Iran, Iraq and Georgia. Where present, online resources are also given for references. We found major gaps in species concepts and taxonomic classification systems, and that many up-to-date Flora revisions remained unresolved, i.e. taxon ranks and species concepts varied among different countries, different systems were adopted or followed in the taxonomic treatments in the Floras and Checklists, and some of the current Floras are out of date. Floras are the first necessary step for many fields, including evolutionary biology, ecology, biogeography, and systematics, as well as environmental research and conservation of biodiversity at national and international levels. Here, we provide the progress updates on the main published floristic works of Southwest Asia, which continue to serve as references for the Flora of Southwest Asia, and will be the foundation of the MAP project.**

Title	**Entanglement and entropy squeezing in the system of two qubits interacting with a two-mode field in the context of power low potentials**
Authors	**Khalil, E.M., Berrada, K., Abdel-Khalek, S., Al-Barakaty, A., Peřina, J.**
Journal	**Scientific Reports 10(1),19600**
Abstract	**We study the dynamics of two non-stationary qubits, allowing for dipole-dipole and Ising-like interplays between them, coupled to quantized fields in the framework of two-mode pair coherent states of power-low potentials. We focus on three particular cases of the coherent states through the exponent parameter taken infinite square, triangular and harmonic potential wells. We examine the possible effects of such features on the evolution of some quantities of current interest, such as population inversion, entanglement among subsystems and squeezing entropy. We show how these quantities can be affected by the qubit-qubit interaction and exponent parameter during the time evolution for both cases of stationary and non-stationary qubits. The obtained results suggest insights about the capability of quantum systems composed of nonstationary qubits to maintain resources in comparison with stationary qubits.**

Title	**Design, synthesis and molecular modeling of novel aryl carboximidamides and 3-aryl-1,2,4-oxadiazoles derived from indomethacin as potent anti-inflammatory iNOS/PGE2 inhibitors**
Authors	**Mohamed, M.F.A., Marzouk, A.A., Nafady, A., (...), El Subbagh, H.I., Moustafa, A.H.**
Journal	**Bioorganic Chemistry 105,104439**
Abstract	**The development of NSAIDs/iNOS inhibitor hybrids is a new strategy for the treatment of inflammatory diseases by suppression of the overproduction of PGE2 and NO. A novel series of aryl carboximidamides 4a-g and their cyclized 3-aryl-1,2,4-oxadiazoles 5a-g counterparts derived from indomethacin 1 were synthesized. Most of the target compounds displayed lower LPS-induced NO production IC50 in RAW 264.7 cells and potent in vitro iNOS and PGE2 inhibitory activity than indomethacin. Moreover, in carrageenan-induced rat paw oedema method, most of them exhibited higher in vivo anti-inflammatory activity than the reference drug indomethacin. Notably, 4 hrs after carrageenan injection, compound 4a proved to be the most potent anti-inflammatory agent in this study, with almost two- and eight-fold more active than the reference drugs indomethacin (1) and celecoxib, respectively. Compound 4a proved to be inhibitor to LPS-induced NO production, iNOS activity and PGE2 with IC50 of 10.70 μM, 2.31 μM, and 29 nM; respectively. Compounds 4a and 5b possessed the lowest ulcerogenic liabilities (35% and 38%, respectively) compared to 1. Histopathological analysis revealed that compounds 4a and 5b demonstrated reduced degeneration and healing of ulcers. Molecular docking studies into the catalytic binding pocket of the iNOS protein receptor (PDB ID: 1r35) showed good correlation with the obtained biological results. Parameters of Lipinski's rule of five and ADMET analysis were calculated where compound 4a had reasonable drug-likeness with acceptable physicochemical properties so it could be used as promising orally absorbed anti-inflammatory therapy and entitled to be used as future template for further investigations.**

Title	**Response of quantum Fisher information, variance entropy squeezing and entanglement to the intrinsic decoherence of two non-degenerate fields interacting with two qubits**
Authors	**Abdel-Khalek, S., Khalil, E.M., Mohamed, A.-B.A., Abdel-Aty, M., Besbes, H.R.**
Journal	**Alexandria Engineering Journal 59(6), pp. 5147-5154**
Abstract	**We investigate the link between quantum Fisher information (QFI) and quantum entanglement for a scheme of two atoms that interact with two non-degenerate modes in the absence and presence of intrinsic decoherence effect. The explicit form of the density matrix approach to the dissipative systems is given when the cavity-field is in generalized coherent states. The dynamical behavior of the QFI is compared with the atom–atom concurrence entanglement. We examine the effect of the dipole–dipole interaction and intrinsic decoherence on the dynamical properties of the QFI, concurrence and variance entropy squeezing. It is found that the atom–atom concurrence and the QFI can be controlled by the intrinsic decoherence and the dipole–dipole interaction.**

Title	**On conformable fractional Legendre polynomials and their convergence properties with applications**
Authors	**Abul-Ez, M., Zayed, M., Youssef, A., De la Sen, M.**
Journal	**Alexandria Engineering Journal 59(6), pp. 5231-5245**
Abstract	**The main objective of this paper is to give a wide study on the conformable fractional Legendre polynomials (CFLPs). This study is assumed to be a generalization and refinement, in an easy way, of the scalar case into the context of the conformable fractional differentiation. We introduce the CFLPs via different generating functions and provide some of their main properties and convergence results. Subsequently, some pure recurrence and differential recurrence relations, Laplace's first integral formula, and orthogonal properties are then developed for CFLPs. We append our study by presenting shifted CFLPs and describing an applicable scheme using the collocation method to solve some fractional differential equations (FDEs) in the sense of conformable derivative. Some useful examples of FDEs are treated to support our theoretical results and examine their exact and approximate solutions. To the best of our knowledge, the obtained results are newly presented and could enrich the fractional theory of special functions.**

Title	**Characterization of polyvinyl alcohol-borax/agarose (PVA-B/AG) double network hydrogel utilized for the cleaning of works of art**
Authors	**Al-Emam, E., Soenen, H., Caen, J., Janssens, K.**
Journal	**Heritage Science 8(1),106**
Abstract	**Since cleaning of artworks may cause undesirable physicochemical alterations and is a nonreversible procedure, it is mandatory to adopt the proper cleaning procedure. Such a procedure should remove undesired materials whilst preserving the original surface. In this regard, numerous gels have been developed and exploited for the cleaning of various artwork surfaces. Lately, agarose (AG) and polyvinyl alcohol-borax (PVA-B) hydrogels have been widely employed as cleaning tools by conservators. Both hydrogels show some limitations in specific cleaning practices. In this work, we investigated the influence of including increased levels of agarose into PVA-B systems. For this reason, we performed a detailed characterization on the double network (DN) hydrogel including the chemical structure, the liquid phase retention, the rheological behavior, and the self-healing behavior of various PVA-B/AG double network hydrogels. These new hydrogels revealed better properties than PVA-B hydrogels and obviated their limitations. The inclusion of AG into PVA-B systems enhanced the liquid retention capacity, shape-stability, and mechanical strength of the blend. Furthermore, AG minimized the expelling/syneresis issue that occurs when loading PVA-B systems with low polarity solvents or chelating agents. The resultant double network hydrogel exhibits relevant self-healing properties. The PVA-B/AG double network is a new and useful cleaning tool that can be added to the conservators' tool-kit. It is ideal for cleaning procedures dealing with porous and complex structured surfaces, vertical surfaces and for long time applications.[Figure not available: see fulltext.].**

Title	**Extraction of thickness, linear and nonlinear optical parameters of Ge20+xSe80-x thin films at normal and slightly inclined light for optoelectronic devices**
Authors	**Alzaid, M., Qasem, A., Shaaban, E.R., Hadia, N.M.A.**
Journal	**Optical Materials 110,110539**
Abstract	**In this framework, a novel Ge20+xSe80-x thin films ~890 nm, with (x = 5, 10, 15, 20, 25, and 30 at. %) were synthesized via thermally evaporation method at 298 K. The elemental ratios of Ge–Se thin films have been checked by EDX analysis and also the amorphous natural was confirmed through X-Ray Diffractometer, XRD. In thin films belonging to the glass chalcogenide, in the case of existence of interference in the optical measurements-namely, transmittance, T and reflectance, R spectra-often the dispersion refractive index, n(λ) and the thickness of the thin film, d were computed based on the spectrum of transmittance or reflectance and also the wavelength along with the optical measurements. In this work, the real optical constant n(λ) and film's thickness of Ge–Se thin films have been computed utilizing the wavelength measurements of the normal and slightly inclined incidence light solely. Then, the linear optical parameters such as Tauc's energy Eg and Urbach's energy Ee, the linear imaginary optical constant, namely, absorption index or extinction coefficient kex, the linear dispersion parameters, namely, the single oscillator energy Eo and the dispersion energy Ed and the non-linear optical constant or so called the second-order of refractive index n2 have been determined. The optical dispersion [Formula presented], phase velocity vp, group velocity Ug, Magneto-Optical Constant or Verdet coefficient V(λ) and the positions of the energy levels have been discussed in detail.**

Title	**Dynamical analysis and chaos control of the fractional chaotic ecological model**
Authors	**Mahmoud, E.E., Trikha, P., Jahanzaib, L.S., Almaghrabi, O.A.**
Journal	**Chaos, Solitons and Fractals 141,110348**
Abstract	**In this paper the fractional version of the proposed integer order chaotic ecological system is studied. Here chaos has been observed in the competitive ecological model due to linear and nonlinear interactions among various species considering shortage of food resources. The system being important constituent of the food supply chain is analyzed using tools of dynamics viz. Lyapunov dynamics, bifurcation diagrams, existence and uniqueness of solution, the fixed point analysis and effect of fractional order on the dynamics of the system. In the presence of uncertainties and disturbances the chaos in the F.O. ecological model is controlled using adaptive SMC theory about its two fixed points. Numerical illustrations have been provided using MATLAB.**

Title	**Design and synthesis of novel pyrazolo[3,4-d]pyrimidin-4-one bearing quinoline scaffold as potent dual PDE5 inhibitors and apoptotic inducers for cancer therapy**
Authors	**Ibrahim, T.S., Hawwas, M.M., Taher, E.S., (...), Abdel-Samii, Z.K., Elshaier, Y.A.M.M.**
Journal	**Bioorganic Chemistry 105,104352**
Abstract	**PDE5 targeting represents a new and promising strategy for apoptosis induction and inhibition of tumor cell growth due to its over-expression in diverse types of human carcinomas. Accordingly, we report the synthesis of series of pyrazolo[3,4-d]pyrimidin-4-one carrying quinoline moiety (11a-r) with potential dual PDE5 inhibition and apoptotic induction for cancer treatment. These hybrids were structurally elucidated and characterized with variant spectroscopic techniques as 1H NMR, 13C NMR and elemental analysis. The assessment of their anticancer activities has been declared. All the rationalized compounds 11a-r have been selected for their cytotoxic activity screening by NCI against 60 cell lines. Compounds 11a, 11b, 11j and 11k were the most active hybrids. Among all, compound 11j was further selected for five dose tesing and it displayed outstanding activity with strong antitumor activity against the nine tumor subpanels tested with selectivity ratios ranging from 0.019 to 8.3 at the GI50 level. Further, the most active targets 11a, b, j and k were screened for their PDE5 inhibitory activity, compound 11j (with IC50 1.57 nM) exhibited the most potent PDE5 inhibitory activity. Moreover, compound 11j is also showed moderate EGFR inhibition with IC50 of 5.827 ± 0.46 µM, but significantly inhibited the Wnt/β-catenin pathway with IC501286.96 ± 12.37 ng/mL. In addition, compound 11j induced the intrinsic apoptotic mitochondrial pathway in HepG2 cells as evidenced by the lower expression levels of the anti-apoptotic Bcl-2 protein, and the higher expression of the pro-apoptotic protein Bax, p53, cytochrome c and the up-regulated active caspase-9 and caspase-3 levels. All results confirmed by western blotting assay. Compound 11j exhibit pre G1 apoptosis and cell cycle arrest at G2/M phase. In conclusion, hybridization of quinoline moiety with the privileged pyrazolo[3,4-d]pyrimidinon-4-one structure resulted in highly potent anticancer agent, 11j, which deserves more study, in particular, in vivo and clinical investiagtions, and it is expected that these results would be applied for more drug discovery process.**

Title	**Effects of a high nonlinear interaction between an open parametric amplifier cavity and a qubit on dynamics of the correlation function and quantum Fisher information**
Authors	**Abdel-Khalek, S., Khalil, E.M., Mohamed, A.-B.A., Bouslimi, J.H., Besbes, H.R.**
Journal	**Solid State Communications 322,114075**
Abstract	**In this paper, we provide an analytical description of the intrinsic noise model of the two-mode cavity, containing a single two-level atom through su(1,1)-algebraic treatment. Each field interacts with the qubit through a four-photon process and is assumed initially in Barut-Girardello coherent state. The Atomic Quantum Fisher information (AQFI), atomic entropy and the correlation function are analyzed under the effects of the intrinsic damping and the superposition of the initial generalized Barut-Girardello Coherent States (B-GCS). Under the nonlinear interactions, the AQFI has irregular oscillatory behavior that depends on the superposition of the B-GCS. Due to the high nonlinear interactions, the damping work with a very small value and leads to the degradation of the AQFI. This degradation can be enhanced in the case of the even B-GCS. The generated entanglement and mixedness of the atomic entropy are explored, they are very sensitive to the physical parameters of the intrinsic damping, the detuning and the initial cavity state. It is found that the second-order correlation depends on the mean photon number, the superposition of the B-GCS, and the damping. For the small value of the mean photon number and with the damping, the sub-Poissonian effects increase with the B-GCS, while the super-Poissonian behavior increases with its even states. For the off-resonant case, the frequency, the regularity and stability of the NSOC function, the atomic entropy and the AQFI are enhanced.**

Title	**A tripled fixed point technique for solving a tripled-system of integral equations and Markov process in CCbMS**
Authors	**Hammad, H.A., De La Sen, M.**
Journal	**Advances in Difference Equations 2020(1),567**
Abstract	**We prove the existence of tripled fixed points (TFPs) of a new generalized nonlinear contraction mapping in complete cone b-metric spaces (CCbMSs). Also, we present some exciting consequences as corollaries and three nontrivial examples. Finally, we find a solution for a tripled-system of integral equations (TSIE) and discussed a unique stationary distribution for the Markov process (SDMP).**

Title	**Correlation dynamics of nitrogen vacancy centers located in crystal cavities**
Authors	**Abdel-Aty, A.-H., Kadry, H., Mohamed, A.-B.A., Eleuch, H.**
Journal	**Scientific Reports 10(1),16640**
Abstract	**In this contribution, we investigate the bipartite non-classical correlations (NCCs) of a system formed by two nitrogen-vacancy (N-V) centers placed in two spatially separated single-mode nanocavities inside a planar photonic crystal (PC). The physical system is mathematically modeled by time-dependent Schrödinger equation and analytically solved. The bipartite correlations of the two N-V centers and the two-mode cavity have been analyzed by skew information, log-negativity, and Bell function quantifiers. We explore the effects of the coupling strength between the N-V-centers and the cavity fields as well as the cavity-cavity hopping constant and the decay rate on the generated correlation dynamics. Under some specific parameter values, a large amount of quantum correlations is obtained. This shows the possibility to control the dynamics of the correlations for the NV-centers and the cavity fields.**

Title	**Use of the geophysical approaches for studying the environmental impact assessment of the human burying techniques to the soil and groundwater: A case study of Geheina cemeteries, Sohag, Egypt**
Authors	**Mohammed, M.A., Abudeif, A.M.**
Journal	**Journal of African Earth Sciences 172,104010**
Abstract	**Electrical resistivity and self-potential are effective geophysical tools for monitoring the soil and groundwater pollution because they are accurate, rapid, costless and non-distractive techniques. Direct or indirect burying of the corpses into the soil is one of the main factors which pollute the soil and the groundwater after decomposition of the tissues and bones. Therefore, the main objective of this study are using these tools to evaluate the rate of soil and groundwater pollution due to burying the corpses in chipboard coffins at depths approximately 0.70–1.30 m (Christians burial method) and directly into the soil at depths about 1.5–1.8 m (Muslims burial method). Beside, assessing the contamination depths and flow paths of the groundwater investigated area. The study area was carefully chosen because of: 1- it contains two different burial methods, 2- presence of shallow groundwater aquifer, 3- the surface layer which contains the burial depth is porous and permeable, 4- the cemeteries are near enough to the population density and agricultural lands. The study area was divided to three main sites; site 1, site 2 and site 3 for Christian cemeteries, Muslims ones and control area that does not contains any cemeteries respectively. Five two-dimensional electrical resistivity tomography (ERT) profiles were surveyed and analyzed using RES2DINV software (two profiles on the site 1, two profiles on the site 2 and one profile on the site 3). 121 points of vertical electrical sounding (VES) at the same depth were collected and analyzed in 3D iso-resistivity map. Self-potential survey (SP) were performed on the same 121 points of VES stations for comparison where the data was contoured to build 3D iso-potential map. The geophysical results were correlated with the available borehole data. The results revealed presence of three resistivity zones of high resistivities (1000–3000 Ω m), moderate ones (50–1000 Ω m) and low ones (<50 Ω m). The main constituents of these three zones are clastic sedimentary rocks with different grain sizes. The rapid decreasing in the resistivity values in the site 2 than that in the site 1 is resulting from the rapid decomposition of the death bodies due to direct burying in the ground without coffins leading to more pollution rates of the soil and the groundwater than burying in coffins. Increasing of the burial depth causes increasing of the contamination rate of the shallow groundwater aquifer. Positive and negative values of potentials were recorded in 3D iso-potential contour map reflecting the flow direction from low to high potentials. The negative values were attributed to the leakage of more the putrefactive liquid resulting from decomposition of the death body. Positive potential values were caused due to the semi-fluid masses consisting of water and putrefied tissues which are mostly generated by the corpses buried in coffins with less amount of fluids and the putrefactive liquid evaporation and low humidity.**

Title	**Langmuir probe and optical emission spectroscopy studies for RF magnetron sputtering during TiON thin film deposition**
Authors	**Metawa, A.E., El-Hossary, F.M., Raaif, M., SalahEl-Deen, M., El-Moula, A.A.A.**
Journal	**Chinese Journal of Physics n68, pp. 168-177**
Abstract	**Low-pressure plasma of gas mixture of Ar, O2 and N2 generated by RF magnetron sputtering was characterized by Langmuir probe and optical emission spectroscopy (OES). The electron temperature (Te), ion density (ni) and electron energy distribution function (EEDF) in Ar-O2-N2 plasma atmosphere were calculated from I-V characteristic of Langmuir probe. Boltzmann plot method was applied for calculating the vibrational temperature (Tvib) of the second positive system of N2 (N2SPS) in Ar-O2-N2 plasma. The Te, ni, EEDF and Tvib in Ar-O2-N2 plasma were studied as a function of O2 percentages. It was found, the Tvib increased from 0.47 eV to 0.55 eV as the oxygen percentage in Ar-N2-O2 plasma increased from 10% to 40%. Further, the Te increased from 1.6 eV to 3 eV as the O2 concentration increased from 10% to 40%.**

Title	**Fractional order of Legendre-type matrix polynomials**
Authors	**Zayed, M., Hidan, M., Abdalla, M., Abul-Ez, M.**
Journal	**Advances in Difference Equations 2020(1),506**
Abstract	**Recently, special functions of fractional order calculus have had many applications in various areas of mathematical analysis, physics, probability theory, optimization theory, graph theory, control systems, earth sciences, and engineering. Very recently, Zayed et al. (Mathematics 8:136, 2020) introduced the shifted Legendre-type matrix polynomials of arbitrary fractional orders and their various applications utilizing Rodrigues matrix formulas. In this line of research, we use the fractional order of Rodrigues formula to provide further investigation on such Legendre polynomials from a different point of view. Some properties, such as hypergeometric representations, continuation properties, recurrence relations, and differential equations, are derived. Moreover, Laplace's first integral form and orthogonality are obtained.**

Title	**Simultaneous voltammetric determination of two binary mixtures containing propranolol in pharmaceutical tablets and urine samples**
Authors	**Khairy, M., Khorshed, A.A.**
Journal	**Microchemical Journal 159,105484**
Abstract	**Simultaneous voltammetric analysis of two antihypertensive binary mixtures containing propranolol (PROP) in combination with either hydrochlorothiazide (HCTZ) or amlodipine (AML) drugs were investigated for the first time. Disposable screen-printed electrodes (SPEs) were utilized in 0.1 M sulphuric acid and Britton Robinson (B. R.) buffer of pH 7.0 containing 0.28 M sodium dodecyl sulfate (SDS) for analysis of PROP-HCTZ and PROP-AML mixtures, respectively. It was found that assemblage of negatively charged SDS molecules at the graphitic SPE surface significantly enhances the peak height and potential separation to be 0.26 V and 0.32 V (vs. Ag/AgCl) for PROP-HCTZ and PROP-AML, respectively. Under the optimized conditions of differential pulse voltammetry (DPV), the unmodified SPE offered a promising, sensitive, robust electrochemical platform in presence of SDS for the simultaneous determination of PROP mixtures without any interference of their voltammetric signals over wide concentration ranges with nanomolar detection limits. Further, the applicability of suggested method was elucidated in the simultaneous assessment of these antihypertensive drug mixtures in pharmaceutical tablets and urine samples with good recoveries.**

Title	**Nanocomposite-based inorganic-organocatalyst Cu(II) complex and SiO2- and Fe3O4 nanoparticles as low-cost and efficient catalysts for aniline and 2-aminopyridine oxidation**
Authors	**Adam, M.S.S., Al-Omair, M.A.**
Journal	**Applied Organometallic Chemistry 34(12),e5999**
Abstract	**Bis-imino Cu(II) complex (CuLAn2), in which the imine ligand (HLAn) acts as a bidentate chelating ligand, was synthesized. The catalytic potential of the inorganic-organocatalyst was studied homogeneously and heterogeneously in the oxidation of aniline and 2-aminopyridine by H2O2 or tBuOOH. Two heterogeneous inorganic-organocatalysts, CuLAn2@Fe3O4 and CuLAn2@SiO2@Fe3O4, were synthesized by the successful immobilization of CuLAn2 on the Fe3O4 surface and the composited Fe3O4 with SiO2, respectively. The heterogeneous structure of those inorganic-organocatalysts was confirmed using Fourier-transform infrared, scanning electron microscopy, energy-dispersive X-ray spectroscopy, X-ray diffraction, transmission electron microscopy, and magnetic properties. The adsorption–desorption isotherms revealed respectable adsorption parameters (SBET, Vp, and rp). All catalysts exhibited high potential in the oxidation of aniline (with phenylhydroxylamine as the main product) and good potential in the oxidation of 2-aminopyridine, in the first attempt (with 2-nitropyridine-N-oxide and 2-nitrosopyridine-N-oxide as main products), at room temperature. Acetonitrile was found to be the best solvent compared to ethanol, dimethyl sulfoxide, chloroform, and water. The homogeneous catalyst exhibited reusability for three times. The heterogeneous catalysts, CuLAn2@Fe3O4 and CuLAn2@SiO2@Fe3O4, were active for five and seven times, respectively. A mechanism was proposed within electron and oxygen transfer processes.**

Title	**Coupled multivariate statistical analysis and WQI approaches for groundwater quality assessment in Wadi El-Assiuty downstream area, Eastern Desert, Egypt**
Authors	**Masoud, A.M., Ali, M.H.**
Journal	**Journal of African Earth Sciences 172,103982**
Abstract	**Groundwater is the primary source of fresh water for agriculture and other purposes in the Wadi El-Assiuty area; therefore, the preservation of its supply and quality is of great importance. The present study aims to evaluate the groundwater quality in the newly reclaimed parts of Wadi El-Assiuty by integrating hydrochemical data, multivariate statistical analyses, and a water quality index (WQI). In this study, 48 groundwater samples were collected and analyzed for 12 physicochemical parameters. Multivariate statistical approaches, including a correlation matrix, factor analysis, and hierarchical cluster analysis, were applied to differentiate the source of the water quality variation and determine the cause of groundwater deterioration. The factor analysis identified three main factors describing the groundwater quality in the study area, and the cluster analysis indicated two main distinct clusters of the analyzed variables. The spatial variation maps of the analyzed parameters were developed using interpolation techniques within a geographic information system environment. The WQI was applied according to the chemical drinking-water quality standards of the World Health Organization (WHO) with respect to the 12 parameters measured to evaluate the suitability of the groundwater for human consumption. The resultant WQI showed that approximately 54% of the collected groundwater samples were of an acceptable quality for human consumption with respect to the 12 parameters measured. The suitability of groundwater for irrigation was evaluated according to the salinity hazard (as electrical conductivity, EC), sodium adsorption ratio (SAR), sodium percentage (Na%), and magnesium hazard (MH). From the results, 40% of the collected samples were "permissible" for irrigation with respect to the EC, 82% were "good" to "excellent" with respect to the SAR values, 29% were "permissible" with respect to the Na%, and 90% were "suitable" with respect to the MH.**

Title	**Structure and optical properties of thermally evaporated Te doped ZnSe thin films**
Authors	**Hasaneen, M.F., Ali, H.M., Abd El-Raheem, M.M., Abdel Hakeem, A.M.**
Journal	**Materials Science and Engineering B: Solid-State Materials for Advanced Technology 262,114704**
Abstract	**The cooled pressing method is used for preparing (ZnSe)1−xTex chalcogenide glasses. The thermal evaporation technique is utilized for depositing the thin films. Topological calculations reveal the obvious effect of doping Te content on the average coordination number Z, parameter determines the deviation from stoichiometry r, glass transition temperature Tg, number of lone-pair electrons L and heat of atomization Hs. Swanepoel's approach is used to estimate the refractive index and the average thickness of the films with high accuracy. The addition of tellurium as an impurity found to has a great influence on the optical parameters such as refractive index, energy band gap Eg, Urbach energy Eu, refractive index n, single oscillator energy Eo, dispersion energy Ed, free-electron concentration N, and plasma frequency, ωp.**

Title	**Association of microRNA 17 host gene variant (rs4284505) with susceptibility and severity of systemic lupus erythematosus**
Authors	**Abdel-Gawad, A.R., Shaheen, S., Babteen, N.A., (...), Fawzy, M.S., Gouda, N.S.**
Journal	**Immunity, Inflammation and Disease 8(4), pp. 595-604**
Abstract	**Objective: MicroRNAs are large family clusters of small noncoding RNAs that implicated in genetic and epigenetic regulation of several immunological processes and pathways. As an epigenetic modifier, the microRNA 17-92 cluster host gene (MIR17HG) has been shown to regulate the expression of genes involved in systemic lupus erythematosus (SLE) pathway. This study aimed to explore the association of MIR17HG (rs4284505; A>G) variant with SLE development and phenotype in a sample of the Eastern Mediterranean population. Methods: A total of 326 participants (163 patients with SLE and 163 healthy controls) were enrolled in this study. The different genotypes of the MIR17HG (rs4284505) variant were characterized using the TaqMan real-time polymerase chain reaction technique. Association with the available clinical and laboratory data, including the systemic lupus erythematosus disease activity index (SLEDAI), was also executed. Results: The MIR17HG (rs4284505) variant showed a protective effect against developing SLE under heterozygote (A/G vs A/A; odds ratio [OR] = 0.10, 95% confidence interval [CI] = 0.05-0.20, P < 0.001) and dominant (A/G+G/G vs A/A; OR = 0.39, 95% CI = 0.25-0.61, P <.001) models. This association was consistent even after SLE stratified by lupus nephritis. In contrast, rs4284505 (G/G) genotype conferred increased susceptibility to SLE (G/G vs A/A+A/G; OR = 2.15, 95% CI = 1.31-3.53, P =.002). Moreover, the rs4284505 variant showed a statistically significant association with mucocutaneous lesions and SLEDAI scores (all P <.05). Conclusion: This study is the first one to explore that the MIR17HG rs4284505 is associated with SLE risk; (A/G) genotype conferred a protective effect, while the (G/G) genotype showed increased susceptibility to SLE and association with the disease severity in the study population.**

Title	**Combined zircon U-Pb dating and chemical Th–U–total Pb chronology of monazite and thorite, Abu Diab A-type granite, Central Eastern Desert of Egypt: Constraints on the timing and magmatic-hydrothermal evolution of rare metal granitic magmatism in the Arabian Nubian Shield**
Authors	**Mahdy, N.M., Ntaflos, T., Pease, V., (...), Abdelfadil, K.M., Fathy, D.**
Journal	**Chemie der Erde 80(4),125669**
Abstract	**We present the first chemical age determination of monazite from a geochemically-specialized rare metal granite of the Central Eastern Desert (CED), Egypt. The Abu Diab composite A-type granite of the CED divides into three co-magmatic phases: two mica granite (TG), garnet-bearing muscovite granite (GMG), and muscovite granite (MG). The GMG granitic phase is a typical example of a rare metal, volatile-rich aqueous silicate magma. Its zircon has extremely high U-concentration (up to 45,000 ppm) and intense metamictization, resulting in significant radiogenic Pb-loss, as well as common Pb contamination, along fractures and other imperfections. Laser ablation (LA-ICP-MS) zircon U-Pb results yield imprecise to meaningless dates. On the other hand, the GMG exhibits two texturally and chemically distinct varieties of monazite, pristine (Mnz1) and altered (Mnz2), that yield similar electron microprobe (EMP) chemical ages of 587 ± 8 Ma (2σ) for Mnz1 and 587 ± 9 Ma (2σ) for Mnz2. These ages, combined with the inferred alteration temperature (T > 400 °C), indicate monazite alteration/replacement occurred during or soon after crystallization of the pluton, in response to expelled magmatic-hydrothermal fluids inferred to be F-rich, late-staged deuteric fluids. The alteration and elemental substitution of zircon and monazite reflect coupled dissolution-recrystallization processes during late-staged deuteric alteration when zircon and thorite were relatively vulnerable to post-magmatic hydrothermal effects because of their extremely metamict state. The ca. 587 Ma age is typical of A-type granite intrusion across the CED and the post-collisional stage of the Arabian Nubian Shield (ANS; 610 – 560 Ma), and is within analytical error of associated magmatic thorite (592 ± 8 Ma). These two ages agree with the timing of rare metal-rich intrusions (0.6−0.4 Ga) related to the Pan-African orogeny. Future research using the monazite chronometer may better constrain the timing of rare metal granitic magmatism of the ANS.**

Title	**Anti-synchronized quad-compound combination among parallel systems of fractional chaotic system with application**
Authors	**Mahmoud, E.E., Jahanzaib, L.S., Trikha, P., Alkinani, M.H.**
Journal	**Alexandria Engineering Journal 59(6), pp. 4183-4200**
Abstract	**The paper introduces a novel 3-D chaotic fractional system. A thorough analytical study of the new system is done using Lyapunov spectrum, bifurcation analysis, equilibrium point analysis, existence & uniqueness of solution, etc. The system is synchronized using a novel technique 'Quad-compound combination anti-synchronization' with its parallel systems using non linear and adaptive sliding mode control method. A comparative study of the obtained results has been done and illustration of achieved synchronization in secure communication is also provided.**

Title	**Influence of rf power on growth, structural and optical properties of ZnO synthesized via vapor transport in inductively coupled plasma**
Authors	**El-Hossary, F.M., Mohamed, S.H., Noureldein, E.A., Abo EL-Kassem, M.**
Journal	**Materials Science in Semiconductor Processing 120,105284**
Abstract	**The aim of this work was to examine the influence of radio frequency (rf) power on ZnO films synthesized by means of chemical vapor transport technique in inductively coupled plasma (ICP). As the rf power increased, with a fixed processing time of only 8 min, the temperature inside the reactor tube, the thickness and surface roughness of the formed polycrystalline ZnO films increased. The morphology of the ZnO films changed to oblate, webby like cloud-grains, nanoslices, and a mixture of nanorods and nanograins with changing the rf power from 300 to 500 W. Mixed phases of hexagonal ZnO and hexagonal Zn were found for samples synthesized at 300 and 500 W whereas single hexagonal ZnO was synthesized at 350, 400 and 450 W. The optical band gap decreased from 3.35 eV to 3.05 eV with increasing the rf power from 300 W to 500 W. The refractive index and extinction coefficient values were mainly increased with increasing the rf power. The electrical resistivity was generally decreased with increasing rf power and has values between 1.38 × 10−2 - 2.83 × 10−3 Ωcm. The obtained results might be important for useful applications of ZnO films grown by chemical vapor transport with the assistance of ICP.**

Title	**Rare earth Ce- and Nd-doped spinel nickel ferrites as effective heterogeneous catalysts in the (ep)oxidation of alkenes**
Authors	**Adam, M.S.S., Hafez, A.M., Khalaf, M.M.**
Journal	**Journal of the Iranian Chemical Society 17(12), pp. 3237-3250**
Abstract	**Cerium (Ce)- and neodymium (Nd)-doped spinel nickel ferrites catalysts system were synthesized using a cost-effective sol–gel route. The as-prepared nickel ferrites and its doped Ce and Nd nanomaterials were characterized in terms of Fourier transform infrared spectrophotometry, X-ray diffraction, field emission scanning electron microscopy, energy-dispersive X-ray spectroscopy, transmission electron microscopy, selected area diffraction pattern, zeta potential and magnetism techniques. Their catalytic potential was examined in the (ep)oxidation of 1,2-cyclooctene by using hydrogen peroxide (H2O2) or tert-butylhydroperoxide (t-BuOOH). Optimization of various parameters, including solvent, oxidant and catalyst type revealed that chloroform (CHCl3) or 1,2-dichloroethane as a solvent and t-BuOOH as an oxidant were found to be the best choice for this catalytic system. The catalytic efficiency was found as Nd–NiFe2O4 > Ce–NiFe2O4 > NiFe2O4. Further, the applied nanocatalysts could be easily renovated and exhibited high catalytic reactivity for 5 times of recycling experiments with long-time durability. A reasonable discussion of the mechanism reaction reinforced the action of these spinel catalysts.**

Title	**Control-based verification of multiatoms in a cavity**
Authors	**Bakry, H., Zidan, N.**
Journal	**Pramana - Journal of Physics 94(1),96**
Abstract	**In this paper, we study a model of two two-level atoms interacting with a quantum field. An analytical solution is obtained which is used to study the information entropy of the system. It is shown that the nonlinear term plays a significant role in the behaviour of the minimum uncertainty (MU) compared with the concurrence (C). Our extensive study of information entropy of atoms–field interaction demonstrates that using the coupling strength between the atoms and the field as a controller parameter, one can control the dynamics of the system by increasing the lower bound of the entropic uncertainty relation or decreasing the entanglement.**

Title	**Photobiocatalytic synthesis of chiral secondary fatty alcohols from renewable unsaturated fatty acids**
Authors	**Zhang, W., Lee, J.-H., Younes, S.H.H., (...), Kourist, R., Hollmann, F.**
Journal	**Nature Communications 11(1),2258**
Abstract	**En route to a bio-based chemical industry, the conversion of fatty acids into building blocks is of particular interest. Enzymatic routes, occurring under mild conditions and excelling by intrinsic selectivity, are particularly attractive. Here we report photoenzymatic cascade reactions to transform unsaturated fatty acids into enantiomerically pure secondary fatty alcohols. In a first step the C=C-double bond is stereoselectively hydrated using oleate hydratases from Lactobacillus reuteri or Stenotrophomonas maltophilia. Also, dihydroxylation mediated by the 5,8-diol synthase from Aspergillus nidulans is demonstrated. The second step comprises decarboxylation of the intermediate hydroxy acids by the photoactivated decarboxylase from Chlorella variabilis NC64A. A broad range of (poly)unsaturated fatty acids can be transformed into enantiomerically pure fatty alcohols in a simple one-pot approach.**

Title	**A facile chemical synthesis of CuxNi(1−x)Fe2O4 nanoparticles as a nonprecious ferrite material for electrocatalytic oxidation of acetaldehyde**
Authors	**Khalaf, M.M., Abd El-Lateef, H.M., Alnajjar, A.O., Mohamed, I.M.A.**
Journal	**Scientific Reports 10(1),2761**
Abstract	**In the present work, Cu-doped nickel ferrite (CuxNi(1−x)Fe2O4) nanoparticles (CuNFNPs) were chemically fabricated by adding citric acid as a capping agent followed by combustion and calcination for acetaldehyde oxidation reaction (AOR) in KOH electrolytes. The as-prepared CuNFNPs were studied in terms of Fourier-transform infrared spectroscopy (FT-IR), Transmission electron microscopy (TEM), Field emission scanning electron microscope (FE-SEM), Energy-dispersive X-ray spectroscopy (EDX), X-ray diffraction (XRD) and Brunauer-Emmett-Teller (BET) specific surface area analyses. The morphology of CuNFNPs has sponges-structure containing irregular pores. Additionally, XRD analysis indicated that the prepared CuNFNPs have a cubic-crystals ferrite without the existence of impurities and the crystal size around 20.2 nm. The electrooxidation of acetaldehyde by the presented CuNFNPs was investigated using cyclic voltammetry (CV), chronoamperometry (CA) and electrochemical impedance spectroscopy (EIS) in −OH media. Furthermore, the effects of −OH and acetaldehyde on the electrocatalytic performance were studied with and without Cu-doping in addition to EIS and CA studies which confirm the high-performance of CuNFNPs as an electrocatalyst for AOR.**

Title	**Optimizing the thermoelectric performance of FeVSb half-Heusler compound via Hf–Ti double doping**
Authors	**El-Khouly, A., Novitskii, A., Serhiienko, I., (...), Khovaylo, V., Adam, A.M.**
Journal	**Journal of Power Sources 477,228768**
Abstract	**FeVSb-based half-Heusler (HH) compound has recently been identified as promising medium-high temperature thermoelectric (TE) materials for power generation applications. In this study, enhanced thermoelectric performance of Fe(V0.8Hf0.2)1-xTixSb (x = 0.0, 0.2, 0.4, 0.5, 0.6) HH alloys by Hf–Ti dual-doping was reported studied in a temperature range from 100 to 900 K. A high content of Ti doping not only optimized the carrier concentration but also reduced the lattice thermal conductivity, which all contribute to high zT. As a result, a zT value was increased by ~20% at 873 K for Fe(V0.8Hf0.2)0.8Ti0.2Sb compound. Hf–Ti dual doping significantly reduced the lattice thermal conductivity due to enhanced point defect scattering which is mainly attributed to mass fluctuations. Hence, suppressed the material's total thermal conductivity. A reduction of ~20% was obtained for the Fe(V0.8Hf0.2)0.8Ti0.2Sb sample, compared with the single Hf-doped FeVSb sample and of ~80% compared to FeVSb at room temperature.**

Title	**Enhancement the perpendicular magnetic anisotropy of nanopatterned hard/soft bilayer magnetic antidot arrays for spintronic application**
Authors	**Salaheldeen, M., Martínez-Goyeneche, L., Álvarez-Alonso, P., Fernández, A.**
Journal	**Nanotechnology 31(48),485708**
Abstract	**Development of perpendicular magnetic anisotropy thin films is a requisite for many applications. In this work, we have illustrated the enhancement of the PMA of Hard (Co)/Soft (Permalloy, Py) ferromagnetic bilayers by depositing them onto nanoporous anodic alumina membranes with different hole diameters varying in the range between 30 nm and 95 nm. A dramatic change in the hysteresis loops behaviour with hole size, D, and magnetic surface cover ratio parameters has been observed: (1) for samples with small antidot hole diameters, the in-plane (INP) hysteresis loops show single-step magnetic behaviour; (2) for D = 75 nm, the hysteresis loops of Co/Py and Py samples exhibit a multistep magnetic behaviour; (3) a decreasing coercivity in the INP hysteresis loops for antidot arrays samples with D> 75 nm has been detected as a consequence of the reduction of the INP magnetic anisotropy and the rising of the out-of-plane component. A crossover of the magnetic anisotropy from the INP to out-of-plane for bilayer antidot samples has been observed for Co/Py ferromagnetic bilayers, favoured by the interfacial exchange coupling between the two ferromagnetic materials. These findings can be of high interest for the development of novel magnetic sensors and for perpendicular-magnetic recording patterned media based on template-assisted deposition techniques.**

Title	**Inference of progressively type-II censored competing risks data from Chen distribution with an application**
Authors	**Ahmed, E.A., Ali Alhussain, Z., Salah, M.M., Haj Ahmed, H., Eliwa, M.S.**
Journal	**Journal of Applied Statistics 47(13-15), pp. 2492-2524**
Abstract	**In this paper, the estimation of unknown parameters of Chen distribution is considered under progressive Type-II censoring in the presence of competing failure causes. It is assumed that the latent causes of failures have independent Chen distributions with the common shape parameter, but different scale parameters. From a frequentist perspective, the maximum likelihood estimate of parameters via expectation–maximization (EM) algorithm is obtained. Also, the expected Fisher information matrix based on the missing information principle is computed. By using the obtained expected Fisher information matrix of the MLEs, asymptotic 95% confidence intervals for the parameters are constructed. We also apply the bootstrap methods (Bootstrap-p and Bootstrap-t) to construct confidence intervals. From Bayesian aspect, the Bayes estimates of the unknown parameters are computed by applying the Markov chain Monte Carlo (MCMC) procedure, the average length and coverage rate of credible intervals are also carried out. The Bayes inference is based on the squared error, LINEX, and general entropy loss functions. The performance of point estimators and confidence intervals is evaluated by a simulation study. Finally, a real-life example is considered for illustrative purposes.**

Title	**Generalized Hermite kernel function for support vector machine classifications**
Authors	**Zanaty, E.A., Afifi, A.**
Journal	**International Journal of Computers and Applications 42(8), pp. 765-773**
Abstract	**Support vector machines (SVMs) have proved to be promising methods for classification and regression analysis because of their solid mathematical foundations which convey several salient properties that other methods hardly provide. The critical SVMs problem is to select appropriate kernels as the performance of SVMs depends on this choice. In this paper, a set of new Hermite kernel functions is proposed for accurate SVMs classification. Besides clarifying how to apply the proposed Hermite kernel functions on vector inputs, we also enhanced the generalization capability of the proposed method when applied to a variety of classification problems. The generalized kernel functions are induced from Hermite polynomials which proved orthogonality and recurrence. The proposed generalized Hermite kernels satisfy Mercer's condition and are stated in the general form, allowing us to derive different kernel functions. The accuracy of the proposed kernels is compared with that of the existing kernels such as Universal, Chebyshev, Gaussian, and Polynomial by applying them to a variety of non-separable data sets with several attributes. It is shown that the proposed kernel gives good classification accuracy in nearly all the data sets, especially those of high dimensions.**

Title	**Investigation of anti-corrosive potentials of Cu(II)–Schiff base complex assembled on magnetic Fe3O4, Fe3O4/TiO2 and Fe3O4/SiO2 nanocubes on carbon steel pipelines in 3.0 N HCl**
Authors	**Khalaf, M.M., Abd El-Lateef, H.M.**
Journal	**Journal of Molecular Liquids 318,114251**
Abstract	**Non-precious Cu(II)-Schiff base complex (CuSB) immobilized on magnetic Fe3O4, Fe3O4/TiO2 and Fe3O4/SiO2 nanocubes were fabricated by a simple and cost-effective route. The as-synthesized materials were categorized using FTIR, XRD, FE-SEM, EDX, TEM, and magnetism (VSM) methods in addition to Monte Carlo (MC) simulations. The FTIR analysis established the efficacious formation of the Schiff base complex@magnetic nanocomposites. The characteristic peak of magnetite Fe3O4 appears at a lower intensity due to the successful CuSB complex immobilization on Fe3O4, Fe3O4/SiO2, and Fe3O4/TiO2. TEM and FE-SEM investigations confirmed that, with CuSB loading on Fe3O4 and it's coated with SiO2 and TiO2 gradually change its crystallite sizes and the appearance of translucent elliptical rods which is specific for CuSB complex. The corrosion protective potentials of as-produced CuSB@Fe3O4, CuSB@Fe3O4/TiO2 and CuSB@Fe3O4/SiO2 nanocomposites were examined for carbon steel pipelines in 3.0 N HCl solution using potentiodynamic polarization (PDP), linear polarization resistance (LPR) corrosion rate, and electrochemical impedance spectroscopy (EIS) measurements. The outcomes revealed that all CuSB@magnetic nanocomposites impede steel corrosion in 3.0 N HCl more than the corresponding CuSB alone. The value of the protection capacity of the CuSB complex is 81.4%, while for CuSB@Fe3O4, CuSB@Fe3O4/TiO2 and CuSB@Fe3O4/SiO2 nanocomposites are 90.9, 93.4 and 98.1%, respectively. These materials, based on PDP tests, worked as mixed-type additives, and the adsorption route follows the model of Langmuir isotherm. Furthermore, the achieved findings were reinforced by surface inspections of steel specimens using FE-SEM/EDX and FTIR studies.**

Title	**Green Synthesis of AgNPs() Ultilizing Delonix Regia Extract as Anticancer and Antimicrobial Agents****
Authors	**Abu-Dief, A.M., Abdel-Rahman, L.H., Abd-El Sayed, M.A., Zikry, M.M., Nafady, A.**
Journal	**ChemistrySelect 5(42), pp. 13263-13268**
Abstract	**Silver is an effective antimicrobial agent with low toxicity, which is important especially in the treatment of burn wounds where transient bacteremia is prevalent. In this research, the green method was employed to synthesis silver nanoparticles (AgNPs). The synthesized AgNPs were characterized using IR, XRD, DLS and UV/Visible Spectrophotometery. XRD pattern of AgNPs has a face-centered cubic (FCC) form and crystalline lattice with a crystallite size of 12 nm. FT-IR spectra indicate the functional groups of phytochemical compounds at Delonix regia extract DRE and AgNPs. DLS showed the distribution of average particle size of AgNPs that have 11 nm mean size of the particle. The prepared AgNPs were screened for their cytotoxic effect against colon carcinoma cells (HCT- 116 cell line), hepatic cellular carcinoma cells (HepG-2) and breast carcinoma cells (MCF-7). The cytotoxic effect of AgNPs is close to the cytotoxic effect of Doxorubicin standard drug. The toxicity of the AgNPs was tested on bacterial species such as Gm (+) positive bacteria (Bacillus subtilis) and Gm (-) negative bacteria (Serrati amarcescence and Escherichia coli) and fungal species such as Candida albicans, Getrichm candidum and Aspergillus flavus. The antimicrobial activity of AgNPs was greater towards Gm (+) positive bacteria compared to Gm (-) negative bacteria. These biological activities of the synthesized AgNPs could be promised to use it as a drug.**

Title	**Three-phase lag model of thermo-elastic interaction in a 2D porous material due to pulse heat flux**
Authors	**Hobiny, A., Alzahrani, F.S., Abbas, I.**
Journal	**International Journal of Numerical Methods for Heat and Fluid Flow 30(12), pp. 5191-5207**
Abstract	**Purpose: The purposes of this study, a generalized model for thermoelastic wave under three-phase lag (TPL) model is used to compute the increment of temperature, the components of displacement, the changes in volume fraction field and the stress components in a two-dimension porous medium. Design/methodology/approach: By using Laplace-Fourier transformations with the eigen values methodologies, the analytical solutions of all physical variables are obtained. Findings: The derived methods are estimated with numerical outcomes which are applied to the porous media in simplified geometry. Originality/value: Finally, the outcomes are represented graphically to display the difference among the models of the TPL and the Green and Naghdi (GNIII) with and without energy dissipations.**

Title	**Corrosion inhibition of carbon steel in hydrochloric acid solution using newly synthesized urea-based cationic fluorosurfactants: Experimental and computational investigations**
Authors	**Abd El-Lateef, H.M., Shalabi, K., Tantawy, A.H.**
Journal	**New Journal of Chemistry 44(41), pp. 17791-17814**
Abstract	**The facile synthesis approach, surface-active properties, and anti-corrosive efficiency of innovative urea-based cationic fluorinated surfactants (FUS) of variable alkyl chain length were investigated. The effect of as-prepared FUS inhibitors on carbon steel corrosion in 15% HCl solution at 20-50 °C was examined using weight loss and various electrochemical methods (open circuit potential (OCP) vs. time, potentiodynamic polarization (PDA) and electrochemical impedance spectroscopy (EIS) methods). The corrosion protection capacities at an optimum concentration (0.5 mM) are 93.2% (FUS-8), 96.3% (FUS-10) and 97.6% (FUS-12) by PDA, comparable to the findings achieved by EIS. PDA measurements indicated that the studied FUS act as inhibitors of mixed-type and chemical adsorption on a carbon steel interface following the Langmuir isotherm model. The thermodynamic and kinetic indices of the corrosion and adsorption processes were estimated and interpreted. Surface examinations by X-ray photoelectron spectroscopy (XPS), Fourier-transform infrared spectroscopy (FTIR), field emission scanning electron microscopy and energy dispersive X-ray analysis (FESEM/EDX) revealed the formation of a protecting layer at the carbon steel/HCl interface. Quantum chemical indices (DFT based) delivered more understanding of the inhibition mechanism. Molecular dynamics (MD) simulations were accomplished to explore the configurational adsorption performance of the studied fluorosurfactants on the iron(110) interface. It is supposed that these findings are of some significance for the reasonable design of effective inhibitors for acidic corrosion.**

Title	**Non-Linear Optical Property and Biological Assays of Therapeutic Potentials Under In Vitro Conditions of Pd(II), Ag(I) and Cu(II) Complexes of 5-Diethyl amino-2-(2-[(2-hydroxy-Benzylidene)-amino]-phenylimino-methyl)-phenol**
Authors	**Abdel-Rahman, L.H., Adam, M.S., Abu-Dief, A.M., Ahmed, H.E.-S., Nafady, A.**
Journal	**Molecules (Basel, Switzerland) 25(21)**
Abstract	**Herein, we report facile procedures for synthesis of a new Schiff base ligand (H2L,5-Diethylamino-2-({2-[(2-hydroxy-benzylidene)-amino]-phenylimino}-methyl)-phenol) and its Ag(I), Pd(II) and Cu(II) complexes. The structure of the H2L ligand as well as its metal complexes was deduced based on wide range of analytical, structural and spectroscopic tools, along with theoretical evidence via density functional theory (DFT) calculations. The obtained results indicated that the Schiff base (H2L) ligand acts as a tetradentate N2O2 donor with two azomethine nitrogen's (N1, N2) and two deprotonated phenolic oxygens (O1, O2) atoms. A distorted octahedral structure is assigned to [CuL(OH2)2]·3/2H2O complex and square planar structure for PdL and AgL complexes. The electronic structure and non-linear optical (NLO) property of the prepared compounds were discussed theoretically by the B3LYP/GENECP program. Results revealed that all complexes have non-planner geometries as indicated from the dihedral angles. The charge transfer occurs within the synthesized complexes as indicated from the calculated energy gap between HOMO and LUMO energies. The H2L ligand and its complexes are excellent candidates for NLO materials as implied from their hyperpolarizabilities and polarizabilities values. The biological activities of the prepared complexes against selected microorganisms and cancer cell lines gave good growth inhibitory effect. The biocidal potencies of the ligand and its complexes can be arranged as follows: AgL > CuL > PdL > H2L, as compared to the used standard drugs. The antiproliferative activity of the studied complexes against different carcinoma cell lines such as liver (Hep-G2), breast (MCF-7) and colon (HCT-116) followed the order H2L < AgL< PdL < CuL < vinblastine. Probing the binding interactions of prepared complexes with calf thymus (CT)-DNA using electronic absorption, gel electrophoresis and viscosity measurements revealed strong interaction via intercalation modes, as also evidenced by their molecular docking study.**

Title	**Information gain in environmental monitoring through bioindication and biomonitoring methods ("B & B technologies") and phytoremediation processes-with special reference to the Biological System of Chemical Elements (BSCE) under specific consideration of Lithium**
Authors	**Markert, B., Abdallah, N., Aksoy, A., (...), Wolterbeek, B., Wünschmann, S.**
Journal	**Bioactive Compounds in Health and Disease 3(11), pp. 214-250**
Abstract	**Different definitions for the concepts of information, information transfer, i.e. communication and its effect and efficiency of false, but also correct information, especially from the environmental sector, are given. "THE TEN ECOLOGICAL COMMANDMENTS"developed by Menke-Glückert at the end of the 1960s, the 9th commandment "Do not pollute information", in particular, is examined in more detail and understood practically as a currently unchanging law in our existing world societies. The "Ethics Consensus", derived from "THE TEN ECOLOGICAL COMMANDMENTS"and developed by Markert at the end of the 1990s, reflects both theoretical and practical levels of action that many people in our highly diverse world societies can support. From a scientific point of view, this article deals with the so-called B & B technologies, i.e. bioindication and biomonitoring of chemical elements, their chemical speciation as well as organic substances. B & B technologies, which deals with the biological detection of atmospheric deposition of chemical substances on a regional, national, and international level, are taken into account. From both an academic and a practical point of view, mosses have prevailed here in the last decades in addition to lichens. The use of mosses is a major focus of international air monitoring, especially in Europe. Furthermore, the phytoremediation of chemical substances in water, soil and air is described as a biological and sustainable biological process, which does not yet have the full scope as it is used in bioindication and biomonitoring, as shown in the example of mosses. However, the phytoremediation is considered to be an excellent tool to have the leading role in the sustainable pollutant "fight". In the future qualitative and quantitative approaches have been further developed to fit scientifically and practically B&B Technologies as well the different forms of phytotechnological approaches. Finally, the example of lithium, which is optionally derived from the Biological System of Chemical Elements (BSCE), becomes a chemical example that the administration of lithium to ALL mentally conditioned diseases such as manic depression to smoking cigarettes becomes one of the most valuable services for the recovery of human society on a global level. As a conclusion of these tremendous effects of lithium can be considered: Pulled out, to make clear that only this chemical element beside a psychiatric care and the involvement of family members, friends, physicians, psychologists and psychiatrists. In addition, it is a must that there is a strong relationship between patient, psychiatrist(s) and strongly related persons to the patient. First an intensive information transfer via communication must be guaranteed. After it, psychological support by doctors and, only if it seems necessary Lithium is to be given in a patient specific dose.**

Title	**Chaos suppression via integrative time delay control**
Authors	**Arafa, A.A., Xu, Y., Mahmoud, G.M.**
Journal	**International Journal of Bifurcation and Chaos 30(14),2050208**
Abstract	**A general strategy for suppressing chaos in chaotic Burke-Shaw system using integrative time delay (ITD) control is proposed, as an example. The idea of ITD is that the feedback is integrated over a time interval. Physically, the chaotic system responds to the average information it receives from the feedback. The main feature of integrative is that the stability of the chaotic system occurs over a wider range of the space parameters. Controlling chaotic systems with ITD has not been discussed before as far as we know. Stability and the existence of Hopf bifurcation are studied which demonstrate that the switch stability occurs at critical values of the time delay. Employing the normal form theory and center manifold argument, an explicit formula is derived to determine the stability and the direction of the bifurcating periodic solutions. Numerically, the bifurcation diagram and the eigenvalues of the corresponding characteristic equations are computed to supply a clear interpretation for suppressing chaos via ITD. Furthermore, ITD method is compared with the time delayed feedback (TDF) control numerically. This comparison shows that the stability area with ITD is larger than TDF which demonstrates the feasibility and effectiveness of the ITD. Other examples of chaotic systems can be similarly investigated.**

Title	**Marine fungi recorded from avicennia marina (Forsk.) vierh. and their secondary product potential**
Authors	**Abdel-Wahab, M.A., Gareth Jones, E.B., Bahkali, A.H.**
Journal	**Nova Hedwigia 111(3-4), pp. 357-390**
Abstract	**In this review, we compiled a list of marine fungi reported from the lower parts of Avi-cennia marina, which are permanently or intermittently inundated with sea water from different geographical regions of the world. From 1955 to 2020 a total of 41 publications reporting marine mycota of A. marina were published that include: 12 studies reporting taxa along with their frequency of occurrence, 10 studies without frequency of occurrence and 19 studies described new taxa from the host. A total of 149 marine fungi (120 ascomycetes, 24 asexual ascomycetes and 5 basidiomycetes) were reported from intertidal and submerged wood, pneumatophores and leaves of Avicennia marina from different geographical locations. This figure is the highest number of marine fungi reported from a single mangrove host. Two new families, 11 new genera and 39 new species were described as new to science from A. marina. The highest number of species were recorded from the Indian Ocean (117), while only 75 taxa were recorded from the Pacific Ocean with 43 fungi common to both oceans. However, fewer studies have been carried out in the latter ocean. Intertidal samples of A. marina were collected from nine countries of which India supported the highest fungal diversity from the host with 68 species, followed by Malaysia (57) and Egypt (42). Marine mycota of A. marina were latitudinally distributed with species from subtropics differing largely from those from tropical regions, but were less investigated. Sordariomycetes, Pleosporales and Halosphaeriaceae were the most-species rich class, order and family, respectively. The high percentages of new species recorded from only a single location (67%) indicate that marine fungi from A. marina and other mangrove plants are understudied. Twenty-six species were recorded exclusively from A. marina, of which 23 were described fairly recently as new taxa from the host and this supports the non-specific nature of the saprobic marine fungi. This review represents the first exclusive list of marine fungi from a single mangrove tree species. Out of the 149 species reported from A. marina, only fourteen fungi were explored for their secondary products. Explored species produced new bioactive compounds; many of them have antimicrobial, cytotoxic, phyto-toxic, antimalarial and antidiabetic effects.**

Title	**Advanced self-healing coatings based on ZnO, TiO2, and ZnO-TiO2/polyvinyl chloride nanocomposite systems for corrosion protection of carbon steel in acidic solutions containing chloride**
Authors	**Abd El-Lateef, H.M., Alnajjar, A.O., Khalaf, M.M.**
Journal	**Journal of the Taiwan Institute of Chemical Engineers 116, pp. 286-302**
Abstract	**Anti-corrosion protective self-healing coating systems for carbon steel that utilizes ZnO, TiO2, and ZnO-TiO2 nanocomposites and polyvinyl chloride (PVC) as an organic healing agent was introduced. These nanocomposites systems were fabricated by a facile preparation method by the coating of ZnO, TiO2, and ZnO-TiO2 with PVC. These synthesized systems are well characterized by the investigation techniques of Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Field emission scanning electron microscopy (FE-SEM), and Transmission electron microscopy (TEM). The good crystallinity of the zincite and anatase phases was confirmed by XRD studies along with a nano grain size of 46.5 nm for ZnO and 13.5 nm for TiO2. ZnO, TiO2, and/or ZnO-TiO2/polyvinyl chloride composites films were applied as an anti-corrosive coating deposited on carbon steel by dip-coating processes. The anticorrosion performance of uncoated and coated carbon steel was inspected in 0.5 M HCl+3.5% NaCl by performing immersion test, Eocp vs. time, impedance spectroscopy (EIS), and potentio-dynamic polarization (PDP) methods. The ZnO, TiO2, and/or ZnO-TiO2/PVC composite coating exhibited premium protection against corrosion of C-steel with protection capacity of 96.2–97.1% after 10 days of exposure. The capacity of the fabricated films increased in the order of ZnO-TiO2/PVC > TiO2 /PVC > ZnO /PVC. The surface topology of the coated specimen before and after 240 hrs dipping in the aggressive medium was assessed using FE-SEM. The current study contributes to the preparation of novel protective systems with self-healing capability for steel corrosion in acidic medium containing chloride.**

Title	**Meshless analysis of nonlocal boundary value problems in anisotropic and inhomogeneous media**
Authors	**Zaheer-Ud-din, Ahsan, M., Ahmad, M., (...), Mahmoud, E.E., Abdel-Aty, A.-H.**
Journal	**Mathematics 8(11),2045, pp. 1-19**
Abstract	**In this work, meshless methods based on a radial basis function (RBF) are applied for the solution of two-dimensional steady-state heat conduction problems with nonlocal multi-point boundary conditions (NMBC). These meshless procedures are based on the multiquadric (MQ) RBF and its modified version (i.e., integrated MQ RBF). The meshless method is extended to the NMBC and compared with the standard collocation method (i.e., Kansa's method). In extended methods, the interior and the boundary solutions are approximated with a sum of RBF series, while in Kansa's method, a single series of RBF is considered. Three different sorts of solution domains are considered in which Dirichlet or Neumann boundary conditions are specified on some part of the boundary while the unknown function values of the remaining portion of the boundary are related to a discrete set of interior points. The influences of NMBC on the accuracy and condition number of the system matrix associated with the proposed methods are investigated. The sensitivity of the shape parameter is also analyzed in the proposed methods. The performance of the proposed approaches in terms of accuracy and efficiency is confirmed on the benchmark problems.**

Title	**Thiocarbohydrazones based on adamantane and ferrocene as efficient corrosion inhibitors for hydrochloric acid pickling of c-steel**
Authors	**Sayed, A.R., Abd El-Lateef, H.M.**
Journal	**Coatings 10(11),1068, pp. 1-20**
Abstract	**N′-(adamantan-2-ylidene)hydrazinecarbothiohydrazide and 2-(ferrocenyl-1-ylidene) hydrazinecarbothiohydrazide are used in coordination and organometallic complexes. The important idea of the research in this paper is the principal to prepare thiocarbohydrazones from the reaction of 2-acetylferrocene (Fe-Th) or 2-adamantanone (Ad-Th) with carbonothioic dihydrazide. The materials were elucidated by elemental analysis and spectral data. The asprepared compounds were applied as effective corrosion inhibitors for HCl pickling of C-steel. Detailed investigations on electrochemical (open circuit potential (OCP) vs. time, potentiodynamic polarization (PDP), and impedance spectroscopy (EIS)) techniques and surface morphology studies are introduced in this work. Results indicated that Fe-Th could deliver greater inhibition performance than Ad-Th, and the highest protection capacity values of 93.6% (Ad-Th) and 97.9% (Fe-Th) were accomplished at 200 ppm. The adsorption of Ad-Th or Fe-Th additives followed the Langmuir isotherm with both the chemical and the physical adsorption with chemisorption predominance. EIS measurements supported a betterment in the capacitive behavior with the corrosion inhibitors. The inhibitors exhibited a mixed-type behavior as observed from the PDP studies. Field emission scanning electron microscopy (FESEM) and Fourier-transform infrared spectroscopy (FTIR) studies emphasize the occurrence of a protective layer of the as-synthesized organic inhibitors on the C-steel interface. Theoretical studies (density functional theory (DFT) calculations and Monte Carlo (MC) simulations) provide appropriate support for the experimental findings. The existing report provides very significant consequences in formulating and designing novel thiocarbohydrazone inhibitors with high protection efficacy.**

Title	**A novel strategy for complete and phase robust synchronizations of chaotic nonlinear systems**
Authors	**Mahmoud, E.E., Higazy, M., Althagafi, O.A.**
Journal	**Symmetry 12(11),1765, pp. 1-18**
Abstract	**Our work here is to propose a novel technique by which chaos complete and phase synchronizations can be accomplished via a low-cost scheme. We call the proposed technique a "single-state feedback track synchronization control algorithm". A single-state feedback track synchronization control algorithm is designed so that both complete and phase synchronizations can be accomplished using the same controller. Complete synchronization between two chaotic systems means complete symmetry between them, but phase synchronization means complete symmetry with a phase shift. In addition, the proposed method is applied to the synchronization of two identical chaotic Lorenz models. The effectiveness and robustness of the proposed algorithm is well illustrated via exhaustive numerical simulation experiments based on the Matlab toolbox of the powerful genetic algorithm. The robustness of the proposed algorithm motivated us to apply this method of synchronization in a secure communication application.**

Title	**Effect of RF power of Al2O3 target on the physical properties of aluminum-doped zinc oxide films**
Authors	**Hasaneen, M.F., El-Raheem, M.M.A., Ahmed, M.R.**
Journal	**Applied Physics A: Materials Science and Processing 126(11),845**
Abstract	**In this report, we investigate the optical and electrical properties of aluminum zinc oxide (AZO) thin films using magnetron sputtering method in preparing the thin films and spectrophotometer to measure the optical characteristics. The X-ray diffraction (XRD) patterns of the films are found to have amorphous structure. The optical band gap Eg, refractive index n, electronic αEp polarizability, carrier concentration Nc, plasma frequency ωp, electrical resistivity ρs, and sheet resistance Rsh are found to decrease with increasing the RF power of Al2O3 target. The refractive index shows a normal dispersion. Urbach energy Eu and figure of merit are found to increase with increasing the RF power of Al2O3 target. Our results manifest that the change of the RF power of the Al2O3 target can improve the AZO thin films, which is appropriate for solar sell applications.**

Title	**Freshwater Dothideomycetes**
Authors	**Dong, W., Wang, B., Hyde, K.D., (...), Nalumpang, S., Zhang, H.**
Journal	**Fungal Diversity 105(1), pp. 319-575**
Abstract	**Freshwater Dothideomycetes are a highly diverse group of fungi, which are mostly saprobic in freshwater habitats worldwide. They are important decomposers of submerged woody debris and leaves in water. In this paper, we outline the genera of freshwater Dothideomycetes with notes and keys to species. Based on multigene analyses and morphology, we introduce nine new genera, viz. Aquimassariosphaeria, Aquatospora, Aquihelicascus, Fusiformiseptata, Neohelicascus, Neojahnula, Pseudojahnula, Purpureofaciens, Submersispora; 33 new species, viz. Acrocalymma bipolare, Aquimassariosphaeria kunmingensis, Aquatospora cylindrica, Aquihelicascus songkhlaensis, A. yunnanensis, Ascagilis submersa, A. thailandensis, Bambusicola aquatica, Caryospora submersa, Dictyocheirospora thailandica, Fusiformiseptata crocea, Helicosporium thailandense, Hongkongmyces aquaticus, Lentistoma aquaticum, Lentithecium kunmingense, Lindgomyces aquaticus, Longipedicellata aquatica, Neohelicascus submersus, Neohelicomyces dehongensis, N. thailandicus, Neohelicosporium submersum, Nigrograna aquatica, Occultibambusa kunmingensis, Parabambusicola aquatica, Pseudoasteromassaria aquatica, Pseudoastrosphaeriella aquatica, Pseudoxylomyces aquaticus, Purpureofaciens aquatica, Roussoella aquatica, Shrungabeeja aquatica, Submersispora variabilis, Tetraploa puzheheiensis, T. yunnanensis; 16 new combinations, viz. Aquimassariosphaeria typhicola, Aquihelicascus thalassioideus, Ascagilis guttulaspora, A. queenslandica, A. seychellensis, A. sunyatsenii, Ernakulamia xishuangbannaensis, Neohelicascus aquaticus, N. chiangraiensis, N. egyptiacus, N. elaterascus, N. gallicus, N. unilocularis, N. uniseptatus, Neojahnula australiensis, Pseudojahnula potamophila; 17 new geographical and habitat records, viz. Aliquandostipite khaoyaiensis, Aquastroma magniostiolata, Caryospora aquatica, C. quercus, Dendryphiella vinosa, Ernakulamia cochinensis, Fissuroma neoaggregatum, Helicotruncatum palmigenum, Jahnula rostrata, Neoroussoella bambusae, N. leucaenae, Occultibambusa pustula, Paramonodictys solitarius, Pleopunctum pseudoellipsoideum, Pseudocapulatispora longiappendiculata, Seriascoma didymosporum, Shrungabeeja vadirajensis and ten new collections from China and Thailand, viz. Amniculicola guttulata, Aquaphila albicans, Berkleasmium latisporum, Clohesyomyces aquaticus, Dictyocheirospora rotunda, Flabellascoma fusiforme, Pseudoastrosphaeriella bambusae, Pseudoxylomyces elegans, Tubeufia aquatica and T. cylindrothecia. Dendryphiella phitsanulokensis and Tubeufia roseohelicospora are synonymized with D. vinosa and T. tectonae, respectively. Six orders, 43 families and 145 genera which belong to freshwater Dothideomycetes are reviewed. Of these, 46 genera occur exclusively in freshwater habitats. A world map illustrates the distribution of freshwater Dothideomycetes.**

Title	**Chalcopyrite CuAlS2 nanocomposite thin films with unusual and promising peculiarities fabricated by two consecutive methods; powder metallurgy and thermal evaporation**
Authors	**Ata, M.H., Abdellateef, E., Elrouby, M.**
Journal	**Materials Science and Engineering B: Solid-State Materials for Advanced Technology 261,114688**
Abstract	**The current work is focused on fabricating bulk CuAlS2 samples by powder metallurgy technique (P/M) at a compacting pressure of 350 MPa, sintering time 2hr and different sintering temperatures (100, 150, 200, 250 and 300 °C). These bulk samples were used to prepare CuAlS2 thin films by vacuum thermal evaporation. The phases, morphology, and content of elements for the CuAlS2 thin films were characterized using X-ray diffraction, scanning electron microscopy (SEM) provided with EDS. Wear, friction, slurry erosion, and electrochemical corrosion measurements were achieved. XRD analysis of the CuAlS2 thin film revealed the formation of the CuAlS2 with the preferred orientation (0 0 8). It is observed that the wear rate decreased from 119.7 × 10−6 mm3/Nm at sintering temperature 250 °C to 58.3 × 10−6 mm3/Nm at sintering temperature 300 °C. Moreover, Mott–Schottky's plot of the sample that sintered at 250 °C shows unusual property and transformed from n-type to p-type at the potential of ~0.1 V.**

Title	**Quantum phase and nonclassical properties of a two qubits interacting with a radiation field in PACS-PHO**
Authors	**Raffah, B.M., Abdel-Khalek, S.**
Journal	**Optik 221,165225**
Abstract	**The problem of interaction falls between a two qubits and a radiation field based on PACS-PHO (Photon Added Coherent States of Pseudo-Harmonic Oscillator) without and with time-varying frequency of the field is considered in this paper. The solution with the analytic method for the wave function of the whole system is applied to describe different quantum measuring. We examine the entanglement between the quantum subsystems of the whole system by considering the qubits concurrence and qubit-field von Neumann entropy. We show the time evolution of the statistical properties of the PACS-PHO during their interaction with the two qubits. Finally, under the main physical parameters we reveal how the geometric phase of the system state can be affected and changed. Hence, according quantum mechanics this studying can open a new perspective for the experimental observation of macro realism.**

Title	**Direct formation of LaFeO3/MCM−41 nanocomposite catalysts and their catalytic reactivity for conversion of isopropanol**
Authors	**Khalil, K.M.S., Elhamdy, W.A., Said, A.-E.-A.A.**
Journal	**Materials Chemistry and Physics 254,123412**
Abstract	**Direct formation of 3–30% (w/w) LaFeO3/MCM−41, nanocomposite catalysts were performed by a sol−gel process, followed by calcination at 550 and 750 °C. The nanocomposites were characterized through different techniques including LAXRD, WAXRD, EDX, simultaneous TG−DTA, ATR−FTIR, nitrogen adsorption/desorption, and TEM. The nanocomposites featured high surface areas (up to 1000 m2/g) and enhanced thermal stability. The direct formation method led to nanodispersion and size confinement of LaFeO3 in MCM−41 mesopores. The nanocomposites showed very high catalytic activity for isopropanol conversion, whereas their parent materials (blank MCM-41 or bulk LaFeO3) were totally inactive under the same reaction conditions. Thus, nanocomposite catalysts with low loading ratios and low calcination temperature produced pure dehydration product (propene) with very high conversion and total selectivity. Nanocomposite catalysts with high loading ratios and high calcination temperature produced an appreciable amount of the dehydrogenation product (acetone) as well as the dehydration products. Moreover, high loading ratios at high reaction temperatures in air atmosphere led to the formation of oxidation products. The different reactivities of the nanocomposite catalysts were discussed and correlated to their nanostructure, in terms of enhancing of the mesoporous textures with surface acidity, oxidation ability and thermal stability.**

Title	**Fabrication and characterization of alumina-silica/poly(o-toluidine) nanocomposites as novel anticorrosive epoxy coatings films on carbon steel**
Authors	**Abd El-Lateef, H.M., Khalaf, M.M.**
Journal	**Microchemical Journal 158,105129**
Abstract	**Alumina-silica/poly(o-toluidine) (POT) nanocomposites were designed from o-toluidine monomer by in-situ polymerization in the existence of nano-Al2O3:SiO2 with a different ratio. The structure and the composition of the as-prepared nanocomposites were investigated in terms of Fourier-transform infrared spectroscopy (FTIR), Field-emission scanning electron microscopy (FE-SEM), X-ray diffraction (XRD), High-resolution transmission electron microscopy (HR-TEM), zeta-potential and nonisothermal differential scanning calorimetry (DSC) methods. Epoxy resin (EP) was blended with the introduced-Al2O3:SiO2/POT composites using a solution combination technique. A qualitative evaluation provided using Cure Index (CI), Al2O3: SiO2/POT/EP nanocomposites can facilitate or hinder curing reaction depending on the different ratios of alumina to silica. The Al2O3:SiO2/POT/EP nanocomposites were painted onto the C-steel substrates, and its corrosion protection characteristics were examined by electrochemical (potential vs. time, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP)) measurements in 1.0 M HCl as corrosive medium and also compared with that of the composite POT/EP coating. The outcomes indicated that the coating systems containing Al2O3:SiO2/POT/EP nanocomposite has higher corrosion resistance than that of individual POT. The protection capacity values of coated systems POT/EP, Al: Si/POT/EP, 2Al: Si/POT/EP and Al: 2Si/POT/EP were 75.2, 91.2, 86.7 and 97.5%, respectively. The existence of Al2O3-SiO2 nanocomposites improved the quality of the POT/EP coating by decreasing the porosity of the painting matrix. FESEM observations before and after the corrosion test confirmed that the occurrence of Al2O3-SiO2 nanocomposites improve the protection features of POT/EP coating.**

Title	**Synthesis, Characterization, Theoretical Studies, and Antimicrobial/Antitumor Potencies of Salen and Salen/Imidazole Complexes of Co (II), Ni (II), Cu (II), Cd (II), Al (III) and La (III)**
Authors	**Abdalla, E.M., Abdel Rahman, L.H., Abdelhamid, A.A., (...), Alothman, A.A., Nafady, A.**
Journal	**Applied Organometallic Chemistry 34(11),e5912**
Abstract	**Although salens and imidazoles are well-studied motifs among bioactive and therapeutic agents, their properties when combined in transition metal complexes are not well developed. To explore the structure/reactivity of this class of compounds, a salen-based ligand, namely (2,2′-{1,2-ethanediylbis[nitrilo(E)methylylidene]}diphenol, S), and its binary (MS) and ternary (MSI) complexes (I = imidazole; M = Co (II), Ni (II), Cu (II), Cd (II), Al (III), and La (III)) have been synthesized and fully characterized by standard physicochemical and theoretical methods. Evidence from structural analysis tools along with DFT modeling revealed an unusual monobasic tridentate salen binding mode, involving the phenolic oxygen, the nitrogen of the azomethine group, and NH group formed via phenol-to-cyclohexadienone tautomerization, giving rise to a general molecular formula of MSI complexes as [M(S)(I)2(Cl)] for M (II) = Co, Ni, Cu and Cd or [M(S)(I)(Cl)2] for M (III) = Al and La, respectively. The antimicrobial activities of S, MS, and MSI were screened against several bacterial and fungal strains. Of all tested complexes, CdS and CuSI were the most effective antimicrobials, giving larger inhibition zones than the reference antibiotics. The antimicrobial efficacy for the MS complexes follows the order: CdS > gentamicin > CuS > NiS > CoS > LaS > AlS > S, whereas MSI complex, potencies are ordered as CuSI > gentamicin > CdSI >NiSI > CoSI > LaSI > AlSI > S. In vitro cytotoxicity screening of MSI complexes disclosed that both CuSI and CdSI exhibited higher activity against human liver (Hep-G2) and breast (MDA-MB231) carcinoma cell lines than the reference (cisplatin) drug. The satisfactory bioactivities observed for several of these compounds supports the underlying design idea for combining important bioactive motifs for possible therapeutic benefit.**

Title	**Some features of the geometric phase and entanglement of three-level atom under cavity damping effects**
Authors	**Abdel-Khalek, S., El-Saman, Y.S., Mechai, I., Abdel-Aty, M.**
Journal	**Indian Journal of Physics 94(11), pp. 1691-1698**
Abstract	**In this manuscript, we present a system consisting of a three-level atom interacting with optical field. We investigate qualitatively the entanglement and atomic (field) geometric phase under the effect of cavity damping. The atom–field entanglement is measured by the negativity. We show that these quantifiers depend strongly on the variations of the initial settings of the atom, and this exhibits substantial phenomena that depend on the cavity damping effect. Finally, we explore the link between the entanglement and atomic (field) geometric phase of different physical parameters within the presence and absence of the cavity damping effect.**

Title	**Modelling of high-efficiency substrate CIGS solar cells with ultra-thin absorber layer**
Authors	**Mohamed, A.S., Mohamed, H.A.**
Journal	**Indian Journal of Physics 94(11), pp. 1725-1732**
Abstract	**Solar cells based on Cu(In,Ga)Se2 (CIGS) are very promising thin-film solar cells due to their high absorption coefficient and appropriate optical band gap. In this work, a model of substrate thin-film solar cell of structure ZnO:Al/CdS/CIGS/Mo/glass has been established to estimate the cell parameter of ultra-thin absorber layer. The quantitative assessment of the optical losses due to reflection at interfaces and absorption in window layer (ZnO:Al) and buffer layer (CdS) as well as the recombination losses at front and rear surface of CIGS layer has been studied. The optical losses are carried out based on the optical constants of the used materials, and the recombination losses are carried out in terms of the parameters of the absorber layer. The effect of antireflection coating and reflectivity from metal electrode on the short-circuit current density and hence on the cell efficiency has been studied. It has been shown that the optical losses can prevent 30% of the incident photons from reaching the absorber layer at 150 nm thickness for each of the ZnO:Al and CdS layers. The antireflection coating of 100 nm thickness is capable of increasing JSC by 8%. High efficiency of 19.56% has been obtained at 1 μm thickness of CIGS layer under certain parameters of the used materials, and this efficiency can reach 20.22% at 100% reflectivity from the back contact.**

Title	**Green Bio-organic and Recoverable Catalyst Taurine (2-aminoethanesulfonic acid) for Synthesis of Bio-active Compounds 3,4-Dihydropyrimidin Derivatives in Aqueous Medium.**
Authors	**Abd El Aleem Ali Ali El-Remaily, M., Elhady, O.M.**
Journal	**ChemistrySelect 5(39), pp. 12098-12102**
Abstract	**A highly green bio-organic catalyst known as Taurine (2-aminoethanesulfonic acid) is plentifully in the tissues of humans and animals and is an efficient and environmentally benign catalyst for the one-pot multicomponent reaction synthesis of bio-active 3,4-dihydropyrimidin-2(1H)-ones/thiones (Biginelli Reaction) in aqueous medium. The advantages of this protocol by way of the Taurine catalyst are that it is eco-friendly, commercially available, low cost, has high reusability, short reaction times, high yields and the products obtained high purities without using any organic solvents.**

Title	**Novel franklinite-like synthetic zinc-ferrite redox nanomaterial: synthesis, and evaluation for degradation of diclofenac in water**
Authors	**Al-Anazi, A., Abdelraheem, W.H., Scheckel, K., (...), O'Shea, K., Dionysiou, D.D.**
Journal	**Applied Catalysis B: Environmental 275,119098**
Abstract	**The current study investigates a novel redox technology based on synthetic franklinite-like zinc-ferrite nanomaterial with magnetic properties and redox nature for potential use in water treatment. Physicochemical characterization revealed the nanoscale size and AB2O4 spinel configuration of the zinc-ferrite nanomaterial. The redox activity of nanoparticles was tested for degradation of diclofenac (DCF) pharmaceutical in water, without any added external oxidants and under dark experimental conditions. Results revealed ~90% degradation in DCF (10 µM) within 2 min of reaction using 0.17 g/L Zn1.0Fe2.0O4. Degradation of DCF was due to chemical reduction by surface electrons on zinc-ferrite and oxidation by oxygen-based radicals. Three byproducts from reduction route and eight from oxidation pathways were identified in the reaction system. Reaction pathways were suggested based on the identified byproducts. Results demonstrated the magnetic zinc-ferrite is a standalone technology that has a great promise for rapid degradation of organic contaminants, such as DCF in water.**

Title	**Generalized thermoelastic interaction in a two-dimensional porous medium under dual phase lag model**
Authors	**Hobiny, A., Abbas, I.**
Journal	**International Journal of Numerical Methods for Heat and Fluid Flow 30(11), pp. 4865-4881**
Abstract	**Purpose: The purpose of this study is to use the generalized model for thermoelastic wave under the dual phase lag (DPL) model to compute the increment of temperature, the components of displacement, the changes in volume fraction field and the stress components in a two-dimensional (2D) porous medium. Design/methodology/approach: Using Fourier and Laplace transformations with the eigenvalue technique, the exact solutions of all physical quantities are obtained. Findings: The derived method is evaluated with numerical results, which are applied to the porous medium in a simplified geometry. Originality/value: Finally, the outcomes are graphically represented to show the difference among the models of classical dynamical coupled, the Lord and Shulman and DPL.**

Title	**Nonlinear dynamics of a cavity containing a two-mode coherent field interacting with two-level atomic systems**
Authors	**Khalil, E.M., Alshehri, H.M., Mohamed, A.-B.A., Abdel-Khalek, S., Obada, A.-S.F.**
Journal	**Applied Sciences (Switzerland) 10(20),7150, pp. 1-15**
Abstract	**This study analytically explored two coupled two-level atomic systems (TLAS) as two qubits interacting with two modes of an electromagnetic field (EMF) cavity via two-photon transitions in the presence of dipole–dipole interactions between the atoms and intrinsic damping. Using special unitary su(1, 1) Lie algebra, the general solution of an intrinsic noise model is obtained when an EMF is initially in a generalized coherent state. We investigated the population inversion of two TLAS and the generated quantum coherence of some partitions (including the EMF, two TLAS, and TLAS–EMF). It is possible to generate quantum coherence (mixedness and entanglement) from the initial pure state. The robustness of the quantum coherence produced and the sudden appearance and disappearance of coherence depended not only on dipole–dipole coupling but also on the intrinsic noise rate. The growth of mixedness and entanglement may be enhanced by increasing dipole–dipole coupling, leading to more robustness against intrinsic noise.**

Title	**A modified harmonic balance method to obtain higher-order approximations to strongly nonlinear oscillators**
Authors	**Hosen, M.A., Chowdhury, M.S.H., Ismail, G.M., Yildirim, A.**
Journal	**Journal of Interdisciplinary Mathematics 23(7), pp. 1325-1345**
Abstract	**We propose a new method, namely, the modified harmonic balance method. This paper also analyses and offers the high-order approximate periodic solutions to the strongly nonlinear oscillator with cubic and harmonic restoring force. The existing harmonic balance method cannot be applied directly to such kind of nonlinear oscillators in the presence of forcing term. It is possible if we rewrite the original form of the nonlinear oscillators. If we do so, the results are valid only for small values of amplitude of the oscillation. Moreover, after applying the existing harmonic balance method, a set of complicated higher-order nonlinear algebraic equations are obtained. Analytical investigation of these equations is cumbersome especially when the amplitude of the oscillation is large. These limitations are removed in the proposed method. In addition, a suitable truncation principle has also been used in which the solution achieves better results than existing solutions. The approximate results agree well with numerically obtained exact solutions. Highly accurate results and a simple solution procedure are the advantages of this proposed method, which could be applied to other nonlinear oscillatory problems arising in nonlinear science and engineering.**

Title	**Circular intensely orthogonal double cover design of balanced complete multipartite graphs**
Authors	**Higazy, M., El-Mesady, A., Mahmoud, E.E., Alkinani, M.H.**
Journal	**Symmetry 12(10),1743, pp. 1-13**
Abstract	**In this paper, we generalize the orthogonal double covers (ODC) of Kn n as follows. The circular intensely orthogonal double cover design (CIODCD) of (formula presented) is defined as collection (formula presented) of isomorphic spanning subgraphs Of X such that every edge of X appears twice in the collection (formula presented) define the half starters and the symmetric starters matrices as constructing methods for the CIODCD of X. Then, we introduce some results as a direct application to the construction of CIODCD of X by the symmetric starters matrices.**

Title	**S-methylcysteine (SMC) ameliorates intestinal, hepatic, and splenic damage induced by cryptosporidium parvum infection via targeting inflammatory modulators and oxidative stress in swiss albino mice**
Authors	**Elmahallawy, E.K., Elshopakey, G.E., Saleh, A.A., (...), Yanai, T., Abdo, W.**
Journal	**Biomedicines 8(10),423, pp. 1-17**
Abstract	**Cryptosporidiosis has been proposed to be one of the major causes of diarrhoeal disease in humans worldwide that possesses zoonotic concern. Thereby, this study investigated the potential effects of s-Methylcysteine (SMC) on the parasite in vivo followed by the measurement of cytokines, oxidative stress parameters, and an investigation of the major histopathological changes. Sixty male Swiss albino mice weighing 20–25 g were allocated equally into five groups and orally administered saline only (control), SMC only (SMC50) (50 mg/kg b.w.), and 104 Cryptosporidium parvum oocysts per mouse via an esophageal tube (C + ve untreated). The fourth and fifth groups (C + SMC25, C + SMC50) administrated 104 C. parvum oocysts combined with SMC25 (low dose) and 50 (high dose) mg/kg b.w., respectively. At days 7 and 14 post-infection (PI), the feces was collected from each group in order to count C. parvum oocysts. After two weeks of treatment, the animals were euthanized and the serum was collected for biochemical analysis. Next, the intestinal, spleen, and liver sections were dissected for histopathological examination. The results revealed lower oocyst numbers in the C + SMC25 and C + SMC50 groups compared to the infected untreated group. Moreover, higher doses of SMC treatment significantly reduced the enteritis induced by C. parvum in a dose-dependent manner. The hepatic lesions were also mitigated as demonstrated in C + SMC25 and C + SMC50 groups unlike the infected group via lowering the serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) enzymes and increasing albumin and globulin serum levels. SMC administration also reduced cytokines production (SAP, TNF-α, IL-6, and IFN-γ) mediated by Cryptosporidium infection in contrast to the infected untreated group. There were marked lymphoid depletion and amyloidosis observed in the infected untreated group, while the treated groups showed obvious increase in the lymphoid elements. Moreover, the scoring of intestinal parasites, hepatic, and splenic lesions in the SMC-treated groups exhibited significantly lower pathological lesions in different organs in a dose-dependent manner, compared to the infected untreated group. Our results also revealed a significant change in the malondialdehyde content with an elevation of glutathione and superoxide dismutase in the intestines collected from C + SMC25 and C + SMC50 mice relative to the untreated group. Taken together, our results indicated that SMC could be a promising effective compound for treating and declining C. parvum infestation via restoring structural alterations in different tissues, enhancing antioxidant enzymes, and suppressing the cytokines liberation.**

Title	**Molecular characterization and developing a point-of-need molecular test for diagnosis of bovine papillomavirus (Bpv) type 1 in cattle from Egypt**
Authors	**El-Tholoth, M., Mauk, M.G., Elnaker, Y.F., (...), Saleh, A.A., Elmahallawy, E.K.**
Journal	**Animals 10(10),1929, pp. 1-14**
Abstract	**Bovine papillomatosis is a viral disease of cattle causing cutaneous warts. A diagnosis of this viral infection is very mandatory for combating the resulting economic losses. Given the limited data available about bovine papillomavirus (BPV) in Egypt, the present study involved the molecular diagnosis of bovine papillomavirus type-1 (BPV-1), -2, -4, -5, and -10 in cattle presenting cutaneous warts on the head and neck from New Valley Province, Egypt. The phylogenetic analysis of the detected types of BPV was also performed, followed by developing a point-of-need molecular assay for the rapid identification of identified BPV types. In this regard, a total of 308 cattle from private farms in Egypt were clinically examined, of which 13 animals presented cutaneous warts due to suspected BPV infection. The symptomatic animals were treated surgically, and biopsies from skin lesions were collected for BPV-1, -2, -4, -5, and -10 molecular identification using polymerase chain reaction (PCR). The presence of BPV-1 DNA was confirmed in 11 collected samples (84.6%), while BPV-2, -4, -5, and -10 were not detected. Sequencing of the PCR products suggested the Egyptian virus is closely related to BPV found in India. An isothermal nucleic acid amplification test (NAAT) with labeled primers specific for the BPV-1 L1 gene sequence, and based on recombinase polymerase amplification (RPA), in combination with a lateral flow strip assay for the detection of RPA products, was developed and tested. The point-of-need molecular assay demonstrated a diagnostic utility comparable to PCR-based testing. Taken together, the present study provides interesting molecular data related to the occurrence of BPV-1 in Egypt and reveals the genetic relatedness of the Egyptian BPV-1 with BPV-1 found in buffalo in India. In addition, a simple, low-cost combined test was also validated for diagnosis of the infection. The present study suggests the necessity of future investigations about the circulating strains of the virus among the cattle in Egypt to assess their genetic relatedness and better understand the epidemiological pattern of the disease.**

Title	**The effect of a hyperbolic two-temperature model with and without energy dissipation in a semiconductor material**
Authors	**Alzahrani, F., Abbas, I.**
Journal	**Mathematics 8(10),1711, pp. 1-11**
Abstract	**In this work, the new model of photothermal and elastic waves, with and without energy dissipation, under a hyperbolic two-temperature model, is used to compute the displacement, carrier density, thermodynamic temperature, conductive temperature and stress in a semiconductor medium. The medium is considered in the presence of the coupling of plasma and thermoelastic waves. To get the complete analytical expressions of the main physical fields, Laplace transforms and the eigenvalue scheme are used. The outcomes are presented graphically to display the differences between the classical two-temperature theory and the new hyperbolic two-temperature theory, with and without energy dissipation. Based on the numerical results, the hyperbolic two-temperature thermoelastic theory offers a finite speed of mechanical waves and propagation of thermal waves.**

Title	**Interaction of a superconducting qubit and a nonlinear field under energy dissipative effect: entanglement and nonclassical properties**
Authors	**Aldaghfag, S.A., Elqahtani, Z.M., Berrada, K., Abdel-Khalek, S.**
Journal	**Optical and Quantum Electronics 52(10),462**
Abstract	**The present manuscript studies the temporal behavior of quantum entanglement and nonclassical properties for a superconducting-qubit (SC qubit)- field system in the framework of deformed f-oscillator formalism. We introduce the nonlinear Jaynes-Cummings model by using the deformation of the mode field operators. Such a generalization of the Jaynes Cummings model that considers the interaction of a SC qubit with an electromagnetic field in the presence of a nonlinear Kerr-like medium and energy dissipation. We examine the effect of the detuning and decay parameters on the degree of the quantum entanglement, population inversion and field photon statistics.Finally, the relationship among quantum quantifiers is explored according to the optimal choice of the main parameters of the physical model.**

Title	**The biodistribution of melanomacrophages and reactivity of PEG or amine-functionalized iron oxide nanoclusters in the liver and spleen of Egyptian toad after intraperitoneal or oral injections: Histochemical study**
Authors	**Awaad, A.**
Journal	**Acta Histochemica 122(7),151629**
Abstract	**Recently, toad flesh is the main source of protein for many peoples. Of note, disease treatment of amphibian animals is a big challenge facing toad farms development. Iron oxide nanoclusters (IONCs) are approved by the Food and Drug Administration (FDA) as new materials for drug delivery systems development. The biodistribution and fate of IONCs in the lower vertebrate tissues such as toads is novel and should be studied in details. In this study, the biodistribution and toxicities of polyethylene glycol-functionalized IONCs (PEG-IONCs) and amine-functionalized IONCs (NH2-IONCs) in the liver and spleen of Egyptian toad were studied after intraperitoneal or oral injections. The localization and levels of IONCs in liver and spleen depends on the root of injection and the surface functionalization. The presence of IONCs in the liver and spleen produced sever to mild histological and histochemical abnormalities, but in a different ratio. The change of melanomacrophages (MMs) numbers depends on the root of injection or the function group on the surface of IONCs and this explains the abnormalities of MMs produced by IONCs treatment. Further, the function group on the surface may control the biodistribution of MMs and abnormalities produced by IONCs in the liver and spleen. Understanding the biodistribution and histological abnormalities of IONCs in the lower vertebrate tissues (amphibians in this study) might introduce important information to develop new drugs which can be used for amphibian diseases treatment or diagnosis. Further, the histopathological and MMs abnormalities produced by IONCs may consider as biomarkers for amphibians diseases diagnosis.**

Title	**An efficient color image compression technique**
Authors	**Abd-Elhafiez, W.M., Gharibi, W., Heshmat, M.**
Journal	**Telkomnika (Telecommunication Computing Electronics and Control) 18(5), pp. 2371-2377**
Abstract	**We present a new image compression method to improve visual perception of the decompressed images and achieve higher image compression ratio. This method balances between the compression rate and image quality by compressing the essential parts of the image-edges. The key subject/edge is of more significance than background/non-edge image. Taking into consideration the value of image components and the effect of smoothness in image compression, this method classifies the image components as edge or non-edge. Low-quality lossy compression is applied to non-edge components whereas high-quality lossy compression is applied to edge components. Outcomes show that our suggested method is efficient in terms of compression ratio, bits per-pixel and peak signal to noise ratio.**

Title	**Quantum and classical genetic algorithms for multilevel segmentation of medical images: A comparative study**
Authors	**Hilali-Jaghdam, I., Ben Ishak, A., Abdel-Khalek, S., Jamal, A.**
Journal	**Computer Communications 162, pp. 83-93**
Abstract	**In this paper, we propose a multilevel segmentation methods of medical images based on the classical and quantum genetic algorithms. The Genetic Algorithm (GA) uses a binary coding while the Quantum Genetic Algorithm (QGA) uses the qubit encoding of individuals. The two evolutionary algorithms are employed to maximize efficiently Rényi, Masi and Shannon entropies for the purpose of multi-objects segmentation of medical images. The Particle Swarm Optimization algorithm (PSO) was also used for comparison reasons. The segmentation quality of the nine proposed approaches is assessed by means of the prevailing indices PSNR, SSIM and FSIM. The numerical results and the comparative study were carried out on a sample of twenty medical images. It was shown that the QGA outpaces the GA, and the PSO outperforms significantly the both algorithms in the optimization task. Finally, it was found that the Rényi entropy is more suitable for the purpose of medical image multilevel thresholding.**

Title	**Tailoring the thermoelectric properties of Pb1-xSmxTe nanostructures via Sm doping**
Authors	**Ibrahim, E.M.M., Ahmed, G.A., Khavrus, V., (...), Hampel, S., Adam, A.M.**
Journal	**Intermetallics 125,106923**
Abstract	**In this research, stoichiometric Pb1-xSmxTe (x = 0, 0.02, 0.04, 0.06, 0.08) nanostructures were synthesized using the hydrothermal technique. The synthesized nanostructures were examined using X-ray diffraction, Raman spectroscopy, scanning and high-resolution transmission electron microscope and photoluminescence spectroscope. The results revealed that the samples were crystallized mainly in a cubic phase characterizing the PbTe compounds. However, the samples containing Sm content above $x \geq 0.06$ exhibited small minor peaks correspond to the Pb phase. The PL spectra show a strong quantum confinement effectand exhibit a strong peak around 400 nm at room temperature that might be ascribed to the high level transition in the PbTe semiconductor. The thermoelectric measurements verified the domination of p-type semiconducting behavior. The reduction in the thermal conductivity through nanostructuring gives a high ZT of 0.7 at 398 K when Sm content reaches x = 0.06. The value is comparable to that of previously reported best PbTe-based thermoelectric materials.**

Title	**Beam-target double spin asymmetries in the reaction γ d → π 0 d near threshold and the role of D-wave component of the deuteron wave function**
Authors	**Al-Ghamdi, H.M., Almogait, E.S., Darwish, E.M., Abdel-Khalek, S.**
Journal	**Brazilian Journal of Physics 50(5), pp. 615-624**
Abstract	**We investigate coherent π0-photoproduction on the deuteron near threshold with special emphasis on beam-target double spin asymmetries. We present results for the spin asymmetries T1Mc (M = 0, 1) for circular polarized photons and vector polarized deuterons, T2Mc (M = 1, 2) for circular polarized photons and tensor polarized deuterons, T1Ml (M = 0, ± 1) for longitudinal polarized photons and vector polarized deuterons, and T2Ml (M = 0, ± 1, ± 2) for longitudinal polarized photons and tensor polarized deuterons in the γd → π0d reaction near threshold. We also discuss the sensitivity of the estimated results to the D-wave component of the deuteron wave function. The unitary isobar MAID-2007 model is used for the elementary γN → πN amplitude. This model is parameterized in terms of invariant amplitudes and allows one to give a more reliable description of the threshold region. The realistic and high-precision Bonn NN potential (full model) is used for the deuteron wave function. We have found that the D-wave component of the deuteron wave function has a little effect on the T1Mc (M = 0, 1) and T2Ml (M = 0, 1, 2) spin asymmetries. On the contrary, we have obtained a significant role of the D-wave component on the spin asymmetries T2Mc (M = 1, 2), T1Ml (M = 0, ± 1), and T2Ml (M = − 1,− 2).**

Title	**Synthesis, assessment and corrosion protection investigations of some novel peptidomimetic cationic surfactants: Empirical and theoretical insights**
Authors	**Abdrabo, W.S., Elgendy, B., Soliman, K.A., Abd El-Lateef, H.M., Tantawy, A.H.**
Journal	**Journal of Molecular Liquids 315,113672**
Abstract	**Three novel peptidomimetic cationic surfactants were synthesized in good yields. The chemical configurations of these surfactants were clarified using 1H, 13C NMR and FT-IR spectroscopy. The inhibition capacity and adsorption performance of these compounds on C-steel were studied by electrochemical techniques (Electrochemical impedance spectroscopy (EIS) and Potentiodynamic polarization (PDP) methods). The prepared compounds demonstrated outstanding protection power for the erosion of C-steel in 0.5 M HCl at 323 K. The PDP studies demonstrated that the novel surfactants behaved as mixed-type additives. The protection capacity rises with an increasing surfactant dose, with values ranging from 93.10 to 98.25% at 100 ppm. The adsorption of additives on the electrode interface follows the Langmuir model and contains chemisorption modes. The Monte Carlo (MD) simulations and density functional theory (DFT) calculations support the experimental findings and provide insight into the understanding of the adsorption features and protection performance mechanisms of the examined surfactants.**

Title	**Synthesis, EGFR-TK inhibition and anticancer activity of new quinoxaline derivatives**
Authors	**Ahmed, E.A., Mohamed, M.F.A., Omran, A., Salah, H.**
Journal	**Synthetic Communications50(19), pp. 2924-2940**
Abstract	**Ethyl 4-substituted-3-oxo-quinoxaline-2-carboxylates 3–5 were obtained via alkylation of ethyl 3-oxo-3,4-dihydroquinoxaline-2-carboxylate (1). Compound 1 was heterocyclized using hydrazines, ethylenediamine, and ethanolamine to give pyrazoloquinoxalines 6, 7, diazepinoquinoxaline 8, and oxazepinoquinoxaline 10. The quinoxaline-2-carboxamides 9, 11, 12 were prepared via condensation of compound 1 with different amines. Compound 1 was thiated using Lawesson's reagent affording quinoxaline-3-thione 13, in fair yield. In addition, the reaction of 4-methyl-3-oxoquinoxaline 3 with some binucleophiles led to a series of new oxoquinoxaline derivatives 14–18. The molecular structure of compounds 1, 3, and 9 was confirmed by X-ray crystallography. The anti-proliferative activity showed that among all the tested compounds, compounds 3, (IC50 2.51 ± 3.0, 4.22 ± 1.6 and 2.27 ± 1.9 µM), 11 (IC50 1.32 ± 2.61, 1.41 ± 1.23 and 1.18 ± 1.91 µM) and 17 (IC50 1.72 ± 1.32, 1.85 ± 0.94 and 1.92 ± 4.83 µM) showed noteworthy anti-proliferative effects against the three cancer cell lines, HCT116, HePG2 and MCF7, respectively, compared to the reference drugs doxorubicin (IC50 1.41 ± 0.58, 0.90 ± 0.62 and 1.01 ± 3.02 µM) and erlotinib (IC50 1.63 ± 0.81, 1.57 ± 0.62 and 1.49 ± 0.54 µM). Compounds 3 (0.899 nM), 11 (0.508 nM) and 17 (0.807) showed strong EGFR inhibitory activity compared to Erlotinib (0.439 nM) and these results are in agreement with the docking study. These results suggest that compounds could probably be promising anticancer agents with EGFR inhibitory activity.**

Title	**Interaction of a three-level atom and a field with a time-varying frequency in the context of triangular well potentials: An exact treatment**
Authors	**Raffah, B., Berrada, K., Abdel-khalek, S., (...), Wahiddin, M.R., Al-Hadeethi, Y.**
Journal	**Chaos, Solitons and Fractals 139,109784**
Abstract	**We introduce a model of interaction between a three-level atom (3LA) and a one-mode field whose frequency evolves with the time in the context of triangular potentials. We consider a new class of cat states described as a superposition of the coherent states that are associated with these kinds of potentials. Mathematical and physical consequences of the obtained results are analyzed and discussed in detail by using the exact analytical treatment of the quantum system-state at subsequent times. We investigate the nonlocal and nonclassical properties of different system states in terms of the main parameters of the model. Interestingly, we present the dynamical behavior of the entanglement, second order correlation function, quantum Fisher information, and geometric phase of the considered bipartite quantum system. We show that the physical quantities for the proposed scheme are very sensitive through the choice of the time-varying frequency of the fields, at either coherent states or their superposition, and we compare the results to the case of fields that are associated to harmonic well potentials. Finally, we explore the relationship and dependence of the physical quantifiers on the main parameters of the model.**

Title	**Growth inhibition of Microcystis aeruginosa and adsorption of microcystin toxin by the yeast Aureobasidium pullulans, with no effect on microalgae**
Authors	**Mohamed, Z.A., Alamri, S., Hashem, M., Mostafa, Y.**
Journal	**Environmental Science and Pollution Research 27(30), pp. 38038-38046**
Abstract	**This study evaluates the inhibitory effect of a yeast strain, Aureobasidium pullulans KKUY0701, isolated from decayed cyanobacterial bloom against harmful cyanobacterium Microcystis aeruginosa and determines the ability of this strain to remove microcystin (MC) toxin from the water. The antialgal activity of this yeast strain was assayed by co-cultivation with M. aeruginosa, diatom, and green algal species. The MC adsorption experiment was conducted in the presence of living and heat-inactivated yeast cells. Both yeast cells and filtrates caused a rapid reduction in the growth of M. aeruginosa, with complete death and cell lysis occurring after 3 days. The yeast strain did not exhibit any inhibitory effect on either green algae or diatoms. Both living and heat-inactivated yeast cells were capable of adsorption of MC on their surfaces. Inactivated yeast exhibited higher adsorption capacity and lower intensity than living yeast for the adsorption of MC toxin. The results of this study suggest that this yeast strain could be employed to selectively reduce cyanobacterial blooms in freshwaters. Moreover, the application of heat-inactivated yeast's biomass for toxin adsorption gives new possibilities in drinking water treatment plants.**

Title	**Generalized dynamic process for an extended multi-valued F-contraction in metric-like spaces with applications**
Authors	**Hammad, H.A., la Sen, M.D., Aydi, H.**
Journal	**Alexandria Engineering Journal 59(5), pp. 3817-3825**
Abstract	**In this article, some fixed point results satisfying an extended multi-valued F-contraction mapping in the context of metric-like spaces are developed. Also, some standard examples are dressed to support our theoretical consequences. Finally, we conclude our paper with two important applications for the system of functional equations and to find a bounded solution for a class of a Fredholm type integral inclusion.**

Title	**Free convection effect on oscillatory flow using artificial neural networks and statistical techniques**
Authors	**Abo-Dahab, S.M., Ragab, M., Elhag, A.A., Abdel-Khalek, S.**
Journal	**Alexandria Engineering Journal 59(5), pp. 3599-3608**
Abstract	**In the present paper, we present the estimated impact of the free convection on oscillatory flow using data to predict the value of the attributes to promote concentration for mass transfer. Various statistical methods can predict concentration of free convection oscillatory flow. We provide exact analytic expressions for the underlying concentration profile using the regular perturbation technique and decision tree method. Moreover, we show how these expressions can help decrease the governing equations to some uncoupled and coupled linear ordinary differential equations. Results were obtained concerning the concentrations constructed and plotted graphically, taking into consideration three values of the time. We then focused on the statistical technique used to analyze the neural network problem of predicting the concentration of free convection oscillatory flow. Both Decision Tree and MLP were used as the best models according to the value of sMAPE, MASE, and MAPE. The obtained results were compared with the corresponding estimation in Abo-Dahab and Hatem (2020), which matched and satisfied the boundary conditions of the free convection impact on the oscillatory flow. Finally, the exact analytical results that have several applications in chemical industries, medicine, and engineering were concluded.**

Title	**Chemical synthesis of NiO nanostructure by surfactant-assisted sol–gel methodology for urea electrocatalytic oxidation**
Authors	**Abd El-Lateef, H.M., Khalaf, M.M., Al-Omair, M.A., Dao, V.-D., Mohamed, I.M.A.**
Journal	**Materials Letters 276,128192**
Abstract	**NiO-nanoparticles were chemically designed via surfactant-assisted sol–gel methodology and investigated in terms of FESEM, BET, TEM, and XRD techniques which indicate the successful preparation of NiO-NPs. The electrocatalytic oxidation of urea was studied in the three-electrode cell to evaluate the efficiency of NiO-NPs material for urea electro-oxidation in the KOH medium. The as-prepared NPs demonstrated improved electrocatalytic oxidation of urea at various urea doses from 0.01 to 2.0 mol/l. The excellent electrocatalytic activity could be related to the successful synthesis of NiO-NPs which can easily form NiOOH and generate electrons from urea-bonds during the electrochemical process. This work will provide novel anode catalysts for urea fuel-cells.**

Title	**Anomalous magnetic behaviour of Bi based tetradymites**
Authors	**Mohamed, A.E.-M.A., Ibrahim, E.M.M., Adam, A.M.**
Journal	**Journal of Magnetism and Magnetic Materials 511,166982**
Abstract	**This work investigates the magnetic properties of the Bi-based bulk Bi2(Se1−xTex)3 tetradymites. The samples were prepared using the melting technique, and all composites are crystallised in the R3m Rhombohedral structure. The lattice cell volume increases monotonically with the Te introduction due to the larger size of Te in comparison with Se. The electrical resistivity data show a metal–semiconductor transition at a certain temperature (Tm) that arises from the overlapping between the 6p and 6s bands. The metal-like behaviour below Tm is in correspondence with the semiconducting degeneracy state, and the empirical analysis has confirmed the metal characteristic scattering mechanisms. The resistivity of the pristine Bi2Se3 compound decreases with the low Te doping level, then increases monotonically with the further Te amounts. This behaviour can be attributed to grain size effect and the change in carriers concentration and mobility. The magnetic measurements have shown the non-pure diamagnetism for the Bi2(Se1−xTex)3 composites, in disagreement with several studies, and show the coexistence of a paramagnetic component. This paramagnetic component arises from the orbital magnetisation, where, the electrons abundance (due to Te and the electron source defects) bends the electronic band, forming 2-dimensional electron gas state that leads to the spin-orbital magnetisation (the source of orbital magnetisation).**

Title	**Terahertz-infrared electrodynamics of single-crystalline Ba0.2Pb0.8Al1.2Fe10.8O19 M-type hexaferrite**
Authors	**Ahmed, A., Prokhorov, A.S., Anzin, V., (...), Gorshunov, B., Alyabyeva, L.**
Journal	**Journal of Alloys and Compounds 836,155462**
Abstract	**Spectral response of single-crystalline Ba0.2Pb0.8Al1.2Fe10.8O19 synthesized by a modified Czochralski method is investigated using terahertz-infrared spectroscopy. Reflectivity, transmissivity, and complex dielectric permittivity spectra of the compound are studied in the temperature range from 6 to 300 K and in the frequency interval 8-8000 cm−1 for two principle polarizations of the radiation electric field relative to the crystallographic c-axis, namely E||c and E⊥c. The resonance absorption lines observed above 80 cm−1 are assigned to polar lattice vibrations basing on a factor group analysis and a comparison with a dielectric response of isostructural compounds. A set of absorption bands is observed in a range of 8–80 cm−1. To clarify their nature, a model is developed that considers electronic transitions within the fine-structured ground state of four-fold coordinated Fe2+. It is shown that the trigonal distortions of the crystal field lead to lowering of the symmetry of 4f1 and 4e tetrahedral site-positions of Fe2+ and, as a result, to further splitting of the ground state spin-orbital sub-levels. Electro-dipole transitions between the corresponding sub-levels are associated with the absorption lines observed in a low-energy response (at 8-80 cm−1) of the Ba0.2Pb0.8Al1.2Fe10.8O19 compound. The study paves the way for the development of low cost materials with high dielectric permittivity (about 30) at terahertz frequencies that are promising for the manufacture of electronic devices with enhanced characteristics.**

Title	**Information Entropy Squeezing and Non-local Correlation Between a Two-Level Atom and Two-Mode Field Under the Classical Field Effect**
Authors	**Khalil, E.M., Abdel-Khalek, S., Albogami, W., (...), Abo-Dahab, S.M., Besbes, H.R.**
Journal	**Frontiers in Physics 8,278**
Abstract	**This paper examines the squeezing on information entropy and entanglement on the basis of a quantum scheme that contains two-mode interaction with time dependence of a two-level atom, including the external field. The proposed model is formulated by eliminating the external field after applying a certain transformation. The dynamics of information entropy squeezing and non-local correlation information for the system Hamiltonian are investigated. The effect of the evolution of the squeezing and entanglement by the classical field are estimated. Based on the results, the obtained dynamic behavior of squeezing and entanglement is controlled using the external field.**

Title	**Information quantifiers for trapped ion in a carrier excitation laser field**
Authors	**Raffah, B.M., Khalil, E.M., Abdel-Khalek, S., (...), Ali, A.T., Wahiddin, M.R.**
Journal	**Modern Physics Letters A 35(28),2050235**
Abstract	**The laser field interacting with single trapped ion in a carrier excitation frame in the presence of an external field is investigated. Detailed analytical expressions are given, taking into account carrier excitation configurations. We study the evolution of the population inversion, fidelity, ion-field entanglement, Fisher information and the geometric phase. The results indicate the influence of the external field on the information quantities to describe some physical phenomena. The relation between the population inversion, fidelity, von Neumann entropy, Fisher information, and geometric phase are explored during the time evolution.**

Title	**The electronic structure, surface properties, and: In situ N2O decomposition of mechanochemically synthesised LaMnO3**
Authors	**Blackmore, R.H., Rivas, M.E., Tierney, G.F., (...), Collier, P., Wells, P.P.**
Journal	**Physical Chemistry Chemical Physics 22(34), pp. 18774-18787**
Abstract	**The use of mechanochemistry to prepare catalytic materials is of significant interest; it offers an environmentally beneficial, solvent-free, route and produces highly complex structures of mixed amorphous and crystalline phases. This study reports on the effect of milling atmosphere, either air or argon, on mechanochemically prepared LaMnO3 and the catalytic performance towards N2O decomposition (deN2O). In this work, high energy resolution fluorescence detection (HERFD), X-ray absorption near edge structure (XANES), X-ray emission, and X-ray photoelectron spectroscopy (XPS) have been used to probe the electronic structural properties of the mechanochemically prepared materials. Moreover, in situ studies using near ambient pressure (NAP)-XPS, to follow the materials during catalysis, and high pressure energy dispersive EXAFS studies, to mimic the preparation conditions, have also been performed. The studies show that there are clear differences between the air and argon milled samples, with the most pronounced changes observed using NAP-XPS. The XPS results find increased levels of active adsorbed oxygen species, linked to the presence of surface oxide vacancies, for the sample prepared in argon. Furthermore, the argon milled LaMnO3 shows improved catalytic activity towards deN2O at lower temperatures compared to the air milled and sol-gel synthesised LaMnO3. Assessing this improved catalytic behaviour during deN2O of argon milled LaMnO3 by in situ NAP-XPS suggests increased interaction of N2O at room temperature within the O 1s region. This study further demonstrates the complexity of mechanochemically prepared materials and through careful choice of characterisation methods how their properties can be understood.**

Title	**Al-doped Fe2O3as a support for molybdenum oxide methanol oxidation catalysts**
Authors	**Bowker, M., Hellier, P., Decarolis, D., (...), Huthwelker, T., Wells, P.P.**
Journal	**Physical Chemistry Chemical Physics 22(34), pp. 18911-18918**
Abstract	**We have made high surface area catalysts for the selective oxidation of methanol to formaldehyde. This is done in two ways-(i) by doping haematite with Al ions, to increase the surface area of the material, but which itself is unselective and (ii) by surface coating with Mo which induces high selectivity. Temperature programmed desorption (TPD) of methanol shows little difference in surface chemistry of the doped haematite from the undoped material, with the main products being CO2 and CO, but shifted to somewhat higher desorption temperature. However, when Mo is dosed onto the haematite surface, the chemistry changes completely to show mainly the selective product, formaldehyde, with no CO2 production, and this is little changed up to 10% Al loading. But at 15 wt% Al, the chemistry changes to indicate the presence of a strongly acidic function at the surface, with additional dimethyl ether and CO/CO2 production characteristic of the presence of alumina. Structurally, X-ray diffraction (XRD) shows little change over the range 0-20% Al doping, except for some small lattice contraction, while the surface area increases from around 20 to 100 m2 g-1. Using X-ray absorption spectroscopy (XAS) it is clear that, at 5% loading, the Al is incorporated into the Fe2O3 corundum lattice, which has the same structure as α-alumina. By 10% loading then it appears that the alumina starts to nano-crystallise within the haematite lattice into the γ form. At higher loadings, there is evidence of phase separation into separate Al-doped haematite and γ-alumina. If we add 1 monolayer equivalent of Mo to the surface there is already high selectivity to formaldehyde, but little change in structure, because that monolayer is isolated at the surface. However, when three monolayers equivalent of Mo is added, we then see aluminium molybdate type signatures in the XANES spectra at 5% Al loading and above. These appear to be in a sub-surface layer with Fe molybdate, which we interpret as due to Al substitution into ferric molybdate layers immediately beneath the topmost surface layer of molybdena. It seems like the separate γ-alumina phase is not covered by molybdena and is responsible for the appearance of the acid function products in the TPD.**

Title	**Theoretical studies of thin-film solar cells based on cdte with different window-layers**
Authors	**Mohamed, H.A., Ahmed, M.R., Ali, S.S., Mohamed, W.S.**
Journal	**International Journal of Thin Film Science and Technology 9(3), pp. 175-183**
Abstract	**The effect of using different types of window layer on the performance of thin-film solar cell based on CdTe was studied. Here, we investigated Cadmium Sulphide (CdS), Zinc Selenide (ZnSe) and Zinc Sulphide (ZnS) as window layer candidates. The calculations of short-circuit current density, internal quantum efficacy, external quantum efficient and the solar cell efficacy were achieved based on the optical and recombination losses. The calculation of the optical losses was performed considering the reflection process at the interfaces of the contacted layer and absorption process in the frontal charge-collecting and window layers. The recombination loss estimates on both front and back surfaces of the CdTe layer is based upon the physical parameters of the window/absorber junction and absorber layer. It was found that the highest short-circuit current density of 26 mA/cm2, the lowest optical and recombination losses of 16% and consequently the highest cell efficiency of about 21.3% were achieved for ZnS window layer. For CdS window layer, the values of short-circuits current density, optical and recombination losses and cell efficiency were 23.38 mA/cm2, 25% and 19%, respectively. The corresponding values of ZnSe layer were between those of ZnS and CdS. These results show that ZnS is considered a good alternative material for the traditional CdS window layer or at least it makes a promising alloy with CdS.**

Title	**The entangling-probe attack on the bennett-brassard 1984 protocol**
Authors	**Abdel-Hameed, H.F.**
Journal	**Applied Mathematics and Information Sciences 14(5), pp. 909-912**
Abstract	**In this paper, we introduce a generalization of the Fuchs-Peres-Brandt (FPB) attack which is the most powerful individualphoton attack against Bennett-Brassard 1984 (BB84) quantum key distribution protocol. We suppose that Eve sets up her C-NOT gate with its control-qubit computational basis (|0>C, |1>C) given by an a rotation from the BB84 (H -V) basis.**

Title	**A survey on sharp oscillation conditions of differential equations with several delays**
Authors	**Abdel-Aty, M., Kavgaci, M.E., Stavroulakis, I.P., Zidan, N.**
Journal	**Mathematics 8(9),1492**
Abstract	**This paper deals with the oscillation of the first-order differential equation with several delay arguments $x'(t) + \Sigma_{i=1}^{m} p_i(t)\, x(\tau_i(t)) = 0$, $t \geq t_0$, where the functions $p_i, \tau_i \in C([t_0, \infty), R^+)$, for every $i = 1, 2, m$, $\tau_i(t) \leq t$ for $t \geq t_0$ and $\lim_{t\to\infty} \tau_i(t) = \infty$. In this paper, the state-of-the-art on the sharp oscillation conditions are presented. In particular, several sufficient oscillation conditions are presented and it is shown that, under additional hypotheses dealing with slowly varying at infinity functions, some of the "liminf" oscillation conditions can be essentially improved replacing "liminf" by "limsup". The importance of the slowly varying hypothesis and the essential improvement of the sufficient oscillation conditions are illustrated by examples.**

Title	**Numerical study of integer-order hyperbolic telegraph model arising in physical and related sciences**
Authors	**Ahmad, I., Ahmad, H., Abouelregal, A.E., Thounthong, P., Abdel-Aty, M.**
Journal	**European Physical Journal Plus 135(9),759**
Abstract	**More recently, it is discovered in the field of applied sciences and engineering that the telegraph equation is better suited to model reaction-diffusion than the ordinary diffusion equation. In this article, the second-order hyperbolic telegraph equations are analyzed numerically by means of an efficient local differential quadrature method utilizing the radial basis functions. The explicit time integration technique is used to semi-discretize the model in the time direction, while the space derivatives are discretized by the proposed meshless procedure. To test the accuracy and capabilities of the method, five test problems are considered utilizing both rectangular and non-rectangular domains, which show that the proposed scheme solutions are converging extremely quick in comparison with the different existing numerical techniques in the recent literature.**

Title	**Fractional-order thermoelastic wave assessment in a two-dimensional fiber-reinforced anisotropic material**
Authors	**Horrigue, S., Abbas, I.A.**
Journal	**Mathematics 8(9),1609**
Abstract	**The present work is aimed at studying the effect of fractional order and thermal relaxation time on an unbounded fiber-reinforced medium. In the context of generalized thermoelasticity theory, the fractional time derivative and the thermal relaxation times are employed to study the thermophysical quantities. The techniques of Fourier and Laplace transformations are used to present the problem exact solutions in the transformed domain by the eigenvalue approach. The inversions of the Fourier-Laplace transforms hold analytical and numerically. The numerical outcomes for the fiber-reinforced material are presented and graphically depicted. A comparison of the results for different theories under the fractional time derivative is presented. The properties of the fiber-reinforced material with the fractional derivative act to reduce the magnitudes of the variables considered, which can be significant in some practical applications and can be easily considered and accurately evaluated.**

Title	**On (ϕ, ψ)-metric spaces with applications**
Authors	**Ameer, E., Aydi, H., Hammad, H.A., Shatanawi, W., Mlaiki, N.**
Journal	**Symmetry 12(9),1459**
Abstract	**The aim of this article is to introduce the notion of a (ϕ, ψ)-metric space, which extends the metric space concept. In these spaces, the symmetry property is preserved. We present a natural topology τ(ϕ, ψ) in such spaces and discuss their topological properties. We also establish the Banach contraction principle in the context of (ϕ, ψ)-metric spaces and we illustrate the significance of our main theorem by examples. Ultimately, as applications, the existence of a unique solution of Fredholm type integral equations in one and two dimensions is ensured and an example in support is given.**

Title	**Neutrino cooling of primordial hot regions**
Authors	**Belotsky, K., El Kasmi, M., Rubin, S.**
Journal	**Symmetry 12(9),1442**
Abstract	**The effect of neutrino cooling of possible primary regions filled by hot matter is discussed. Such regions could be obtained from the primordial density inhomogeneities and survive up to the modern epoch. The inhomogeneities could be caused by a symmetry breaking during the inflationary stage. We show that the final temperature of such region should be ~10 keV provided that the initial temperature is within the interval 10 keV ÷ 100 MeV. The cooling is realized due to the weak nuclear reactions containing n - p transition. The lower limit 10 keV is accounted for by suppression of the reactions rates because of the threshold effect and particle concentration decrease.**

Title	**Fractional derivative order analysis and temperature-dependent properties on p- and SV-waves reflection under initial stress and three-phase-lag model**
Authors	**Abo-Dahab, S.M., Kilany, A.A., Abdel-Salam, E.A.-B., Hatem, A.**
Journal	**Results in Physics 18,103270**
Abstract	**The paper primarily aims to examine the fractional effect and explore the impact of temperature-dependent properties and primary stress on reflecting plane and secondary vertically waves using the three-phase-lag model (THPL). Its problem has been formulated by neglecting the body force and external heat source and having initial stress and temperature-dependent under THPL theory in its fractional form (conformable fractional derivatives). The boundary conditions were applied taking into account mechanical stresses and temperature-dependence. A comparison between analytical and fractional solutions for the problem was made to get the solution included in the fractional orders. The authors analyzed the findings. They presented the findings graphically to illustrate the physical meaning of the issue under study. If the problem considered is in integer form, we strongly included that the results obtained agree with the results obtained by Abo-Dahab et al. (2020).**

Title	**Carboxymethyl cellulose/metal (Fe, Cu and Ni) nanocomposites as non-precious inhibitors of C-steel corrosion in HCl solutions: synthesis, characterization, electrochemical and surface morphology studies**
Authors	**El-Lateef, H.M.A., Albokheet, W.A., Gouda, M.**
Journal	**Cellulose 27(14), pp. 8039-8057**
Abstract	**Abstract: This study was aimed at improving the stability and protection capacity of carboxymethyl cellulose (CMC) by combining copper, iron and nickel nanoparticles (Cu NP, Fe Np and Ni NP) produced in situ through the deposition of various metal oxide nanoparticles into a CMC matrix. The fabricated CMC as well as CMC/Fe NP, CMC/Cu NP and CMC/Ni NP nanocomposites were characterized by field emission-scanning electron microscope (FE-SEM), Fourier transform-infrared spectroscopy (FT-IR), energy-dispersive X-ray spectroscopy, transmission electron microscope, selected area diffraction pattern and X-ray diffraction techniques. The investigations of electrochemical methods, such as electrochemical impedance spectroscopy and potentiodynamic polarization (PDP), reinforced by surface morphology studies (FE-SEM, and FT-IR) were organized to explore the prepared materials' protection abilities on a carbon steel electrode in 2 N of HCl. The highest protection power for the CMC as well as CMC/Fe NP, CMC/Cu NP and CMC/Ni NP composites at 400 mg L−1 were 76.6, 94.9, 96.2 and 98.4%, respectively. FE-SEM/EDX and FT-IR examinations confirmed that the prepared nanocomposites could successfully block an aggressive attack with Cl− via chemical adsorption on the steel, in accordance with the adsorption model of Langmuir. PDP data indicated that the nanocomposites could deliver superior corrosion protection and exhibited mixed-type inhibitors. Graphic abstract: [Figure not available: see fulltext.].**

Title	**Tensor analyzing power component T20 of the γd→→π0d process in the photon energy range from 200 to 400 MeV**
Authors	**Al-Ghamdi, H., Almogait, E.S., Darwish, E.M., Abdel-Khalek, S.**
Journal	**Results in Physics 18,103238**
Abstract	**The tensor analyzing power component, T20, of the γd→→π0d process in the photon energy range from 200 to 400 MeV is investigated. This work is motivated by the most recent and unique measurements from the VEPP-3 electron storage ring at the Budker Institute of Nuclear Physics in Novosibirsk, Russia. We point out a special sensitivity of T20 to the elementary γN→πN amplitude and to the realistic NN potential model adopted for the deuteron wave function at backward pion angles, especially in the region 90°<θ<150°. The estimated results for T20 are compared with the experimental data from VEPP-3 and a satisfactory agreement is obtained at incident photon energies below 375 MeV. At higher photon energies and extreme backward pion angles, the estimated results of T20 considerably underestimate the data.**

Title	**Tuning of the electronic and phononic properties of NbFeSb half-Heusler compound by Sn/Hf co-doping**
Authors	**Mohamed, M.A.A., Ibrahim, E.M.M., Rodriguez, N.P., (...), Nielsch, K., He, R.**
Journal	**Acta Materialia 196, pp. 669-676**
Abstract	**Pure phase NbFeSb1-xSnx (where x = 0, 0.04, 0.08, 0.12, 0.16) half-Heusler samples were prepared by direct mechanical alloying followed by spark plasma sintering. The results showed that the substitution of Sb by Sn can effectively enhance the peak figure of merit (ZT) to 0.55 at 923 K in NbFeSb0.88Sn0.12 through optimized carrier concentration. To further reduce the lattice thermal conductivity (κL), we substituted Nb by Hf to enhance the point defect scattering of phonon transport. A maximum reduction of ~80% in κL was observed in Nb0.8Hf0.2FeSb0.88Sn0.12 when compared to undoped NbFeSb at 573 K. We realized a minimum κL of ~2.96 W m−1 K−1 at 673 K and a peak ZT of ~0.82 at 973 K for Nb0.88Hf0.12FeSb0.88Sn0.12.**

Title	**Beam-target double spin asymmetries in the reaction γ→d→→πNN near threshold with final-state rescattering effects**
Authors	**Darwish, E.M., Almarashi, M.M., Saleh Yousef, M.**
Journal	**Annals of Physics420,168254**
Abstract	**Near-threshold incoherent pion photoproduction on the deuteron including final-state rescattering effects is investigated with special emphasize on the beam-target double spin asymmetries. The elementary γN→πN amplitude is taken from the unitary isobar MAID-2007 model which describes well the threshold region. We present the first results on all possible double spin asymmetries of the differential and total cross sections for both the charged- and neutral-pion production channels near threshold. We discuss the sensitivity of the estimated results to the NN and πN final-state rescattering effects. It turns out that the role of NN-rescattering is significant, and its inclusion strongly affected the results for double spin asymmetries in the charged- and neutral-pion channels. We also find that the πN-rescattering effect is insignificant in the case of charged-pion channels, whereas it has a noticeable contribution on most of double spin asymmetries in the neutral-pion channel.**

Title	**In vitro assessment of the antimicrobial efficacy of chitosan nanoparticles against major fish pathogens and their cytotoxicity to fish cell lines**
Authors	**Ahmed, F., Soliman, F.M., Adly, M.A., (...), El-Matbouli, M., Saleh, M.**
Journal	**Journal of Fish Diseases 43(9), pp. 1049-1063**
Abstract	**Nanotechnology is an emerging avenue employed in disease prevention and treatment. This study evaluated the antimicrobial efficacy of chitosan nanoparticles (CSNPs) against major bacterial and oomycete fish pathogens in comparison with chitosan suspension. Initially, the minimum inhibitory concentrations (MIC, MIC90) were determined and the per cent inhibition of bacterial growth was calculated. Subsequently, the minimum bactericidal concentrations (MBCs) were determined. The time-dependent disruptions of CSNP-treated pathogens were observed via transmission electron microscopy (TEM), and the effect of CSNPs on the viability of two fish cell lines was assessed. No antimicrobial effect was observed with chitosan, while CSNPs (105 nm) exhibited a dose-dependent and species-specific antimicrobial properties. They were bactericidal against seven bacterial isolates recording MBC values from 1 to 7 mg/ml, bacteriostatic against four further isolates recording MIC values from 0.125 to 5 mg/ml and fungistatic against oomycetes recording MIC90 values of 3 and 4 mg/ml. TEM micrographs showed the attachment of CSNPs to the pathogenic cell membranes disrupting their integrity. No significant cytotoxicity was observed using 1 mg/ml CSNPs, while low dose-dependent cytotoxicity was elicited by the higher doses. Therefore, it is anticipated that CSNPs are able to compete and reduce using antibiotics in aquaculture.**

Title	**Electromagnetic field in fiber-reinforced micropolar thermoelastic medium using four models**
Authors	**Abo-Dahab, S.M., Abd-Alla, A.M., Kilany, A.A.**
Journal	**Journal of Ocean Engineering and Science5(3), pp. 230-248**
Abstract	**This paper aimed to study the effect of electromagnetic field on general model of the equations of the generalized thermoelasticity reinforcement of the deformation of a micropolar generalized thermoelastic medium. The phenomenon is in the context of the couple theory (C-D), Lord-Shulman (L-S) and Green-Lindsay (G-L) as well as the Dual-Phase-Lag (DPL) models. The normal mode technique is used to find the exact expressions components of displacement, force stress, and temperature. The modifications of the considered variables with the horizontal distance are illustrated graphically to show the distance values that reduce to the variables interrupt. Comparisons are made with the results in the absence and presence of electromagnetic field for the general of reinforcement on the total deformation of a micropolar thermoelastic medium. The results obtained are calculated numerically and displayed by the graphs to show the effect of the entered new parameters on the phenomena.**

Title	**Physical, electrochemical, and biocompatibility characteristics of Ti-Al-N thin film synthesized by DC pulsed magnetron sputtering**
Authors	**El-Hossary, F.M., El-Rahman, A.M.A., Raaif, M., El-Kassem, M.A.**
Journal	**Journal of the Australian Ceramic Society56(3), pp. 1155-1165**
Abstract	**Owing to the desired mechanical and biomedical characteristics of TiN-based coatings and the encourage features of pulsed magnetron sputtering, the current study was conducted to deposit Ti-Al-N thin film on AISI 316 using DC pulsed magnetron sputtering. All processing parameters were constant excluding the pulsed magnetron power which was varied from 100 to 175 W. The effect of processing power on the structure, mechanical, electrochemical, and biocompatibility characteristics of Ti-Al-N thin films were inspected. X-ray outlines the formation of (Ti, Al)N solid solution with (111) preferred orientation at high-pulsed magnetron powers. The outcomes of this study demonstrated that the Vickers's microhardness of Ti-Al-N coatings increased with increasing pulsed power to record a value of nearly 810 HV0.015 at 175 W. Moreover, the wear characteristics and the friction coefficient of the coated AISI 316 with Ti-Al-N were ascendant as compared with the uncoated substrate. The wear rate of Ti-Al-N films deposited at pulsed power of 175 W recorded a value of nearly 4.7 × 10−6 mm3/Nm which was very low compared with that of stainless steel substrate (3.2 × 10−4 mm3/Nm). The biological peculiarities of Ti-Al-N films were examined by exploring the proliferation rate of MC3T3-E1 osteoblast cells on the film surface. The results reflected that the proliferation rate of the osteoblast cells were enhanced on Ti-Al-N films deposited at pulsed powers of 150 and 175 W. The biological attitudes were discussed according to the results of surface roughness and surface energy besides the surface chemical compositions.**

Title	**An analytical solution of the bioheat model in a spherical tissue due to laser irradiation**
Authors	**Abbas, I., Hobiny, A., Alzahrani, F.**
Journal	**Indian Journal of Physics 94(9), pp. 1329-1334**
Abstract	**This article studies an analytical approach associated with Laplace transform, experimental temperature data and a sequential concept over time to obtain the thermal damage and the temperature in living tissue due to laser irradiation. The effects of blood perfusion and the thermal relaxation time on the temperature of skin tissues and the resulting of thermal damage are investigated. The resulting of thermal damage to the tissue is assessed by the denatured protein range using the formulation of Arrhenius. The outcomes show that the hyperbolic bioheat model is reduced to the parabolic bioheat model when the relaxation time is close to zero. The numerical outcomes of thermal injuries and temperatures are graphically introduced. In conclusion, the comparison between the numerical computations and the existing experimental study displays that a current mathematical model is an effective tool for evaluating the biological heat transfer in biological tissues.**

Title	**Responses of Eucalyptus globulus and Ficus nitida to different potential of heavy metal air pollution**
Authors	**El-Khatib, A.A., Youssef, N.A., Barakat, N.A., Samir, N.A.**
Journal	**International Journal of Phytoremediation 22(10), pp. 986-999**
Abstract	**The present study aimed to explore the tolerance potential of Cd, Pb and Cu and physiological alterations in two common tree species growing in Minia governorate (Egypt) namely: Eucalyptus globulus and Ficus nitida and to investigate the leaf features [leaf area (LA) and specific leaf area (SLA)] associated with the phytoremediation process. The findings may be useful for future surveillance as preliminary reference values for levels of heavy metals in urban and industrial settings. The levels of cadmium, lead and Cupper in plant leaf were determined. The results showed that heavy metals could inhibit the growth of plants including LA and SLA. The water content (WC) and photosynthetic pigments of Eucalyptus and Ficus decreased with the increased concentration of metals. Contrary to chlorophylls (a) and (b), carotenoids and chlorophyll ratio (a/b) showed a significant increase with increasing metals concentration especially that of Cd and Cu. Proline content was relatively increased and soluble carbohydrate content decreased in plants with high metal accumulation. Eucalyptus showed better tolerance capacity for Cd, Pb and Cu when compared to Ficus. The ability of Eucalyptus to accumulate and tolerate metal stress makes this species a good candidate to recuperate heavy metals-contaminated conditions.**

Title	**Rayleigh surface wave propagation in an orthotropic rotating magneto-thermoelastic medium subjected to gravity and initial stress**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Ahmed, S.M., Rashid, M.M.**
Journal	**Mechanics of Advanced Materials and Structures27(16), pp. 1400-1411**
Abstract	**The prime objective of the present article is to analyze the effects of rotation and initial stress on the propagation of Rayleigh surface waves in a homogeneous, orthotropic magneto-thermoelastic half space subjected to gravity field. The frequency equations in closed form are derived and the amplitude ratios of surface displacements, temperature change during the Rayleigh wave propagation on the surface of half space have been computed analytically. The highlights of this study are the effects of different parameters (rotation, magnetic field, initial stress, and gravity) on the velocity of Rayleigh waves. Variation in phase velocity of Rayleigh waves against a wave number is shown graphically. Some particular cases have been deduced. Also, the classical Rayleigh wave equation is obtained as a special case of the present study. Numerical example has been carried out and represented by the means of graphs. Impacts of various involved parameters appearing in the solutions are carefully analyzed. In fact, in the absence of various parameters, these equations are in agreement with the results for isotropic medium.**

Title	**Inspection of electrochemical behavior of tolnaftate a topical antifungal agent and its active hydrolysis products by disposable screen-printed carbon electrode**
Authors	**Khairy, M., Khorshed, A.A.**
Journal	**Journal of Electroanalytical Chemistry871,114274**
Abstract	**Inspection of the electrochemical behavior tolnaftate (TNF), of a topical antifungal agent and its active hydrolysis products, was carried out by utilizing a disposable screen-printed carbon electrode (SPCE) for the first time. The voltammetric behavior of TNF was studied in various pH values using cyclic voltammetry and differential pulse voltammetry. A well-defined irreversible oxidation wave of TNF was observed at 1.20 V (vs. pseudo Ag/AgCl) and did not shift with different pH of solutions. The electro-analytical performance of the disposable SPCE was investigated in wide concentration ranges with limits of detection (LOD) of 0.24 µM and 3.76 µM in 0.1 M H2SO4 and B.R. buffer pH 7, respectively. Thus, the disposable SPCEs offer a sensitive and reproducible electrochemical platform for TNF in dosage forms. Further, the TNF was hydrolyzed in an alkaline medium to release its possible lethal products i.e. 2- Naphthol which can be analyzed voltammetrically without any interference so it is considered as a first selective stability-indicating assay for TNF.**

Title	**An efficient and non-precious anode electrocatalyst of NiO-modified carbon nanofibers towards electrochemical urea oxidation in alkaline media**
Authors	**Abd El-Lateef, H.M., Khalaf, M.M., Mohamed, I.M.A.**
Journal	**Ceramics International 46(12), pp. 20376-20384**
Abstract	**Non-precious NiO nanoparticles were combined with carbon fibers (CFs) to design the novel electrode material; NiO-CFs. The as-synthesized NiO-CFs material was investigated in terms of Field emission scanning electron microscope (FE-SEM), Fourier-transform infrared spectroscopy (FT-IR), Brunauer-Emmett-Teller (BET) surface area, Energy-dispersive X-ray spectroscopy (EDX), UV–vis spectra, Transmission electron microscope (TEM), selected area diffraction (SAED) pattern and X-ray diffraction (XRD) techniques. These analyses indicate the successful synthesis of a nanocomposite of NiO-CFs. Cyclic voltammetry (CV) in addition to chronoamperometric (CA) and electrochemical impedance spectroscopy (EIS) methods were studied in the 3-electrodes system to examine the electrochemical performance of NiO-CFs material for urea oxidation in KOH medium. The synthesized nanocomposite showed improved electrochemical oxidation of urea at various urea concentrations up to 1.5 M. The decreasing of both charge transfer impedance and series resistance indicates the enhanced transfer of electrons in the occurrence of urea which could be related to the high electrochemical performance of NiO-CFs material as an electrocatalyst. The superior electrochemical activity can be due to the assembly of C-structure with NiO nanoparticles during the synthesis steps which enhance electrocatalysis, charge transfer, and structural defects.**

Title	**Free-space 16-ary orbital angular momentum coded optical communication system based on chaotic interleaving and convolutional neural networks**
Authors	**El-Meadawy, S.A., Shalaby, H.M.H., Ismail, N.A., Abd El-Samie, F.E., Farghal, A.E.A.**
Journal	**Applied Optics 59(23), pp. 6966-6976**
Abstract	**Recently, orbital angular momentum (OAM) rays passing through free space have attracted the attention of researchers in the field of free-space optical communication systems. Throughout free space, the OAM states are subject to atmospheric turbulence (AT) distortion leading to crosstalk and power discrepancies between states. In this paper, a novel chaotic interleaver is used with low-density parity-check coded OAM-shift keying through an AT channel. Moreover, a convolutional neural network (CNN) is used as an adaptive demodulator to enhance the performance of the wireless optical communication system. The detection process with the conjugate light field method in the presence of chaotic interleaving has a better performance compared to that without chaotic interleaving for different values of propagation distance. Also, the viability of the proposed system is verified by conveying a digital image in the presence of distinctive turbulence conditions with different error correction codes. The impacts of turbulence strength, transmission distance, signal-to-noise ratio (SNR), and CNN parameters and hyperparameters are investigated and taken into consideration. The proposed CNN is chosen with the optimal parameter and hyperparameter values that yield the highest accuracy, utmost mean average precision (MAP), and the largest value of area under curve (AUC) for the different optimizers. The simulation results affirm that the proposed system can achieve better peak SNR values and lower mean square error values in the presence of different AT conditions. By computing accuracy, MAP, and AUC of the proposed system, we realize that the stochastic gradient descent with momentum and the adaptive moment estimation optimizers have better performance compared to the root mean square propagation optimizer.**

Title	**First-time synthesis of a magnetoelectric core-shell composite: Via conventional solid-state reaction**
Authors	**Henrichs, L.F., Mu, X., Scherer, T., (...), Hansen, T.C., Hahn, H.**
Journal	**Nanoscale 12(29), pp. 15677-15686**
Abstract	**In recent years, multiferroics and magnetoelectrics have demonstrated their potential for a variety of applications. However, no magnetoelectric material has been translated to a real application yet. Here, we report for the first time that a magnetoelectric core-shell ceramic, is synthesized via a conventional solid-state reaction, where core-shell grains form during a single sintering step. The core consists of ferrimagnetic CoFe2O4, which is surrounded by a ferroelectric shell consisting of (BiFeO3)x-(Bi1/2K1/2TiO3)1-x. We establish the core-shell nature of these grains by transmission-electron microscopy (TEM) and find an epitaxial crystallographic relation between core and shell, with a lattice mismatch of 6 ± 0.7%. The core-shell grains exhibit exceptional magnetoelectric coupling effects that we attribute to the epitaxial connection between the magnetic and ferroelectric phase, which also leads to magnetic exchange coupling as demonstrated by neutron diffraction. Apparently, ferrimagnetic CoFe2O4 cores undergo a non-centrosymmetric distortion of the crystal structure upon epitaxial strain from the shell, which leads to simultaneous ferrimagnetism and piezoelectricity. We conclude that in situ core-shell ceramics offer a number of advantages over other magnetoelectric composites, such as lower leakage current, higher density and absence of substrate clamping effects. At the same time, the material is predestined for application, since its preparation is cost-effective and only requires a single sintering step. This discovery adds a promising new perspective for the application of magnetoelectric materials.**

Title	**Influence of final-state interaction on double spin asymmetries in incoherent ? + -photoproduction on the deuteron near threshold**
Authors	**Darwish, E.M., Al-Ghamdi, H.M.**
Journal	**International Journal of Modern Physics E 29(8),2050056**
Abstract	**Incoherent ?+-photoproduction on the deuteron is investigated for photon energies near threshold with particular focus on beam-target double spin asymmetries. The analysis is based on a γd → ?+nn reaction model in which realistic elementary amplitudes for γN → ?N, NN → NN and ?N → ?N are incorporated. Numerical results on all possible beam-target double spin asymmetries of the differential and total cross-sections in the photon energy region near threshold are presented. Effects of NN and ?N final-state interactions are investigated and their roles are found to be important.**

Title	**The multiplicity characteristics of 7Li-Em interactions as a function of noninteracting projectile nucleons**
Authors	**Mohery, M., Sultan, E.M., Abdallah, N.N., Farghaly, M.H.**
Journal	**International Journal of Modern Physics E29(8),2050063**
Abstract	**In this work, the interactions of 7Li nuclei with emulsion at 3 A GeV/c were studied. Multiplicity of the charged secondary particles as well as the charge of the outgoing projectile fragments were measured, while correlations among them are discussed. The values of the total charge of the noninteracting projectile nucleons and the average number of interacting projectile nucleons are estimated. The dependence of the secondary particles on the number of heavily-ionized tracks is analyzed. The results show that interactions of 7Li nuclei with emulsion nuclei exhibit a number of regularities, which had been noted in experiments with lighter nuclei. The absorption of relativistic particles, while increasing the degree of target destruction, is observed. The average multiplicities of the secondary charged particles depend on the impact parameter, as their values increase, while decreasing the impact parameter. The number of secondary charged particles in the heavy-ion interactions depends on the degree of disintegration of the target nuclei. This dependence is not observed in the case of the interaction of hadron with emulsion. The experimental data of the interaction of 7Li are systematically compared with the other interactions at different energies. The results agree with the corresponding results at nearly the same energy.**

Title	**Enhancement of the molecular and serological assessment of hepatitis e virus in milk samples**
Authors	**Sayed, I.M., Hammam, A.R.A., Elfaruk, M.S., (...), Elkhawaga, A.A., El-Mokhtar, M.A.**
Journal	**Microorganisms 8(8),1231, pp. 1-14**
Abstract	**Hepatitis E virus (HEV) infection is endemic in developing and developed countries. HEV was reported to be excreted in the milk of ruminants, raising the possibility of transmission of HEV infection through the ingestion of contaminated milk. Therefore, the detection of HEV markers in milk samples becomes pivotal. However, milk includes inhibitory components that affect HEV detection assays. Previously it was reported that dilution of milk matrix improves the performance of HEV molecular assay, however, the dilution of milk samples is not the best strategy especially when the contaminated milk sample has a low HEV load. Therefore, the objective of this study is to compare the effect of extraction procedures on the efficiency of HEV RNA detection in undiluted milk samples. In addition, we assessed the effect of the removal of milk components such as fats and casein on the performance of the molecular and serological assays of HEV. Phosphate buffered saline (PBS) and different milk matrices (such as whole milk, skim milk, and milk serum) were inoculated with different HEV inoculums and subjected to two different extraction procedures. Method A includes manual extraction using spin column-based extraction, while method B includes silica-based automated extraction. Method A was more sensitive than method B in the whole milk and skim milk matrices with a LoD95% of 300 IU/mL, and virus recovery yield of 47%. While the sensitivity and performance of method B were significantly improved using the milk serum matrix, with LoD95% of 96 IU/mL. Interestingly, retesting HEV positive milk samples using the high sensitivity assay based on method B extraction and milk serum matrix increased the HEV RNA detection rate to 2-fold. Additionally, the performance of HEV serological assays such as anti-HEV IgG and HEV Ag in the milk samples was improved after the removal of the fat globules from the milk matrix. In conclusion, HEV RNA assay is affected by the components of milk and the extraction procedure. Removal of inhibitory substances, such as fat and casein from the milk sample increased the performance of HEV molecular and serological assays which will be suitable for the low load HEV milk with no further dilutions.**

Title	**Global stability of an adaptive immunity HIV dynamics model with silent and active cell-to-cell transmissions**
Authors	**Elaiw, A.M., Alshamrani, N.H., Hobiny, A.D., Abbas, I.A.**
Journal	**AIP Advances 10(8),085216**
Abstract	**This paper proposes and investigates an HIV dynamics model with adaptive immunity. The model describes the interactions between five compartments: healthy CD4+T cells, silent infected cells, active infected cells, free HIV particles, and cytotoxic T lymphocytes and antibodies. The model incorporates two methods of transmission: virus-to-cell and cell-to-cell (CTC). The healthy cells can be infected when they come into contact with free HIV particles or silent infected cells or active infected cells. We established that the model is well-posed by establishing the nonnegativity and boundedness of the solutions. The model has admitted five equilibria, and their existence is governed by five threshold parameters. We prove the global asymptotic stability of the equilibria by constructing Lyapunov functions. We have illustrated the theoretical results by numerical simulations. We have shown that the inclusion of CTC transmission decreases the concentration of healthy cells and increases the concentration of free HIV particles.**

Title	**Water-soluble Cu(II)-complexes of Schiff base amino acid derivatives as biological reagents and sufficient catalysts for oxidation reactions**
Authors	**Mohamad, A.D.M., El-Shrkawy, E.R., Al-Hussein, M.F.I., Adam, M.S.S.**
Journal	**Journal of the Taiwan Institute of Chemical Engineers 113, pp. 27-45**
Abstract	**Two novel water-soluble Cu(II) complexes (Cu-PSA and Cu-PSL) are synthesized from easily accessible Schiff base amino acid ligands (HPSA and HPS), as sodium sulfonate salts, obtained from D,L-phenylalanine and D,L-leucine, respectively. Their chemical composition is confirmed using various spectroscopic analyses (NMR, UV–vis, IR and mass spectroscopies, CHN micro-analyses, conductivities, TGA, and magnetism). The effect of sodium sulfonate group (Na+ SO3− group) on the chemical behavior of both Cu-PSA and Cu-PSL complexes is studied catalytically and biologically. Catalytically, Cu-PSA and Cu-PSL exhibit high reactivity in the (ep)oxidation of 1,2-cyclooctene and benzyl alcohol in polar reaction media, (acetonitrile or water) at 80 °C, under homogeneous reaction condition. Biologically, the Cu-complexes and their ligands (HPSA and HPS) are tested for antimicrobial activity against some pathogens strains. Both Cu-complexes reveal higher performance than their corresponding ligands. Cu-PSA and Cu-PSL complexes are also examined for ctDNA-interaction, which studied using various techniques including spectroscopy, viscosity and gel-electrophoresis. Despite, their low lipophilicity due to the sodium sulfonate group (salting group), they show potentially high electrostatic interaction with ctDNA. The binding potential of these compounds is also investigated by molecular docking showing the role of the central metal ion (Cu2+) and the salting group in the ctDNA interaction. For anticancer reactivity, both ligands (HPSA, HPSL), and their complexes (Cu-PSA or Cu-PSL) are examined against hepatocellular carcinoma (HepG2) cell line, breast carcinoma (MCF7) cell line and colon carcinoma (HCT-116) cell line. The obtained results are encouraging and after optimization the Cu-complexes could be potentially anticancer drug candidates.**

Title	**Carcass characteristics, physicochemical properties, and texture and microstructure of the meat and internal organs of carrier and king pigeons** ***Open Access***
Authors	**Kokoszyński, D., Stęczny, K., Żochowska-kujawska, J., (...), Hrnčár, C., Włodarczyk, K.**
Journal	**Animals** **10(8),1315, pp. 1-15**
Abstract	**Pigeons have been the subject of research in the past, but the knowledge gained is incomplete and must be extended. The aim of the study was to provide information about differences in carcass weight and measurements, carcass composition, proximate chemical composition, acidity, electrical conductivity, color attributes, the texture, rheological properties and microstructure of the meat, and some biometric characteristics of the digestive system in carrier and King pigeons, and also to determine if the two compared breeds meet the expectations of pigeon meat consumers to the same extent. The study involved 40 carcasses from carrier pigeons and King pigeons after three reproductive seasons. The chemical composition was determined by near-infrared transmission (NIT) spectroscopy, color coordinates according to CIELab, the texture according to Texture Profile Analysis (TPA) and Warner–Bratzler (WB) tests, and the rheological properties of meat according to the relaxation test. The compared pigeon groups differed significantly ($p < 0.05$) in carcass weight and measurements, carcass composition (except breast muscle percentage), chemical composition (except leg muscle collagen content) and electrical conductivity, lightness (L*), yellowness (b*), chroma (C*) and hue angle (h*), textural characteristics (except cohesiveness and Warner–Bratzler shear force), rheological properties, microstructure of the pectoralis major muscle, as well as the total length of intestine and its segments, duodenal diameter, weight of proventriculus, gizzard, liver, heart, and spleen. The sex of the birds had a significant ($p < 0.05$) effect on the carcass weight, chest circumference, carcass neck percentage, breast muscle collagen content, and caeca length. The genotype by sex interaction was significant ($p < 0.05$) for fat content, collagen content, hardness, sum of elastic moduli and sum of viscous moduli of the pectoralis major muscle, protein and collagen content of leg muscles, duodenal and caecal length, jejunal and ileal diameter, and spleen weight. The obtained results show a significant effect of genetic origin and sex on the nutritive and technological value of the meat, and on the digestive system development of the pigeons.**

Title	**Design, synthesis and anticonvulsant activity of new imidazolidindione and imidazole derivatives**
Authors	**Marzouk, A.A., Bass, A.K.A., Ahmed, M.S., (...), Salman, A.M.M., Aly, O.M.**
Journal	**Bioorganic Chemistry 101,104020**
Abstract	**New imidazolidindiones and tetra-substituted imidazole derivatives were designed, synthesized, and evaluated for the anticonvulsant activity through pentylenetetrazole (PTZ)-induced seizures and maximal electroshock (MES) tests using valproate sodium and phenytoin sodium as reference drugs, respectively. Most of the target compounds showed excellent activity against pentylenetetrazole (PTZ)-induced seizures with fair to no-activity against MES. Compounds 3d, 4e, 11b, and 11e showed higher activity (120%) than that of valproate sodium in PTZ model. Almost all compounds showed no neurotoxicity, as indicated by the rotarod test. Estimation of physicochemical properties and pharmacokinetic profiles of the target compounds were studied. The chemical structures of the target compounds were characterized by different spectrometric methods and elemental analysis.**

Title	**First results from in situ transmission electron microscopy studies of all-solid-state fluoride ion batteries**
Authors	**Fawey, M.H., Chakravadhanula, V.S.K., Munnangi, A.R., (...), Fichtner, M., Kübel, C.**
Journal	**Journal of Power Sources** **466,228283**
Abstract	**A focused ion beam (FIB) system is used to fabricate a micron-sized all-solid-state fluoride ion cell from a bulk battery for in situ transmission electron microscopy (TEM) testing. The bulk battery is based on a La0·9Ba0·1F2.9 solid-state electrolyte with a nanocomposite of Cu/C as a cathode and a nanocomposite of MgF2, Mg, La0·9Ba0·1F2.9 and C as an anode. The evolution of the morphology, structure, and composition of the electrodes and their interfaces with the electrolyte is characterized using in-situ TEM during electrochemical cycling. The high-resolution transmission electron microscopy (HRTEM) and scanning transmission electron microscopy-energy dispersive X-ray (STEM-EDX) analysis of the cathode-electrolyte interface reveal the expected formation of CuF2 phase during charging. During cycling, grain growth of Cu in the cathode ingredients and Cu diffusion from the cathode into the electrolyte are observed in addition to void formation.**

Title	**Pollen diversity in the genus Carlina L. (subtribe Carlininae, Compositae) and its systematic significance**
Authors	**Badry, M.O., Osman, A.K., Elkordy, A**
Journal	**Review of Palaeobotany and Palynology 279,104243**
Abstract	**Pollen morphology of 19 species, 4 subspecies, and 1 variety of Carlina was studied in detail by light and scanning electron microscopy. Qualitative and quantitative pollen morphological characters which vary between taxa are found in the length of the ectocolpi, presence/nature of the echinae, pollen size and shape, lumina area, P/E ratio, polar axis, equatorial diameter, pollen shape, ectocolpi length, sculpture of ectoaperture membranes, area of lumina, and exine ornamentation. Three main pollen types are discerned: the C. atlantica type characterized by P/E ≤ 1.00, the C. curetum type characterized by P/E = 1.03–1.11, and the C. acanthifolia type with ratio P/E = 1.24–1.50. HCA and PCA analyses were carried out to detect the potential palynological characters which could be used to identify taxa. The data suggest that several pollen morphological characters can be used to delimit the taxa of Carlina. Dichotomous artificial keys based on palynological data are also given.**

Title	**Biogenic Synthesis of ZnO Nanoparticles and Its Potential Use as Antimicrobial Agent Against Multidrug-Resistant Pathogens**
Authors	**Gad El-Rab, S.M.F., Abo-Amer, A.E., Asiri, A.M.**
Journal	**Current Microbiology 77(8), pp. 1767-1779**
Abstract	**In case of Escherichia coli and Klebsiella pneumoniae infection, the increased prominence of multidrug-resistance strains has become the greatest challenge in the urinary tract disease treatment. Therefore, the 16S rRNA sequencing of multidrug-resistant strains was performed, in addition to those of plasmids and genes responsible for multidrug resistance. These strains showed containing responsible genes Sulfonamides sul1, Tetracycline Tet(A), Tetracycline Tet(B), chloramphenicol catA1, β-lactams blaSHV, and cmlA. Also, the strains demonstrated resistance to at least 10 types of antibiotics or more due to carrying various plasmids. For increasing the level of public health in daily life and treatment of multidrug-resistant bacteria, the nanomedicine was employed. Consequently, ZnO nanoparticles (ZnONPs-E) were synthesized by employing supernatant of Escherichia hermannii strain isolated from raw milk source. The E. hermannii strain produces high concentration of ZnONPs-E compared to other strains so we used it in this study. This ZnONPs-E has a minimal inhibitory concentration (MIC) ranged from the concentration 10 µg/ml to 40 µg/ml against E. coli and K. pneumoniae, respectively. The antimicrobial efficiency of ZnONPs-E was 40 µg/ml and it was superior to the reported values in literature. Moreover, SEM results evident for distorted membrane morphology, blebbing of membrane, cell elongation, and leakage of cellular contents due to ZnONPs-E activity against tested bacteria. These results indicated that the ZnONPs-E exhibited interesting antimicrobial activity against pathogenic extended-spectrum β-lactamases (ESBLs) strains. The present study revealed that the active components entered in biosynthesis of ZnONPs-E pave the way to lead its effective nano-medical and drug delivery applications.**

Title	**Poikilocytosis and tissue damage as negative impacts of tramadol on juvenile of Tilapia (Oreochromis niloticus)**
Authors	**Soliman, H.A.M., Sayed, A.E.-D.H.**
Journal	**Environmental Toxicology and Pharmacology 78,103383**
Abstract	**Pharmaceuticals residue was detected in the water bodies as a consequence of the incomplete treatment. Recently, the side impacts of that residue on aquatic creatures have received a considerable attention. However, there is insufficient information about the effect of the most consumed narcotic drug (tramadol) on fish as an aquatic model. Thus, this study aims at investigating the poikilocytosis and tissue damage in Oreochromis niloticus after the exposure to 100 and 200 mg/L of tramadol hydrochloride. Three groups of fish were used; one as a control group, and the other two groups were exposed to 100 mg/L and 200 mg/L of tramadol hydrochloride respectively for 25 days. Exposure to tramadol caused a significant increase in the percentage of poikilocytosis compared to the control group. Poikilocytosis included tear-drop cell, spindle-shaped cell, sickle cell, schistocyte, blebbed cell, acanthocyte, eccentric nucleus, amoebocyte, dividing cell, and crenated cell. Moreover, liver tissue in fish exposed to tramadol showed degeneration and vacuolization of hepatocytes and atrophy of pancreatic acini as signs of histopathological alterations. Histopathological changes of brain showed severe gliosis, dark neurons, and vacuolization in fish exposed to tramadol compared to control fish. Gills tissue showed erosion, epithelial lifting, and secondary lamellae shrinking in fish exposed to tramadol compared to control fish. In conclusion, tramadol induced histopathological changes in liver, brain, and gills of Oreochromis niloticus as well as poikilocytosis were indicated clearly. Therefore, tramadol leakage to waters should be avoided to preserve aquatic creatures.**

Title	**Hybrid organic-inorganic Cu(II) iminoisonicotine@TiO_2@Fe_3O_4 heterostructure as efficient catalyst for cross-couplings**
Authors	**Adam, M.S.S., Ullah, F., Makhlouf, M.M.**
Journal	**Journal of the American Ceramic Society 103(8), pp. 4632-4653**
Abstract	**Two novel mononuclear copper (II) complex catalysts were synthesized from a new tridentate iminoisonicotine ligand (HL) by coordination with Cu(II) ion, with (CuL@TiO2@Fe3O4) and without (CuL) immobilization on TiO2-coated nanoparticles of Fe3O4. The ester moiety on the back of the ligand was utilized for immobilization on nanoparticles of Fe3O4. Both ligand and CuL complex were fully characterized by using alternative spectral techniques (nuclear magnetic resonance, infrared, ultraviolet-visible and mass spectroscopy, and elemental analyses). Different analytical techniques were used to identify the structural feature and morphology of the immobilized copper catalyst (CuL@TiO2@Fe3O4) shell-shell-core system. The structural analysis revealed that the catalyst system is composed of both agglomerated nanospheres and deformed nanorods. Both copper catalysts, immobilized CuL@TiO2@Fe3O4 and un-immobilized CuL were studied in heterogeneous and homogeneous catalysis, respectively, for Suzuki-Miyaura (C–C) and Buchwald-Hartwig (C–N) cross-coupling reactions of various heteroaryl halides. Both catalysts showed good catalytic potential under the controlled optimal reaction conditions. In contrast to the homogeneous catalyst (CuL), the heterogeneous catalyst (CuL@TiO2@Fe3O4) showed slightly better catalytic performance. The characteristic obtains supported the catalytic potential of the current samples. Reusability/recycling of both catalysts was also investigated in C–C cross-coupling reactions. It was found that the homogeneous catalyst (CuL) could be only recycled up to three times, whereas the heterogeneous one (CuL@TiO2@Fe3O4) could be reused up to seven times with good efficiency.**

Title	**Fractional Order GN Model on Photo-Thermal Interaction in a Semiconductor Plane**
Authors	**Hobiny, A., Abbas, I.**
Journal	**Silicon** **12(8), pp. 1957-1964**
Abstract	**A mathematical model of Green–Naghdi photothermal theory based on fractional-order of heat transfer is given to study the wave propagation in a two-dimensional semiconductor material. Closed-form analytical solutions to obtain the physical quantities subjected to a heat flux with a pulse that decays exponentially in the surface of semiconductor half-space are presented. Through the use of Laplace and Fourier transforms with the methodology of eigenvalues techniques, the analytical solutions of all physical quantities are obtained. A semiconductor medium such as silicon is studied. The derived method is evaluated with numerical results which are applied to the semiconductor medium in simplified geometry. The significant influence of time-fractional derivative parameters are discussed for all physical quantities. Suitable discussions and conclusions are presented.**

Title	**Solar light-assisted remediation of domestic wastewater by NB-TiO_2 nanoparticles for potable reuse**
Authors	**Abdelraheem, W.H.M., Nadagouda, M.N., Dionysiou, D.D.**
Journal	**Applied Catalysis B: Environmental 269,118807**
Abstract	**Water reuse has become a worldwide necessity due to scarcity of fresh water supplies. Recently, advanced oxidation processes (AOPs) has been incorporated into water reuse treatment train to destroy residual organics in water before its discharge. Yet, the currently applied ultraviolet/H2O2 AOP is associated with high electrical demand by the UV process in addition to transport and storage problems of H2O2. Accordingly, the current work investigates the use of solar light/NB-TiO2 as an efficient AOP for water reuse industry. The technology was developed and tested for degradation of five contaminants of emerging concern (CECs) spiked in Milli-Q water and different wastewater samples. All CECs were successfully removed from individual and quinary systems, even in presence of natural levels of common inorganic quenching agents. Roles of different reactive species involved on the degradation of CECs were explored. Using mass spectroscopy, transformation products from CECs degradation were identified and degradation pathways were hypothesized.**

Title	**Immunohistochemical localization of alpha-synuclein in the retina of some nocturnal and diurnal animals**
Authors	**Seleem, A.A.**
Journal	**Biotechnic and Histochemistry** **95(5), pp. 360-372**
Abstract	**Although alpha-synuclein has been reported to participate in neurodegenerative diseases, the actual normal biological function of alpha-synuclein remains unclear. I investigated the correlation of alpha-synuclein expression with nocturnal and diurnal activity for various species. Hematoxylin and eosin staining, periodic acid-Schiff's reaction (PAS) and immunohistochemistry of alpha-synuclein expression were performed for the retinas of diurnal, nocturnal, nocturnal with diurnal activity species. I found different intensity of alpha-synuclein expression in the retinal layers. I found alpha-synuclein expression in the outer segment of the photoreceptor layer in the diurnal studied species and absence of alpha-synuclein expression in the compartments of photoreceptor layer in the retina of nocturnal species. I found localization of alpha-synuclein in the inner and outer segments of photoreceptors of the retina of nocturnal with diurnal activity species. The retinas of diurnal animals exhibited glycogen in the paraboloid structure in the inner segment of the photoreceptor layer. The retinas of nocturnal and nocturnal with diurnal activity species were devoid of glycogen in the photoreceptor layer. I conclude that the function of alpha-synuclein is more related to diurnal than to nocturnal species.**

Title	**Physical Insights into Band Bending in Pristine and Co-Pi-Modified $BiVO_4$Photoanodes with Dramatically Enhanced Solar Water Splitting Efficiency**
Authors	**Kandiel, T.A., Ahmed, M.G., Ahmed, A.Y.**
Journal	**Journal of Physical Chemistry Letters 11(13), pp. 5015-5020**
Abstract	**Herein, a novel method is introduced to synthesize 3D hierarchically assembled BiVO4 nanosheet photoanodes. Despite the fact that the obtained photoanodes inherit the intrinsic properties of 2D and 3D structures, they generate low photocurrent under simulated solar light at 1.0 sun. Upon modification with the cobalt-phosphate (Co-Pi) cocatalyst, the photocurrent is dramatically enhanced from 0.41 to 3.32 mA cm-2 at 1.23 VRHE. Charge-transfer kinetic studies by intensity-modulated photocurrent spectroscopy indicated that the low photocurrent response is mainly due to the high density of surface states, which pin the Fermi level and suspend the band bending. The Co-Pi loading passivates these surface states, unpins the Fermi level, and thus resumes the band bending. It also greatly enhances the rate constant of charge transfer and the overall efficiency, evincing that Co-Pi exhibits a dual function (i.e., passivation and catalysis). The current results explicitly disclose the role of the Co-Pi cocatalyst in photoelectrochemical solar water splitting on BiVO4.**

Title	**Developmental neurotoxicity after penconazole exposure at embryo pre- and post-implantation in mice**
Authors	**El-Shershaby, A.E.-F.M., Lashein, F.E.-D.M., Seleem, A.A., Ahmed, A.A.**
Journal	**Journal of Histotechnology 43(3), pp. 135-146**
Abstract	**The present study was conducted to evaluate the effect of penconazole fungicide at a low dose (2.5 mg/kg b.w.) during embryogenesis in either the pre- or post-implantation of embryos. Females were determined pregnant according to the presence of vaginal plug and then grouped into control and penconazole-exposures at high doses (30, 20, 10, and 5 mg/kg b.w.). These high doses provoked foetoresorptionin the first experiment. Thus, a low dose (2.5 mg/kg b. w.) was used in either the pre- or post-implantation of embryos to clarify the embryotoxicity without mortality on the developing brain and eye. Results indicate a developmental delay of the cerebral hemisphere, hippocampus, cerebellum (lobulation) and induced retinopathy during eye development in post-implantation of penconazole treated group. Also, the effect of penconazole at low dose provoked a decrease in the expression of α-synuclein in the hippocampus, cerebellum, and ganglion cell layer of the developing brain and eye. In conclusion, exposure to PEN fungicide during pregnancy at a dose (2.5 mg/kg) induces alterations in the developing brain and eye tissues.**

Title	**Formulation of mint and thyme essential oils with Arabic gum and Tween to enhance their efficiency in the control of postharvest rots of peach fruit**
Authors	**Alamri, S.A.M., Hashem, M., Alqahtani, M.S.A., (...), Mohamed, Z.A., Ziedan, E.S.H.**
Journal	**Canadian Journal of Plant Pathology 42(3), pp. 330-343**
Abstract	**The peach (Prunus persica) is a fruit that is susceptible to many fungal infections following harvest, leading to significant losses. This study was aimed at evaluating the efficacy of a novel formulation prepared from mint and thyme essential oils and used to protect peaches from postharvest decay. The formulation was prepared by mixing the oils with Arabic gum as a coating material and Tween 20 as an emulsifier. The formulations were tested for their efficacy in inhibiting fungal growth in vitro and suppressing disease development on the fruit under a wide range of temperatures and under cold storage conditions. The results demonstrated the inhibition of growth of Botrytis cinerea, Penicillium expansum and Rhizopus stolonifer following application of the formulations. Six days following application of the formulations, the reduction in growth of the three pathogens was 83.0%, 77.0% and 88.0%, respectively. The formulations succeeded in protecting peaches from postharvest rot under a wide range of temperatures (5–30°C) in vivo. In cold storage (4°C), the formulations protected peaches from the three fungal pathogens for 10 days and significantly hindered disease progress compared with the controls, Arabic gum and Tween 20, for up to 30 days. Use of oil formulations reduced the disease incidence to 25.0–30.0% and lowered disease severity to 26.6–46.7% throughout the time the peach fruit was kept in storage. The findings support the application of the essential oil formulations, Arabic gum and Tween 20 as effective, natural and edible coating materials to preserve peaches free from infections for an extended period.**

Title	**Application of zeolite prepared from natural materials for reducing ground water salinity and sodium ion from Wadi el-Assiuti**
Authors	**Abdelmoneim, A.A., Abdul-Moneim, M., Geies, A.A., Farghaly, S.O.**
Journal	**Desalination and Water Treatment 193, pp. 72-82**
Abstract	**Groundwater is an important source of freshwater in Egypt. With growing populations and human activities in Egypt, the demand for groundwater has increased. In this study, sodalite was succes-sively synthesized from low-cost natural clay materials (kaoline) and white sand using the fusion with the NaOH method. The conditions of hydrothermal crystallization (zeolitization) were found at a temperature of 170°C, and a time span of 72 h for raw material. Sodalite has been characterized by X-ray diffraction, scanning electron microscopy, Fourier transform infrared spectroscopy, and differential thermal analysis/thermogravimetric analysis. Sodalite was tested as adsorbents for reducing a variety of salinity total dissolved solids with Na cation from groundwater of Wadi El-Assiuti, Egypt. Batch experiments were carried out to investigate the effects of some parameters (dosage of adsorbent, pH, temperature, and contact time) on both salinity and the Na+ ion adsorp-tion. The results showed that sodalite has a good efficiency in the removal of salinity and the Na+ ion with concentrations up to 6,000 and 1,320 ppm respectively. The percent adsorption was evaluated with changes in the previous parameters for different concentrations of Na1+ ion. The Langmuir constants model for Na1+ ion sorption on the adsorption isotherms is fitted well. The RL value in the present investigation at concentration 1,320 ppm was less than one, indicating that the adsorption of the metal ion by sodalite is favorable. Freundlich adsorption isotherm is also adapted in the case of sodalite (R2 = 0.7) for Na+ ion.**

Title	**The Effect of Various Three-Body Forces on Nuclear Matter and Neutron Stars Properties**
Authors	**Abou-Elsebaa, H.M., Darwish, E.M., Hassaneen, K.S.A.**
Journal	**Moscow University Physics Bulletin 75(4), pp. 320-330**
Abstract	**The binding energy per nucleon for nuclear matter, i.e., equation of state (EOS), within the Brueckner–Hartree–Fock (BHF) approach with the consideration of various three-body forces (3BFs) like the phenomenological 3BF and by adding a contact term to the BHF calculations are considered at variance densities. The 3BF contribution turns out to be nonnegligible contribution and to have a substantial saturation effect. The calculations are done utilizing the CD-Bonn and Argonne V18 nucleon–nucleon (NN) potentials. These NN potentials give great fitting to the deuteron properties and are phase-shift equivalent. The resultant EOS is compatible with the phenomenological analysis on the saturation point. It is demonstrated that the 3BF influences significantly on the nuclear matter EOS at high densities. Moreover, it is necessary for reproducing the empirical saturation properties for symmetric nuclear matter. The pressure has been also calculated and the suggested approaches reproduce fairly well agreement with the empirical data. We also examined the maximum neutron star masses which are close to two solar masses, which is again compatible with recent observational data. Comparison with other microscopic EOS is presented and discussed.**

Title	**Emission Spectrum and Fidelity of an Atomic System Coupled to Fields with Level Energy Differences**
Authors	**Altowyan, A.S., Aldaghfag, S.A., Berrada, K., Abdel-Khalek, S.**
Journal	**Journal of Russian Laser Research 41(4), pp. 327-333**
Abstract	**We study the emission spectrum and quantum-state fidelity for an atomic system interacting with radiation fields of quantum systems described by power-law potentials. We consider a set of manifold fields that are characterizable by their level-energy differences. They include triangular, infinite, and harmonic potentials as special cases. We present the time evolution of the spectrum and fidelity for this class of potentials with respect to model parameters of the physical system. The results indicate that the spectrum and fidelity during the dynamics are highly sensitive to the value of the photon-transition number and exponent parameter.**

Title	**Quantum Extropy and Statistical Properties of the Radiation Field for Photonic Binomial and Even Binomial Distributions**
Authors	**Almarashi, A.M., Algarni, A., Abdel-Khalek, S., Abd-Elmougod, G.A., Raqab, M.Z.**
Journal	**Journal of Russian Laser Research 41(4), pp. 334-343**
Abstract	**We present quantum formula for extropy based on the Husimi Q-function and the atomic Husimi Q-function. The quantum extropy is used to detect the entanglement or nonlocal correlations of the system consisted of a single qubit and the radiation field. We provide explicit forms of the binomial and even binomial distributions. We compare the temporal behavior of quantum extropy within the atomic and field bases with the tomographic entropy, which is a measure for quantifying nonlocal correlations between the field and a single qubit. The photon statistics of the field can also be quantified by the evolution of the Mandel parameter, if the field initially follows the binomial and even binomial distributions. We use the total density matrix to compute and analyze the time evolution of the initial photonic binomial probability distribution that governs the behavior of the atom–photon entanglement. In this context, we investigate the links among the temporal behavior of the atomic quantum extropy, tomographic entropy, and statistical properties of the field. The quantum extropy is a useful indicator of the qubit–field entanglement, whereas the quantum extropy of the field basis is a good indicator of the dynamical behavior of the atom–field system.**

Title	**An efficient synthesis of electrospun TiO_2-nanofibers/Schiff base phenylalanine composite and its inhibition behavior for C-steel corrosion in acidic chloride environments**
Authors	**Abd El-Lateef, H.M., Mohamed, I.M.A., Zhu, J.-H., Khalaf, M.M**
Journal	**Journal of the Taiwan Institute of Chemical Engineers 112, pp. 306-321**
Abstract	**Non-precious TiO2 nanofibers (NFs) Schiff base phenylalanine (SBP) composite was designed via facile methodology; electrospinning and Schiff base loading. The as-fabricated TiO2 NFs/SBP material was investigated in terms of Field emission-scanning electron microscope (FE-SEM), X-ray photoelectron spectroscopy (XPS), Transmission electron microscope (TEM), Fourier-transform infrared spectroscopy (FT-IR), Thermogravimetric analysis (TGA), Brunauer-Emmett-Teller (BET) surface area, Energy-dispersive X-ray spectroscopy (EDX), and X-ray diffraction (XRD) techniques. These physicochemical characterizations indicate the successful design of a nanocomposite of TiO2 NFs/SBP. The corrosion protection of C-steel in acidic chloride environments by the designed TiO2 NFs/SBP material was examined using electrochemical tools (open circuit potential (OCP) vs. time, linear polarization resistance (LPR) corrosion rate, potentiodynamic polarization (PDP), electrochemical impedance spectroscopy (EIS)) and surface morphology investigations (FESEM/EDX and FT-IR). The findings showed that the protection capacity (EPDP%) of the individual SBP and TiO2 NFs are 85.6 and 64.8%, respectively, while the EPDP% value for TiO2 NFs/SBP composite is 97.9% at the same conditions. The as-prepared TiO2 NFs/SBP material acts as a good mixed-type inhibitor and its adsorption at the steel/HCl interface followed Langmuir's isotherm model. FESEM/EDX and FT-IR inspections established the formation of the adsorbed layer of the TiO2 NFs/SBP molecule on the electrode surface. The outcomes display that the TiO2 NFs/SBP composite could be used as an efficient inhibitor with excellent anti-corrosion features for C-steel in the acidic pickling solution.**

Title	**Gold resources from clastic Cambrian rocks and their link with underlying Precambrian rocks, southern Sinai, Egypt**
Authors	**Saber, E.S.A.**
Journal	**Arabian Journal of Geosciences 13(13),529**
Abstract	**Geological, mineralogical, and geochemical methods are utilized to discover new gold resources in the Cambrian clastic rocks in the area of southern Sinai. Relation between the Precambrian basement rocks and the overlying gold-bearing Cambrian sediments is also clarified. The Cambrian sediments are underlined by Precambrian basement rocks in which gold mineralization is closely related to intrusive granitic and volcanic rocks. The Cambrian clastic sediments are composed of basal conglomerate and thick sequence of sandstone and siltstone. The mineralogical studies revealed that the conglomerate and quartz-sandstone of the lower Cambrian platform are hosting zircon, monazite, uranophane, thoriante and xenotime, pyrite, and gold. The association of gold, rare earth element (REE)-bearing minerals, and sulfide suggested that these Cambrian sediments are the result weathering of former gold-enriched Precambrian hinterlands. Major and trace elements show the enrichment of silica, high field strength elements (Zr, Y, Nb, Hf, Th, and U), and depletion of all other major elements (Fe2O3, TiO2, MnO, MgO, K2O, Na2O, and CaO) and large-ion lithophile elements (Rb, Ba, and Sr); among the trace elements, gold shows high concentration range from 0.5 to 13 ppm. REE pattern shows enrichment in LREE and flat HREE with negative Eu anomalies, all of these indicate that the provenance of the present Cambrian sediments is a granitoid-greenstone located to the south. The geochemical parameters (Th/Co, Zr/Co, Th/La, and Th/Yb ratios) and the Paleo-weathering indices (CIA and ICV) for the Cambrian sediments indicate that they were derived from felsic source rocks which were subjected to high chemical weathering under humid climatic condition. The geochemical data and discrimination function plots indicate that the present Cambrian sediments deposited in a passive continental margin**

Title	**Biosynthesis, Characterization, and Wound-Healing Activity of Phenytoin-Loaded Copper Nanoparticles**
Authors	**Saddik, M.S., Alsharif, F.M., El-Mokhtar, M.A., (...), Farghaly, H.S., Abou-Taleb, H.A.**
Journal	**AAPS PharmSciTech 21(5),175**
Abstract	**Wound-healing is a very complex and evolutionary process that involves a great variety of dynamic steps. Although different pharmaceutical agents have been developed to hasten the wound-healing process, the existing agents are still far from optimal. The present work aimed to prepare and evaluate the wound-healing efficacy of phenytoin-loaded copper nanoparticles (PHT-loaded CuNPs). CuNPs were biosynthesized using licorice aqueous extract. The prepared CuNPs were loaded with PHT by adsorption, characterized, and evaluated for wound-healing efficiency. Results showed that both plain and PHT-loaded CuNPs were monodisperse and exhibited a cubic and hexagonal morphology. The mechanism by which PHT was adsorbed on the surface of CuNPs was best fit by the Langmuir model with a maximum loaded monolayer capacity of 181 mg/g. The kinetic study revealed that the adsorption reaction followed the pseudo-second order while the thermodynamic parameters indicated that the adsorption process was physical in nature and endothermic, and occurred spontaneously. Moreover, the in vivo wound-healing activity of PHT-loaded CuNP impregnated hydroxypropylmethyl cellulose (HPMC) gel was carried out using an excisional wound model in rats. Data showed that PHT-loaded CuNPs accelerated epidermal regeneration and stimulated granulation and tissue formation in treated rats compared to controls. Additionally, quantitative real-time polymerase chain reaction (RT-PCR) analysis showed that lesions treated with PHT-loaded CuNPs were associated with a marked increase in the expression of dermal procollagen type I and a decrease in the expression of the inflammatory JAK3 compared to control samples. In conclusion, PHT-loaded CuNPs are a promising platform for effective and rapid wound-healing.**

Title	**Optical and structure properties of CdTe/CdS films under influence of both $CdCl_2$ heat treatment and (O_2 + Ar) atmosphere**
Authors	**Hasaneen, M.F., Taya, Y.A., Ali, H.M., Ahmed, M.R.**
Journal	**Applied Physics A: Materials Science and Processing 126(7),496**
Abstract	**Thin films of CdTe/CdS were prepared using the thermal evaporation technique with pressure 2 × 10−5 mbar on substrate from glass. The thickness of CdCl2 layer around 150 nm was deposited making as-deposited CdTe/CdS films. The films covered by cadmium chloride (CdCl2) layer were annealed in atmosphere of (O2 + Ar) at different temperatures of 400 °C, 450 °C and 480 °C for 15 min. The effect of CdCl2 as a top layer on morphological, structural and optical properties was studied, and the results were compared with as-deposited films and also with (O2 + Ar) annealing process. The refractive index in whole wavelength and film thickness was estimated by Cauchy dispersion relation and Swanepoel's envelope method, respectively. Furthermore, many optical parameters such as transmittance, absorbance, reflectance, and optical band gap, Urbach energy, film thickness, electronic polarizability, lattice dielectric constant were calculated also in this study. The heat treatment of our films with depositing CdCl2 layer in (O2 + Ar) flow lowered the energy gap which led CdTe/CdS films to be a candidate to work in thin-film solar cells as an absorber layer.**

Title	**Impact of salicylic acid on the growth and physiological activities of parsley plants under lead toxicity**
Authors	**Alamer, K.H., Fayez, K.A.**
Journal	**Physiology and Molecular Biology of Plants 26(7), pp. 1361-1373**
Abstract	**Impact of spraying 50 µM salicylic acid (SA), lead nitrate soil treatments [1 and 2 mM Pb (NO3)2] and their combinations on parsley leaves (Petroselinum crispum L.) for 3 weeks was studied to evaluate leaf symptoms, photosynthetic pigments, anthocyanin, ultrastructure, malondialdehyde (MDA), soluble proteins, phenolic compounds, and guaiacol peroxidase activity (GPOX). Under Pb effect, parsley leaves showed chlorosis and decline in the content of photosynthetic pigments chlorophyll a (Chl a), chlorophyll b (Chl b) and carotenoid (Car) with increasing Pb treatments compared to the control. SA spraying helped to reduce chlorosis and increase photosynthetic pigments of Pb-treated plants compared to that of Pb treatment alone. Leaf anthocyanin content of SA-sprayed plants significantly increased compared to the control. On contrast, the anthocyanin content of Pb-treated plants with or without SA treatment decreased compared to the control. Parsley leaf chloroplasts were characterized by many and large starch grains. Deformations of chloroplast shape, increasing formation of plastoglobules and degeneration of chloroplast grana thylakoids were observed in Pb-treated plants. MDA and total phenolic compound contents increased in Pb-treated plants compared to the control. In contrast, soluble protein content decreased in Pb-treated plants. The decrease in leaf photosynthetic pigments and increase MDA contents was Pb-concentration dependent. The results as indicated by increasing lipid peroxidation confirmed Pb treatments generated reactive oxygen species (ROS) which caused oxidative stress. In contrast, SA application declined the extent of detrimental and harmful influence of Pb toxicity as indicated by the decrease MDA content, and increase in photosynthetic pigments, anthocyanin and phenolic compound contents of parsley leaves.**

Title	**Tailoring the physical properties of low dimensional MgO nanostructures using vapor transport deposition**
Authors	**Hadia, N.M.A., Alzaid, M., Mohamed, W.S**
Journal	**Materials Characterization 165,110392**
Abstract	**In this study, low-dimensional (LD) MgO nanostructured thin films with three different morphologies, namely, nanowires (NWs), nanotubes (NTs) and nanoparticles (NPs) were fabricated by a vapor transport method on quartz and silicon substrates under optimum growth conditions. It was found that the deposition parameters have great influences on the morphology, optical, photoluminescent, electrical, gas sensing and magnetic behavior of the resulting products. X-ray diffraction analysis illustrated that all three LD MgO nanostructures have five expected Bragg peaks of cubic MgO phase purity with well crystalline nature. The morphology and diameter of LD MgO nanostructures were probed by scanning electron and transmission electron-microscopes. The optical band gap values for LD MgO nanostructure films varies between 3.65 eV and 3.95 eV depending on growth conditions. It was found that all MgO films exhibit two distinguishing PL peaks related to the near band edge luminescence of LD MgO nanostructures and defect levels produced by oxygen vacancies, respectively. It was found that the dependence of electrical conductivity on film morphology can be attributed to the defect levels produced by O2- ion vacancies during the synthesis process. NH3 gas sensing efficiency of LD MgO nanostructures with various morphologies were carried out at different operating temperatures from 25 °C to 300 °C. The MgO film with NWs structure has the highest sensor response value of 27 at 100 °C and the film with NPs structure has the lowest response value of 12 at 150 °C. Ferromagnetic order has been recorded for all morphologies at room temperature with clear hysteresis loop and different magnetic parameters depending on growth conditions. Thus, our results present a direct route for the growth of high-quality and diverse LD MgO nanostructures developed via vapor transport for many technological applications**

Title	**Hepato-nephrotoxicity in late juvenile of Oreochromis niloticus exposed to gibberellic acid: Ameliorative effect of Spirulina platensis**
Authors	**Sayed, A.E.-D.H., AbdAllah, E.A., Hamed, M., Soliman, H.A.M.**
Journal	**Pesticide Biochemistry and Physiology 167,104600**
Abstract	**The current work intended to inspect the hepato-nephrotoxicity of gibberellic acid (GA3) in juvenile of Oreochromis niloticus as well as the possibility of restoration after dietary addition of different concentrations of Spirulina platensis (SP). Fishes were evenly assorted into five groups: Group I assigned as control, Group II fed on basal diet and exposed to 150 mg/L gibberellic acid (GA3). The 3rd, 4th, and 5th groups exposed to150 mg/L gibberellic acid (GA3) and previously fed for two months on SP supplemented diets at levels of 5, 20, and 100 g/kg, respectively. Fish serum were utilized to check glucose, total protein, hepatic and renal functions, enzymatic and non-enzymatic antioxidants activities (superoxide dismautase; SOD, catalase; CAT, and total antioxidant capacity; TAC) as well as histopathological alterations in liver and kidney. The results showed that creatinine, uric acid, liver enzymes, glucose, total protein, SOD, and CAT were significantly elevated in GA3-treated group. Liver of GA3-treated fish manifested some histopathological changes (hypertrophy, cytoplasmic vacuolization, and apoptotic cells with pyknotic nuclei, necrosis, dilated blood sinusoids, and lymphocytic aggregation around the central veins). Kidney of GA3-exposed fish revealed edema of the epithelium lining of some renal tubules and some showed vacuolar degeneration and dissociation. Hypertrophy in the glomerulus was observed with dilated blood capillaries. SP supplementation restored these biochemical, antioxidants, and histological changes near to control levels. This improvement was higher with 100 g/kg SP showing concentration dependency. According to this study we can conclude that SP supplementation can improve the hepato- and nephrotoxicity caused by GA3 exposure indicating its role as potent antioxidant food additive.**

Title	**A fractional model for estimating the hole geometry in the laser drilling process of thin metal sheets**
Authors	**Zahra, W.K., Abdel-Aty, M., Abidou, D.**
Journal	**Chaos, Solitons and Fractals 136,109843**
Abstract	**Fractional calculus has been increasingly attracting interest in various fields of science and engineering where the problems are governed by differential and integral equations. This shift towards adopting such an approach approves its validity since it has shown that different engineering problems could be better represented by fractional than integer order calculus. Therefore, in this work, fractional calculus is employed in order to simulate a previously addressed problem of metal laser drilling process using meshless local Petrov–Galerkin (MLPG). Both approximations of shifted and weighted shifted Grünwald–Letnikov are used and compared with each other in terms of the expected hole geometry and its closeness to the experimental data. Moreover, the fractional order derivative is considered to be both constant and variable in order to show its impact on the expected outcome of the hole profile. Specifically speaking, for this problem of fixed laser absorptivity, it is shown that the fractional derivative order needs to be variable in order to make the numerical results best match the experimental data in both stages of transient and steady-state.**

itle	**Generalized Thermoelastic Interactions in a Poroelastic Material Without Energy Dissipations**
Authors	**Alzahrani, F., Abbas, I.A.**
Journal	**International Journal of Thermophysics 41(7),95**
Abstract	**The purpose of this investigation is providing a method to study the effect of porosity in a porothermoelastic medium by the finite element technique. The formulations are applied under Green-Naghdi model without energy dissipations. One-dimensional application for a poroelastic half-space is considered. Due to the complex basic equations, the finite element method (FEM) has been adopted to solve this problem. The numerical outcomes for displacements, temperatures and the stress components are represented graphically for the solid and the fluid.**

Title	**Investigative petrophysical fingerprint technique using conventional and synthetic logs in siliciclastic reservoirs: A case study, Gulf of Suez basin, Egypt**
Authors	**Radwan, A.E., Abudeif, A.M., Attia, M.M.**
Journal	**Journal of African Earth Sciences 167,103868**
Abstract	**Typically pressure gradients and density-neutron crossover are used to differentiate between reservoir water, oil and gas. This study investigates fluid type in the Badri Field, Sidri sandstone reservoir of four offshore wells, A, B, C and D. These wells lack pressure or well test data and density-neutron fluid interpretation remain equivocal. In addition, these wells have not been tested before. Hence, a new technique adopted from the geochemical fingerprint technique termed petrophysical fingerprint has been used to distinguish equivocal petrophysical characteristics. In this study, the petrophysical fingerprint was used to distinguish fluids, a combination of synthetic and raw logs was plotted on crossplots charts and correlated to previous oil and gas well tests. This study revealed that, 1) the Petrophysical Fingerprint technique was found to clarify otherwise ambivalent log responses, lending confidence to the Badri Field interpretation, 2) the petrophysical fingerprint strategy showed notable results, resulted in gas signature fingerprint in the well B, while showing an oil signature fingerprint in wells C and D. 3) In comparison to the traditional plotting method, the petrophysical fingerprint technique has the advantages that the correlation between the obtained petrophysical fingerprints of the individual petrophysical characters and the unknown investigated petrophysical character will increase the precision of the petrophysical investigation process, which in turn will guarantee a reliable judgment on the investigated petrophysical properties, 4) the authors refer to some caution, where more or less homogeneous reservoir characteristics are preferred to correlate petrophysical fingerprints signatures, else at least the reservoir to be not highly heterogeneous, where homogeneous reservoirs are not common in reality.**

Title	**Nonclassical and Nonlocal Properties of a Superconducting Qubit in the Presence of a Kerr-Like Medium Under Decoherence Effect**
Authors	**Aldaghfag, S.A., Elqahtani, Z.M., Berrada, K., Abdel-Khalek, S.**
Journal	**Journal of Superconductivity and Novel Magnetism 33(7), pp. 1971-1978**
Abstract	**Superconducting qubits are leading candidates in the race to construct quantum computers capable of realizing computations beyond the reach of modern supercomputers. Here, we investigate the time evolution of the entanglement, photon statistics, and Wehrl entropy for a system of one superconducting qubit interacting with a single-mode field in the presence of a nonlinear Kerr-like medium under decoherence effect. By taking into account the influence of the Kerr-like medium and detuning, we discuss the dependence of the physical quantifiers on the phase damping effect by considering the exact solution of the master equation. We show that the control effect of the decoherence on the quantifiers may occur by adjusting the main model parameters. Finally, we explore the relationships among quantum quantifiers with respect to the physical parameters during the time evolution.**

Title	**Impact of rare earth europium (RE-Eu^{3+}) ions substitution on microstructural, optical and magnetic properties of $CoFe_{2-x}Eu_xO_4$ nanosystems**
Authors	**Mohamed, W.S., Abu-Dief, A.M.**
Journal	**Ceramics International 46(10), pp. 16196-16209**
Abstract	**In this study, pure cobalt ferrite (CoFe2O4) nanoparticles and europium doped CoFe2O4 (CoFe2−xEuxO4; x = 0.1, 0.2, 0.3) nanoparticles were synthesized by the precipitation and hydrothermal approach. The impact of replacing trivalent iron (Fe3+) ions by trivalent rare earth europium (RE-Eu3+) ions on the microstructure, optical and magnetic properties of the produced CoFe2O4 nanoparticles was studied. X-ray diffraction (XRD) and Fourier transform infrared (FTIR) spectra exposed the consistency of a single cubic phase with the evidence of Eu2O3 phases for x ≥ 0.2. FTIR transmittance spectra showed that, the all investigated samples have three characteristic metal-oxygen bond vibrations corresponding to octahedral B-site (υ1 and υ2) and tetrahedral A-site (υ3) around 415 cm−1, 470 cm−1 and 600 cm−1 respectively. XRD and energy dispersive X-ray spectroscopy studies affirmed the integration of RE-Eu3+ ions within CoFe2O4 host lattice and decrease of average crystals size from 13.7 nm to 4.7 nm. Transmission electron microscopy (TEM) analysis showed the crucial role played by RE-Eu3+ added to CoFe2O4 in reducing the particle size below 5 nm in agreement with XRD analysis. High resolution-TEM (HR-TEM) analysis showed that the as-synthesized spinel ferrite, i.e., CoFe2−xEuxO4, nanoparticles are single-crystalline with no visible defects. In addition, the HR-TEM results showed that pure and doped CoFe2O4 have well-resolved lattice fringes and their interplanar spacings matches that obtained by XRD analysis. Magnetic properties investigated by the vibrating sample magnetometer technique illustrated transformation of magnetic state from ferromagnetic to superparamagnetic at 300 K resulting in introducing RE-Eu3+ in CoFe2O4 lattice. At low temperature (~5 K) the magnetic order was ferromagnetic for both pure and doped CoFe2O4 samples. Substitution of Fe3+ ions in CoFe2O4 nanoparticles with RE-Eu3+ ions optimizes the sample nanocrystals size, cation distribution and magnetic properties for many applications.**

Title	**Synthesis and characterization of CeO_2/rGO nanoflakes as electrode material for capacitive deionization technology**
Authors	**Yousef, A., Al-Enizi, A.M., Mohamed, I.M.A., (...), Ubaidullah, M., Brooks, R.M.**
Journal	**Ceramics International 46(10), pp. 15034-15043**
Abstract	**The development of capacitive deionization (CDI) electrode materials to improve electrochemical properties and specific capacitance (Cs) has attracted considerable attention. Due to their excellent physical, chemical, electrical, and electrochemical properties, cerium oxide nanoparticles (CeO2 NPs) have been intercalated between graphene nanoflakes (GNFs) to improve the electrosorption capacity of GNFs in CDI cells. In this study, the nanocomposite was prepared via simple sonication and hydrothermal treatment processes. The electrochemical activity of the nanocomposite was examined by cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) in an NaCl aqueous solution. Moreover, the desalination activity was performed based on a batch mode CDI technique. The studied nanocomposite demonstrated a distinct improvement in the Cs and electrosorption capacity compared to those of the pristine GNFs. The studied electrode material (5% CeO2@GNF) showed higher cycling stability, higher specific capacitance (452.26 F/g), higher salt removal efficiency (65%), and better electrosorption capacity (7.2 mg g−1) than GNFs and 10% CeO2@GNFs in 100 µS cm−2 NaCl solution at 1.4 V. Overall, this study introduces a novel, efficient, and low-cost nanocomposite (CeO2@GNF) for the technological advancement of CDI.**

Title	**High-order Gegenbauer integral spectral element method integrated with an adaptive Chebyshev optimization strategy for solving linear singularly perturbed differential equations**
Authors	**Elgindy, K.T., Refat, H.M.**
Journal	**Journal of Computational and Applied Mathematics 372,112722**
Abstract	**We propose a high-order adaptive spectral element method based on Gegenbauer polynomial basis for solving singularly perturbed differential equations with Dirichlet boundary conditions and a boundary layer at one end. The method reduces the singularly perturbed boundary value problem into a single system of linear algebraic equations when the solution is smooth on the solution domain, or two systems of linear algebraic equations when the solution has a thin boundary layer. The core of the new adaptive strategy lies in constructing a mathematical model of the last few Gegenbauer coefficients in the Gegenbauer truncated series approximating the second-order derivative of the solution, which can be readily converted into a minimization problem in a least-squares sense and solved using fast optimization techniques. An error and convergence analysis of the method for sufficiently smooth solutions is presented. A numerical test example with various parameter settings is presented to verify the accuracy, effectiveness, and applicability of the proposed method. Numerical comparisons with other rival methods in the literature are included to demonstrate further the power of the proposed method.**

Title	**Sensitivity of tensor and vector analyzing powers in elastic e-d scattering to modern local and nonlocal NN potentials**
Authors	**Darwish, E.M., Abou-Elsebaa, H.M., Mahrous, E.M., Al-Thoyaib, S.S.**
Journal	**Indian Journal of Physics** **94(7), pp. 1025-1040**
Abstract	**In this study, the sensitivity of tensor-deuteron and beam-vector-deuteron analyzing powers in elastic e-d scattering to modern local and nonlocal NN potentials is investigated. We report numerical results for the tensor-deuteron (T20, T21, T22) and beam-vector-deuteron (T10, T11) analyzing powers as functions of the four-momentum transfer square Q2 and the electron scattering angle in the laboratory frame θe. This could be made possible with the advent of recent polarization measurements with polarized electron beams and polarized deuteron targets at MIT-Bates, JLab, NIKHEF, VEPP-2, and VEPP-3. We found that the estimated results for T20, T21, and T22 are slightly dependent on the local and nonlocal NN potential models adopted for the deuteron wave functions up to Q2≃ 0.5 (GeV/c)2. At Q2> 0.5 (GeV/c)2, the theoretical discrepancies among various local and nonlocal NN potential models were found. As for the beam-vector-deuteron analyzing powers T10 and T11, we also found that they started to become model dependent when Q2> 0.5 (GeV/c)2. The considerable dependence of T10 and T11 on the local and nonlocal NN potential models was observed at extremely forward electron angles. The T10 analyzing power was found to be smaller than T11. Therefore, in addition to the single analyzing power T20, the double beam-vector-deuteron analyzing power T11 can be used as another tool for extracting the three deuteron form factors, which provide an intuitive picture of the internal structure of the deuteron. The predicted results for analyzing powers are also compared with the available experimental data and a satisfactory agreement was obtained.**

Title	**A genetic algorithm to solve capacity assignment problem in a flow network**
Authors	**Hamed, A.Y., Alkinani, M.H., Hassan, M.R.**
Journal	**Computers, Materials and Continua 64(3), pp. 1579-1586**
Abstract	**Computer networks and power transmission networks are treated as capacitated flow networks. A capacitated flow network may partially fail due to maintenance. Therefore, the capacity of each edge should be optimally assigned to face critical situations-i.e., to keep the network functioning normally in the case of failure at one or more edges. The robust design problem (RDP) in a capacitated flow network is to search for the minimum capacity assignment of each edge such that the network still survived even under the edge's failure. The RDP is known as NP-hard. Thus, capacity assignment problem subject to system reliability and total capacity constraints is studied in this paper. The problem is formulated mathematically, and a genetic algorithm is proposed to determine the optimal solution. The optimal solution found by the proposed algorithm is characterized by maximum reliability and minimum total capacity. Some numerical examples are presented to illustrate the efficiency of the proposed approach.**

Title	**Thermomechanical response in a two-dimension porous medium subjected to thermal loading**
Authors	**Saeed, T., Abbas, I.**
Journal	**International Journal of Numerical Methods for Heat and Fluid Flow 22(7), pp. 4103-4117**
Abstract	**The purposes of this study, a mathematical model of generalized thermoelastic theory subjected to thermal loading is presented to study the wave propagation in a two-dimensional porous medium. Design/methodology/approach: By using Fourier–Laplace transforms with the eigenvalue approach, the physical quantities are analytically obtained. Findings: The derived method is evaluated with numerical results, which are applied to the porous medium in simplified geometry. Originality/value: Numerical outcomes for all the physical quantities considered are implemented and represented graphically. The variations of temperature, the changes in volume fraction field, the displacement components and the stress components have been depicted graphically.**

Title	**Thermal response of cylindrical tissue induced by laser irradiation with experimental study**
Authors	**Hobiny, A., Abbas, I.**
Journal	**International Journal of Numerical Methods for Heat and Fluid Flow 22(7), pp. 4013-4023**
Abstract	**The purpose of this paper is to provide a method for determining the numerical solutions of the thermal damage of cylindrical living tissues using hyperbolic bioheat model. Due to the complex governing equation, the finite element approach has been adopted to solve these problems. To approve the accuracy of the numerical solution, the numerical outcomes obtained by the finite element approach are compared with the existing experimental study. In addition, the comparisons between the numerical outcomes and the existing experimental data displays that the present mathematical models are efficient tools to evaluate the bioheat transfer in the cylindrical living tissue. Numerical computations for temperatures and thermal damage are presented graphically. Design/methodology/approach: In this section, the complex equation of bioheat transfer based upon one relaxation time in cylindrical living tissue is summarized by using the finite element method. This method has been used here to get the solution of equation (8) with initial conditions (9) and boundary conditions (10). The finite element technique is a strong method originally advanced for numerical solutions of complex problems in many fields, and it is the approach of choice for complex systems. Another advantage of this method is that it makes it possible to visualize and quantify the physical effects independently of the experimental limits. Abbas and his colleagues [26-34] have solved several problems under generalized thermoelastic theories. Findings: In this study, the different values of blood perfusion and thermal relaxation time of the dermal part of cylindrical living tissue are used. To verify the accuracy of the numerical solutions, the numerical outcomes obtained by the finite element procedure and the existing experimental study have been compared. This comparison displays that the present mathematical model is an effective tool to evaluate the bioheat transfer in the living tissue. Originality/value: The validation of the obtained results by using experimental data the numerical solution of hyperbolic bioheat equation is presented. Due to the nonlinearity of the basic equation, the finite element approach is adopted. The effects of thermal relaxation times on the thermal damage and temperature are studied.**

Title	**Identification of a Novel DNA Gyrase Inhibitor via Design and Synthesis of New Antibacterial Pyrido[1′,2′:1,2]pyrimido[4,5-e][1,3,4]thiadiazin-5-ol Derivatives**
Authors	**Khalil, H.H., Khattab, S.N., Toughan, M.M., El-Saghier, A.M.M., El-Wakil, M.H.**
Journal	**ChemistrySelect** **5(22), pp. 6556-6564**
Abstract	**Two new series of pyrido[1′,2′:1,2]pyrimido[4,5-e][1,3,4]thiadiazin-5-ol Schiff's bases (4 a-j) and 1,3,5-triazinylaminobenzamides (6 a-e) as effective antibacterial agents targeting E.coli DNA gyrase were designed and synthesized. Compound 6 e was found to be the most promising antibacterial agent among the screened compounds. Further evaluation of the inhibitory activity of 6 e against E.coli DNA gyrase in the supercoiling assay revealed its potential inhibitory activity (IC50=4.86 µM) more than reference drug ciprofloxacin (IC50=4.98 µM). Comparison of molecular electrostatic potential maps between 6 e and ciprofloxacin revealed similar regions of positive and negative potentials. While docking studies illustrated the predicted binding mode of 6 e inside the active site of E.coli DNA gyrase which involved key binding interactions with the essential amino acid residues. Additional in silico computation of physicochemical parameters, ADMET and ligand efficiency indices pointed out to the potential drug-like properties of 6 e as a lead compound for future optimization and development.**

Title	**Monte Carlo study of the effect of charge ordering on the electrical and magnetic properties of half-doped manganites**
Authors	**Ahmed, M.R.**
Journal	**Journal of Magnetism and Magnetic Materials 504,166628**
Abstract	**The Monte Carlo Antiferromagnetic Ising model was used to study the electrical properties and magnetoresistance of manganese oxides due to the charge ordering phase occurring at half doping, x = 0.5. The half-doped manganites have an insulator antiferromagnetic ground state. The internal energy, specific heat, resistivity, the magneto-resistance and magnetization have been investigated with different applied magnetic fields. Our simulation reveals that the resistivity decreases exponentially as the free charge increase to transport from the insulator to conductor phase. The magnetoresistance has positive high values with magnetic field. The obtained insulator–metal transition behavior candidates the half-doped manganites to be very good semiconductors diode junctions.**

Title	**An inter-disciplinary modelling approach in industrial 5G/6G and machine learning era** ***Open Access***
Authors	**Mohamed, A., Ruan, H., Abdelwahab, M.H.H., (...), Gao, Y., Tafazolli, R.**
Journal	**2020 IEEE International Conference on Communications Workshops, ICC Workshops 2020 - Proceedings** **9145434**
Abstract	**Unlike conventional cellular systems, the fifth generation (5G) and beyond includes intrinsic support for vertical industries with diverse service requirements. Industrial process automation with autonomous fault detection and prediction, optimised operations and proactive control can be considered as one of the key verticals of 5G and beyond. Such applications enable equipping industrial plants with a reasoning sixth sense for optimised operations and fault avoidance. In this direction, we introduce an inter-disciplinary approach integrating wireless sensor networks with machine learning-enabled industrial plants to build a step towards developing this sixth sense technology, i.e., the reasoning ability. We develop a modular-based system that can be adapted to the vertical-specific elements. Without loss of generalisation, exemplary use cases are developed and presented including a fault detection/prediction scheme in a wireless communication network with sensors and actuators to enable the sixth sense technology with guaranteed service load requirements. The proposed schemes and modelling approach are implemented in a real chemical plant for testing purposes, and a high fault detection and prediction accuracy is achieved coupled with optimised sensor density analysis.**

Title	**Optical properties of nanocrystalline/amorphous TiO_2 thin film deposited by rf plasma magnetron sputtering**
Authors	**Abd El-Moula, A.A., Raaif, M., El-Hossary, F.M.**
Journal	**Acta Physica Polonica A** **137(6), pp. 1068-1074**
Abstract	**This work is a part of serious experimental efforts established on constructing multilayers based on TiO2 for industrial use in optical devices. Recognizing the structure and optical features of TiO2 single layer is very significant in designing optical devices and in constructing multilayers based on TiO2 layer for probable industrial requests. In this regard, rf plasma magnetron sputtering was employed to prepare TiO2 thin film on glass substrates. The effect of oxygen ratios % with respect to argon on the optical characteristics of TiO2 thin film was studied. Structural studies revealed the transition from crystallization to amorphous nature of TiO2 films with increasing the oxygen ratios. All TiO2 thin films were transparent in the visible zone and the transmittance of TiO2 films increased with increasing the O2 ratios. The estimated energy gap of TiO2 thin films increased from 3.62 eV to 3.77 eV with increasing the oxygen ratios. However, the refractive index decreased with increasing the oxygen ratios. Moreover, diverged optical constants like optical conductivity (σopt), dielectric constants (εi and εr), the Urbach energy (Eu), the dispersion energy (Ed) and single oscillator energy (Eo) have been explored and discussed.**

Title	**Measurement of the tensor analyzing power T_{20} for the reaction $\gamma d \rightarrow d\pi$**
Authors	**Gauzshtein, V.V., Darwish, E.M., Kuzin, M.Y., (...), Sinyatkin, S.V., Starostina, E.V.**
Journal	**European Physical Journal A 56(6),169**
Abstract	**We present the first accurate results of measurements of the tensor analyzing power component T20 for the coherent neutral pion photoproduction on the deuteron. The measurements were performed at the Budker Institute of Nuclear Physics at VEPP-3 storage ring using the internal tensor polarized deuterium target. The measurements cover the region of photon energy from 200 to 450 MeV and the region of the center-of-mass pion polar angle from 100 to 140 degrees. The results obtained are compared with predictions of several theoretical models.**

Title	**Impact of interleukin IL-6 rs-1474347 and IL-10 rs-1800896 genetic polymorphisms on the susceptibility of HCV-infected Egyptian patients to hepatocellular carcinoma**
Authors	**Abd El-Baky, R.M., Hetta, H.F., Koneru, G., (...), Fawzy, M.A., Fathy, M.**
Journal	**Immunologic Research** **68(3), pp. 118-125**
Abstract	**Hepatitis C virus (HCV) is considered leading cause of cirrhosis and hepatocellular carcinoma (HCC). We aimed to examine the association of IL-6 and IL-10 single-nucleotide polymorphisms with the progression of chronic HCV (CHC) infection to cirrhosis and HCC. For comparative purposes, four groups were enrolled; chronic HCV group (CHC, n = 22), HCV-related liver cirrhosis group (HCV-LC, n = 22), HCV-related HCC group (HCV-HCC, n = 54), and an apparently healthy control group (controls, n = 48). HCC diagnosis and staging were in concordance to Barcelona Clinic Liver Cancer (BCLC) staging system. IL-6 rs-1474347 and IL-10 rs-1800896 genotyping was performed by allelic (VIC- and FAM-labeled) discrimination method using assay-on-demand TaqMan real-time PCR assays. For IL-6 rs1474347, the AA genotype was more frequent in CHC, HCV-LC, and HCV-HCC compared to controls. Also, the IL-6 rs1474347 AC genotype was favorable for the progression of HCV chronic infection to cirrhosis and HCC. On the other hand, the IL-10 rs1800896 TT genotype was found to be prominent in the HCC group. Additionally, the IL-10 rs180096 TT genotype was favorable for the progression of chronic HCV infection to cirrhosis and HCC. Furthermore, higher levels of AFP were observed in HCC patients with IL-6 rs1474347 AA genotype and HCC patients with IL-10 rs1800896 CC and TT genotypes. Screening for IL-6 rs 1474347 AC genotype and IL-10 rs180096 TT genotype as well as the determination of AFP level showed to be good markers for examining the susceptibility of HCV Egyptian patients to develop cirrhosis and HCC.**

Title	**Quantum correlations and quantum Fisher information of two qubits in the presence of the time-dependent coupling effect** ***Open Access***
Authors	**Raffah, B., Abdel-Khalek, S., Berrada, K., (...), Almalky, N., Wahiddin, M.R.B.**
Journal	**European Physical Journal Plus** **135(6),467**
Abstract	**In this paper, we consider two separate Jaynes–Cummings (JC) nodes with a nonidentical qubit-field system in the presence of dissipation terms. We reveal the influence of the time variation of the coupling terms on some important measures when the qubits are immersed in a vacuum. The density matrix for the two qubits initially in Bell states are obtained. The dynamical behavior of the quantum discord (QD), classical correlation (CC), qubit-qubit entanglement, and quantum Fisher information (QFI) is investigated. We explore the relationship among QD, CC, qubit-qubit entanglement, and QFI in the absence and presence of the dissipation effect during the time evolution. Furthermore, we show the main optimal conditions for obtaining a high level of correlation and coherence between the two qubits.**

Title	**Properties of SnO_2 and $SnO_{2-x}N_x$ grown on the boat walls using vapor transport method**
Authors	**Abd El-Rahman, A.M., Mohamed, S.H.**
Journal	**Applied Physics A: Materials Science and Processing 126(6),457**
Abstract	**The aim of the study was to examine the properties of SnO2 and SnO2−xNx nanowires (NWs) grown on the walls of the boat of the vapor transport system. Nanowires of SnO2 and SnO2−xNx were synthesized using Ar plus O2 and N2 plus O2 gas mixtures, respectively. The obtained chemical compositions were SnO2 and SnO1.71N0.18. In both cases, tetragonal single-phase SnO2 with nanowires morphologies were obtained by X-ray diffraction and scanning electron microscopy examinations, respectively. The NWs diameters were ranged from 150 nm to 1.6 µm, and the lengths extended to more than 400 µm for the sample grown with Ar plus O2, whereas the diameters of the NWs ranged from 30 nm to 2.1 µm and the lengths exceeded to 1 mm for the sample grown with N2 plus O2. The calculated optical band gap values were 3.54 and 3.27 eV for samples grown with Ar plus O2 and N2 plus O2, respectively. Higher photoluminescence spectrum intensity was observed for SnO2−xNx NWs. The room-temperature resistivity of SnO2−xNx was one order lower than that for SnO2 NWs and decreased upon increasing temperature, indicating a semiconducting behavior. Two activation energies were recorded for each sample.**

Title	**Quaternion nonlinear Lü model and its novel quaternion complete synchronization**
Authors	**Alyami, M.A., Mahmoud, E.E.**
Journal	**Alexandria Engineering Journal** **59(3), pp. 1391-1403**
Abstract	**In this work we propose the chaotic nonlinear Lü structure in quaternion form. Our new structure is high dimensional (9D). Highlights and qualities of this model are studied. Also, we present a novel king of quaternion synchronization. We call this new sort of synchronization "quaternion complete synchronization" (QCS). The idea of QCS did not consider in writing and has some unusual properties. Some organizations are conducted using the Lyapunov function to study QCS of two identical Lü attractors with quaternion variables. Numerical studies have shown the validity and accuracy of the analytical results of the control functions. Numerical studies also showed properties that distinguish QCS from the rest of the synchronization types that were previously studied.**

Title	**Balance between the explored Pt counter electrode in an electrolyte medium and the photoanode for highly efficient liquid-junction photovoltaic devices**
Authors	**Dang, H.-L.T., Dao, V.-D., Vu, N.H., (...), Vu, D.A., Tuan, P.A.**
Journal	**Journal of Science: Advanced Materials and Devices 5(2), pp. 180-184**
Abstract	**This work investigates the effect of the ratio of the explored Pt area in the electrolyte medium and the photoanode area (REP) on the performance of dye-sensitized solar cells (DSCs). It is found that the power conversion efficiency of DSCs increases by the ascending REP. The highest power conversion efficiency, which was obtained for the cell with the REP of 64/49, was 8.40%. Furthermore, a relationship between the efficiency and fabrication cost is analyzed in terms of reducing or enhancing the surface area of CE compared to the photoanode's surface area. These findings may provide a way for the development of efficient and large-scale DSCs.**

Title	**Synthesis and antidiabetic activity of novel triazole derivatives containing amino acids**
Authors	**Mohamed, M.A.A., Abd Allah, O.A., Bekhit, A.A., Kadry, A.M., El-Saghier, A.M.M.**
Journal	**Journal of Heterocyclic Chemistry 57(6), pp. 2365-2378**
Abstract	**New series of triazole derivatives coupled with amino acids 1a-h were obtained via multicomponent reaction of 2-hydroxy benzaldehyde or 2-hydroxy acetophenone with thiosemicarbazide and different amino acids. The obtained compounds were reacted with p-toluinesulfonyl chloride 2 to give the corresponding sulfonamides 3a-h. Compound 1b was allowed to react with different aromatic aldehydes or cyclic ketone under alkaline conditions to afford the expected imino compounds 4a-d and 6a-c, respectively. These compounds were allowed to react with ethyl glycolate to yield the expected thiazolidinone derivatives 5a-d or 7a-c, respectively. Structures of the newly synthesized compounds were found to be in accordance with their elemental analyses and spectral data. The obtained compounds exhibited very prominent in vitro and in vivo antihyperglycemic effect at a dose of 40 mg/kg body weight compared to the standard drug gliclazide and control. The antidiabetic effect was investigated using oral glucose tolerance test in normal and non-insulin-dependent diabetes mellitus (NIDDM) in STZ-rat model. Compounds 3a-h, 5b, 5c, 5d, 7a, 7b, and 7c showed significant activity in lowering blood glucose (more than 80%) compared to the NIDDM control.**

Title	**Signal flow graph and control of realizable autonomous nonlinear Chen model with quaternion variables**
Authors	**Mahmoud, E.E., Higazy, M., Al-Harthi, T.M.**
Journal	**Alexandria Engineering Journal** **59(3), pp. 1287-1305**
Abstract	**In this work, we continue our study of autonomous nonlinear dynamical systems with quaternion variables. We present a novel chaotic Chen system with quaternion variables. This system in real form is high (nine) dimensional. We study the dynamics and basic properties of this model with quaternion variables. We also evaluate the stability of the trivial points and restrict the conditions under which the nonlinear novel quaternion Chen system has negative, zero, or positive Lyapunov exponents. A signal flow graph and an electronic circuit implementation are designed, analyzed, and constructed to realize the novel Chen system. The control problem of chaotic nonlinear systems with quaternion variables is investigated. We propose and design an approach to build a controller for these systems. The viability and usefulness of the suggested approach are illustrated by an application to the chaotic Chen model with quaternion variables. Using the proposed method, the attractors of the quaternion Chen model are transformed to trivial fixed point, quasi-periodic, or periodic (limit cycle) states. The mathematical results for the controller according to this method are confirmed numerically.**

Title	**Catalytic evaluation of copper (II) N-salicylidene-amino acid Schiff base in the various catalytic processes**
Authors	**Al-Hussein, M.F.I., Adam, M.S.S.**
Journal	**Applied Organometallic Chemistry 34(6),e5598**
Abstract	**N-Salicylidene amino acid Schiff base sodium sulfonate salt, as a tridentate dibasic chelating ligand, was obtained from the common condensation of salicylaldehyde-5-sodium sulfonate with tyrosine (HPST). The internal formed ligand coordinated to Cu2+ ion in an aqueous media affording new Cu (II)-complex (Cu-PST), which characterized by various physico-chemicals spectral tools. The mononuclear complex was evaluated as a homogeneous and heterogeneous catalyst in the (ep)oxidation protocols of 1,2-cyclooctene and benzyl alcohol. Heterogeneously, Cu-PST was immobilized on Fe3O4-SiO2, as nanoparticles. The heterogeneous catalyst was characterized by infrared, X-ray diffraction, scanning electron microscopy, transmission electron microscopy, energy-dispersive spectroscopy, Brunauer−Emmett−Teller and magnetism. Homogeneously, the temperature, solvent and oxidant influences were examined in the catalytic reactions to realize the best reaction conditions. Cu-catalyst exhibited better catalytic performance in the (ep)oxidation processes homogeneously than that in the heterogeneous phase at 80°C for 2 hr in acetonitrile. Reusability of the homogeneous catalyst was for a maximum of three times in the (ep)oxidation reaction, whereas the heterogeneous catalyst was active for six times. A mechanistic pathway was proposed for both catalysts, comparatively.**

Title	**Complex modified projective phase synchronization of nonlinear chaotic frameworks with complex variables**
Authors	**Shammakh, W., Mahmoud, E.E., Kashkari, B.S.**
Journal	**Alexandria Engineering Journal** **59(3), pp. 1265-1273**
Abstract	**In this work we display and examine the definition of complex modified (or altered) projective phase synchronization (CMPPS) of chaotic complex nonlinear frameworks which have not been presented as of late within the writing. This type of complex synchronization can be seen as a generalization in the literature of many types of synchronizations and complex synchronizations. A scheme is outlined to attain CMPPS of chaotic complex nonlinear frameworks based on the stability theory. In CMPPS, we show how nonlinear chaotic systems with complex variables can also be synchronized to a complex constant scaling matrix in a master-slave setup. The obvious change of the complex scaling matrix in CMPPS can furthermore improve the security of communications. The viability and feasibility of the CMPPS are highlighted in the recreation case.**

Title	**Sinkholes induced by uncontrolled groundwater withdrawal for agriculture in arid Saudi Arabia. Integration of remote-sensing and geophysical (ERT) techniques**
Authors	**Youssef, A.M., Zabramwi, Y.A., Gutiérrez, F., (...), Otaibi, Z.A., Zahrani, A.J.**
Journal	**Journal of Arid Environments 177,104132**
Abstract	**Recently, an increasing number of sinkholes related to cavernous karst bedrock has been documented in the Kingdom of Saudi Arabia (KSA). One of the most hazardous areas is Al Jouf region, with an average annual rainfall below 35 mm. Here, crop fields irrigated with groundwater have experienced a very rapid expansion. Limited hydrogeological data indicate that the over-exploitation of the aquifers with very low recharge have caused a decline of around 50 m in the groundwater level. Landsat images acquired in 2002, 2015, and 2018 were utilized to automatically map and assess the expansion of agricultural activities in the area, as a proxy for groundwater withdrawal. The data indicate a rising expansion rate, from 57 km2/yr in the period 2002–2015, to 123 km2/yr during the 2015–2018 interval. The recent sinkhole spate is attributed to the growth of irrigated crops and the associated groundwater level decline, as supports the temporal and spatial correlation. It is proposed that the water level drawdown entails an increase in the effective weight of the roof of relict cavities formed in the past. This interpretation is substantiated at a specific sinkhole investigated by ERT. The geophysical investigation provides information of the position of the underlying cavity and indicates that its roof has been affected by buoyancy loss related to the anthropogenic water level decline.**

Title	**Quantum scheme for N-level atom interacting with a two two-level atom: Atomic Fisher information and entropy squeezing**
Authors	**Hilal, E.M.A., Alkhateeb, S., Abdel-Khalek, S., Khalil, E.M., Almowalled, A.A**
Journal	**Alexandria Engineering Journal 59(3), pp. 1259-1264**
Abstract	**In this work, we introduce a model of a two-atom interacting with a multi-level atom governed by su(2) Lie algebra in the presence of external classical field. The influence of the classical field on the system is discussed in detail for certain values for the classical terms. The atomic density matrix of the proposed system is obtained. The dynamical behavior of the atomic Fisher information as an indicator of the nonlocal correlation between a two-atom and su(2) field is discussed. Moreover, we examine the effect of classical field on the evolution of entropy squeezing and the geometric phase induced between the initial and final state of the proposed system. The results outlined some important phenomena as sudden death and sudden birth of entanglement in presence of the classical terms is observed through the dynamics of atomic Fisher information in the presence of classical field for the large number of levels.**

Title	**New optical solitary wave solutions of Fokas-Lenells equation in optical fiber via Sine-Gordon expansion method**
Authors	**Ali, K.K., Osman, M.S., Abdel-Aty, M.**
Journal	**Alexandria Engineering Journal** **59(3), pp. 1191-1196**
Abstract	**This article presents soliton solutions to a generalized nonlinear Fokas-Lenells equation via the Sine-Gordon expansion method. To uncover the clear picture of the gained solutions, the two and three-dimensional figures for the solutions are given. It is shown that the proposed methodology provides powerful mathematical tools for obtaining the exact traveling wave solutions of different nonlinear evolution equations.**

Title	**Secure communications via complex phase synchronization of pair complex chaotic structures with a similar structure of linear terms with modifying in nonlinear terms**
Authors	**Eshmawi, A.A., Mahmoud, E.E.**
Journal	**Alexandria Engineering Journal** **59(3), pp. 1107-1116**
Abstract	**In this paper, we discuss the idea of complex phase synchronization in complex nonlinear structures with chaotic conduct. The CPHS combines two types of common synchronizations, which are phase synchronization and anti phase synchronization. A general scheme has been proposed to study the CPHS. Through this scheme, complex control functions are assigned to obtain effective CPHS. For example, we study the CPHS in regards pair chaotic complex Lü structures including incompletely evolving for nonlinear terms. Numerical figures are drawn to prove our plan's validity. The consequences of the CPHS are exploited in secure communications. The error function resulting from the definition of the CPHS was used as a key to retrieve the encrypted message.**

Title	**Origin and Petrogenetic Implications of Spessartine Garnet in Highly-Fractionated Granite from the Central Eastern Desert of Egypt**
Authors	**Sami, M., Ntaflos, T., Mohamed, H.A., (...), Abdelfadil, K.M., Fathy, D.**
Journal	**Acta Geologica Sinica** **94(3), pp. 763-776**
Abstract	**A highly-fractionated garnet-bearing muscovite granite represents the marginal granitic facies of the Abu-Diab multiphase pluton in the Central Eastern Desert of Egypt. New electron microprobe analyses (EMPA) and laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) data from garnets are reported, in order to constrain their origin and genesis. Garnet in the Abu-Diab host granite is euhedral to subhedral, generally homogeneous and, in rare cases, it shows weak zonation. The garnet contains appreciable amounts of MnO and FeO, with lesser amounts of MgO and CaO, yielding an end-member formula of Sps61–72Alm25–35Prp1–4Adr0–1. Moreover, it is depleted in large ion lithophile elements (LILE) with lower values of Ba, Nb and Sr relative to the primitive mantle. Additionally, it contains high concentrations of HREE and Y and their REE pattern shows strong negative Eu anomalies. The garnet was crystallized under relatively low temperature (646°C–591°C) and pressure (< 3 kbar) conditions. The textural and chemical features indicate that the garnet is magmatic in origin and is chemically similar to that from highly-fractionated A-type granite. It was probably formed at the expense of biotite in a highly-evolved MnO-rich magma and/or by hydroxyl complexing of Mn during the ascending fluid phases.**

Title	**Tracking the transition from subduction-related to post-collisional magmatism in the north Arabian–Nubian Shield: A case study from the Homrit Waggat area of the Eastern Desert of Egypt**
Authors	**Azer, M.K., Abdelfadil, K.M., Asimow, P.D., Khalil, A.E.**
Journal	**Geological Journal** **55(6), pp. 4426-4452**
Abstract	**Field and geochemical observations of the granitoids of the Homrit Waggat area in the central Eastern Desert of Egypt reveal two magmatic phases. The early phase of weakly deformed subduction-related calc-alkaline rocks includes tonalite and granodiorite. We name the later phase the Homrit Waggat Pluton (HWP); it includes undeformed syenogranite, alkali feldspar granite, and minor albitized granite. The tonalite and granodiorite have distinct negative Nb–Ta anomalies and lower alkalis, REE, Nb, Zr, and Hf than the HWP. The early magmatic pulse is a subduction-related suite, likely generated by underplating of mantle-derived magmas that triggered partial melting of mafic lower crust; mixing of these melts led to intermediate magma that further fractionated to tonalite and granodiorite. The HWP granites of the late magmatic pulse are transitional from a subduction-related to an anorogenic within-plate environment, plausibly generated by post-collisional lithosphere delamination. Although the parent magma of the HWP was I-type, extensive fractional crystallization produced residual liquids with A2-type character. Albitized granites are found only along the outer margin of the HWP, and contacts with the alkali feldspar granite are gradational, suggesting fluid interactions at a late stage of crystallization. The original textures of the albitized granites are preserved, but their bulk composition was modified by the production of Na-rich minerals and the removal of K, REE, and some trace elements by fluids.**

Title	**Dynamic scapular recognition exercise improves scapular upward rotation and shoulder pain and disability in patients with adhesive capsulitis: a randomized controlled trial**
Authors	**Mohamed, A.A., Jan, Y.-K., El Sayed, W.H., Wanis, M.E.A., Yamany, A.A.**
Journal	**Journal of Manual and Manipulative Therapy 28(3), pp. 146-158**
Abstract	**Background: Examine the ability of a dynamic scapular recognition exercise to improve scapular upward rotation and decrease shoulder pain and disability in patients with adhesive capsulitis of the shoulder. Methods: A test-retest randomized controlled study design was used. A total of sixty-six patients with unilateral adhesive capsulitis were equally divided into two groups. The study group received a dynamic scapular recognition exercise using a wireless biofeedback system, while the control group received placebo treatment in the form of active range-of-motion (ROM) exercises of the sound upper limb. A digital inclinometer was used to measure the scapular upward rotation and ROM of the shoulder joint, and the Shoulder Pain and Disability Index (SPADI) was used to measure the shoulder pain and disability. Results: Study results showed that after two weeks, there were statistically significant differences between the study and control groups in scapular upward rotation and shoulder flexion and abduction (P <.05) and nonsignificant differences in shoulder external rotation and SPADI (P >.05). After two and six months, there were statistically significant differences between study and control groups in scapular upward rotation; shoulder flexion, abduction and external rotation; and SPADI scores (P <.05). Conclusion: This study showed that a dynamic scapular recognition exercise significantly improves scapular upward rotation and the ROM of shoulder flexion and abduction after two weeks. At two and six months, this exercise improves scapular upward rotation; ROM of shoulder flexion, abduction, and external rotation; and SPADI scores. These improvements persisted for six months after the performance of this exercise.**

Title	**Design and synthesis of three Fe(III) mixed-ligand complexes: Exploration of their biological and phenoxazinone synthase-like activities**
Authors	**Ismael, M., Abdel-Mawgoud, A.-M.M., Rabia, M.K., Abdou, A.**
Journal	**Inorganica Chimica Acta 505,119443**
Abstract	**New Fe(III) complexes with mixed ligands based on 1-{(E)-[(4-methylphenyl)imino]methyl}-2-naphthol (HN) as primary ligand and secondary co-ligand of O-hydroxy quinolone (HQ), 2-(1H-benzimidazol-2-yl)phenol (HB) and 2-(4,5-diphenyl-1H-imidazol-2-yl)phenol (HI) had been isolated and characterized. The isolated complexes had 1:1:1 ratio for Fe(III):ligand:co-ligand with one chloride and one water molecule coordinated to the Fe-centre, suggesting octahedral structure around the Fe-center with the formula [Fe(Ligand)(co-ligand)(Cl)(H2O)]. Theoretical calculations using density functional theory by B3LYP with LANL2DZ basis set had been done for two possible orientations of the ligand moieties around the Fe-center, to find out the most reliable coordination modes. Calculations include geometry optimization, molecular orbital description, and energy evaluation of trans- and cis-coordination modes of the chloride and water around the Fe-center. In-vitro antibacterial and antifungal properties of the isolated complexes have also been examined against pathogenic bacteria, E. coli (G−), B. cereus (G+), and A. fumigatus fungi, by using broth microdilution and disc diffusion methods. The target compounds exhibited considerable growth inhibition against selected pathogenic microorganisms as antimicrobial candidates with low minimum inhibitory concentration (MIC). The complexes showed biomimetic phenoxazinone synthase-like activity for the aerial coupling oxidation of o-aminophenol (OAP) to phenoxazine-2-one (Phz), in acetonitrile (ACN) solution, with high turnover number (Kcat). Structure Activity Relationship (SAR) model was derived, using Multi-Linear Regression analysis, by correlation the practical biological (MIC) data with calculated chemical descriptors.**

Title	**Dual-Site-Mediated Hydrogenation Catalysis on Pd/NiO: Selective Biomass Transformation and Maintenance of Catalytic Activity at Low Pd Loading**
Authors	**Campisi, S., Chan-Thaw, C.E., Chinchilla, L.E., (...), Wells, P.P., Villa, A.**
Journal	**ACS Catalysis** **10(10), pp. 5483-5492**
Abstract	**Creating a new chemical ecosystem based on platform chemicals derived from waste biomass has significant challenges: catalysts need to be able to convert these highly functionalized molecules to specific target chemicals and they need to be economical - not relying on large quantities of precious metals - and maintain activity over many cycles. Herein, we demonstrate how Pd/NiO is able to direct the selectivity of furfural hydrogenation and maintain performance at low Pd loading by a unique dual-site mechanism. Sol-immobilization was used to prepare 1 wt % Pd nanoparticles supported on NiO and TiO2, with the Pd/NiO catalyst showing enhanced activity with a significantly different selectivity profile; Pd/NiO favors tetrahydrofurfuryl alcohol (72%), whereas Pd/TiO2 produces furfuryl alcohol as the major product (68%). Density functional theory studies evidenced significant differences on the adsorption of furfural on both NiO and Pd surfaces. On the basis of this observation we hypothesized that the role of Pd was to dissociate hydrogen, with the NiO surface adsorbing furfural. This dual-site hydrogenation mechanism was supported by comparing the performance of 0.1 wt % Pd/NiO and 0.1 wt % Pd/TiO2. In this study, the 0.1 and 1 wt % Pd/NiO catalysts had comparable activities, whereas there was a 10-fold reduction in performance for 0.1 wt % Pd/TiO2. When TiO2 is used as the support, the Pd nanoparticles are responsible for both hydrogen dissociation and furfural adsorption and the activity is strongly correlated with the effective metal surface area. This work has significant implications for the upgrading of bioderived feedstocks, suggesting alternative ways for promoting selective transformations and reducing the reliance on precious metals.**

Title	**Porous Fe_2O_3-ZrO_2 and NiO-ZrO_2 nanocomposites for catalytic N_2O decomposition**
Authors	**Basahel, S.N., Mokhtar, M., Ali, T.T., Narasimharao, K.**
Journal	**Catalysis Today 348, pp. 166-176**
Abstract	**Mesoporous Fe2O3-ZrO2 and NiO-ZrO2 nanocomposites with 10 and 20 wt% of Fe2O3 and NiO composition were prepared by modified sol-gel method. The physico-chemical characteristics of calcined nanocomposites were evaluated utilizing different techniques such as X-ray diffraction, Raman spectroscopy, scanning electron microscopy, transmission electron spectroscopy, N2-physisorption, H2-temperature programed reduction, Fourier transformed infrared spectroscopy after pyridine adsorption and X-ray photoelectron spectroscopy. The N2O decomposition activity of calcined nanocomposite catalysts was evaluated using fixed bed reactor at different reaction temperatures. Bare mesoporous ZrO2 without any reducible oxide exhibited 30% N2O conversion at reaction temperature of 550 °C. Fe2O3-ZrO2 nanocomposites with 10 wt% Fe2O3 offered enhanced N2O conversion (≈95%) and stability for N2O decomposition at 550 °C. Interestingly, NiO-ZrO2 nanocomposite with 20 wt% NiO exhibited lowest N2O conversion among the synthesized nanocomposites. The variations in N2O decomposition activity of Fe2O3-ZrO2 and NiO-ZrO2 nanocomposites could be expounded on the basis of catalyst characterization results. It was observed that presence of reducible M-O-Zr (M = metal) species along with crystalline tetragonal ZrO2 phase is essential to obtain better N2O decomposition. A complete ZrO2 phase transformation to cubic and large NiO particle size were responsible for the poor catalytic activity for NiO-ZrO2 nanocomposite with 20 wt% NiO. The durability of Fe2O3-ZrO2 and NiO-ZrO2 nanocomposites was tested for about 120 h and the results revealed that the synthesized nanocomposites were robust without losing any catalytic activity.**

Title	**An eigenvalues approach for a two-dimensional porous medium based upon weak, normal and strong thermal conductivities**
Authors	**Alzahrani, F., Hobiny, A., Abbas, I., Marin, M.**
Journal	**Symmetry** **12(5),238**
Abstract	**This work is devoted to the investigation of a two-dimensional porous material under weak, strong and normal conductivity, using the eigenvalues method. By using Laplace-Fourier transformations with the eigenvalues technique, the variables are analytically obtained. The derived technique is assessed with numerical results that are obtained from the porous mediums using simplified symmetric geometry. The results, including the displacements, temperature, stresses and the change in the volume fraction field, are offered graphically. Comparisons are made among the outcomes obtained under weak, normal and strong conductivity.**

Title	**The Spin Response of the (Formula presented.) Reaction Near Threshold and Its Implication to the GDH Sum Rule and the Double Polarization E-Asymmetry**
Authors	**Darwish, E.M., Abou-Elsebaa, H.M., Alsadi, K.S., Saleh Yousef, M.**
Journal	**Moscow University Physics Bulletin 75(3), pp. 198-207**
Abstract	**The spin response of the (Formula presented.). reaction near threshold is investigated. Our formalism based on the impulse approximation, uses the realistic Bonn NN potential (full model) for the deuteron wave function and the unitary isobar MAID-2007 model for the elementary γN → πN amplitude. We present the first results for the double polarized differential and total cross sections for parallel and antiparallel helicity states, the deuteron spin asymmetry, the helicity E-asymmetry, the deuteron GDH integral, and the double spin asymmetries of the total cross section in the near-threshold region. Sensitivity of the estimated results to the D-wave effect of the deuteron wave function for a realistic NN potential is studied. We find an insignificant sensitivity of most of the estimated observables to the D-wave component. A noticeable role is obtained only in the double polarized differential cross section with antiparallel spins of photon and deuteron dσA/dΩπ close to the threshold energy at forward and backward pion angles as well as in the double spin asymmetry of the total cross section (Formula presented.). at relatively large photon energies. Thus, we compare results for these two observables using various NN potential models with different D-state probabilities, and a noticeable influence is found.**

Title	**Effect of N_2/TMS Gas Ratio on Mechanical and Erosion Performances of Ti-Si-C-N Nanocomposite Coatings**
Authors	**Abd El-Rahman, A.M., Wei, R., Raaif, M., (...), Hammad Fawey, M., Abo El-kassem, M.**
Journal	**Journal of Materials Engineering and Performance 29(5), pp. 3324-3333**
Abstract	**To optimize the tribo-mechanical performance of thick Ti-Si-CN nanocomposite coatings for a wide range of harsh industrial applications, reactive gases of nitrogen and trimethylsilane were employed with specific flow rates of PEMS process. Plasma-enhanced magnetron sputtering (PEMS) was employed for depositing thick Ti-Si-C-N nanocomposite (22-27 µm) on Ti-6Al-4V substrates at relatively high deposition rate up to 4.5 µm/h. Controlling the nitrogen partial pressure ratio PN2/(PN2 + PTMS) from 0.29 to 0.69 resulted in controlling the chemical and physical properties of the coatings. The XRD results demonstrated that the crystallinity of the nanocomposite structure increased with the increase in nitrogen pressure ratio. The coating hardness, erosion resistance, sliding wear resistance and corrosion resistance were augmented with increasing the nitrogen content in the plasma atmosphere. The results displayed that the sliding wear resistance of Ti-Si-C-N coatings increased by approximately three orders of magnitude comparing with the uncoated Ti-6Al-4V substrate. At low nitrogen content, low coefficient of friction (0.13-0.15) was achieved. Furthermore, the coating prepared at high nitrogen content reflected greater values of ratios H/E* and H3/E*2 that correlated well with the coating erosion resistance.**

Title	**Quantum Fisher information and nonclassical properties of a two-atom interacting with a radiation field in squeezed coherent states**
Authors	**Algarni, M., Al-Ghamdi, H., Abdel-Khalek, S.**
Journal	**Optical and Quantum Electronics 52(5),263**
Abstract	**In this paper, we consider the problem of the interaction between a two atoms and a radiation field in the squeezed coherent states with one- and two-photon processes. The analytic solution for the wavefunction of the whole system is used to describe various quantum measures. The article investigates the dynamics of entanglement between the squeezed coherent field with two atoms measured by quantum entropy. On the other side, the negativity is used to detect the atom–atom entanglement. The influence of the multiphoton transitions, the initial atomic state and intensity dependent function on the entanglement and Quantum Fisher Information (QFI) for the system under consideration is examined. Furthermore, we show how the QFI of the system states is affected and changed according to the main physical parameters. Finally, our results have reported some important phenomena such as entanglement sudden death and birth and its link with the dynamical behavior of the QFI.**

Title	**Bis-dioxomolybdenum (VI) oxalyldihydrazone complexes: Synthesis, characterization, DFT studies, catalytic epoxidation potential, molecular modeling and biological evaluations**
Authors	**Adam, M.S.S., Ahmed, M.S.M., El-Hady, O.M., Shaaban, S.**
Journal	**Applied Organometallic Chemistry 34(5),e5573**
Abstract	**Two cis-bis-dioxomolybdenum oxalylsalicylidenedihydrazone complexes (MoO2L1 and MoO2L2) were synthesized via the complexation of dioxomolybdenum (VI) acetylacetonate with oxalylsalicylidenedihydrazone (H2L1) and p-sodium sulfonate oxalylsalicylidenedihydrazone (H2L2) bis-Schiff base chelating ligands, respectively. The structures of the newly synthesized complexes were confirmed by 1H- and 13C-NMR, IR, ultraviolet–visible and mass spectra, as well as elemental analyses (EA) and conductivity measurements. The spectrophotometric continuous variation method revealed the formation of 2: 1 (metal: ligand molar ratios). DFT studies were applied for the ligands and their Mo-chelates. Interestingly, the bis-MoO2(VI) oxalyldihydrazone complexes showed remarkable catalytic sufficiency towards the selective (ep)oxidation of 1,2-cyclooctene, benzyl alcohol and thiophene using H2O2 or tert-butyl hydroperoxide (tBuOOH) at 85 °C. Under aqueous conditions, the MoO2L2 (with p-sodium sulfonate substituent) exhibited superior that of the MoO2L1 (without p-NaSO3—group), highlighting the role of sodium sulfonate substituent in the catalytic progress of the Mo-chelate. The ligands (H2L1 and H2L2) and their corresponding Mo-complexes (MoO2L1 and MoO2L2) were assessed for their antitumor and antimicrobial activities. Furthermore, the antioxidant activity was also evaluated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) and superoxide dismutase (SOD) assays. The binding nature between the Mo-complexes and calf thymus DNA (ctDNA) was also studied within spectroscopic and hydrodynamic techniques.**

Title	**Antioxidants and molecular damage in Nile Tilapia (Oreochromis niloticus) after exposure to microplastics**
Authors	**Hamed, M., Soliman, H.A.M., Osman, A.G.M., Sayed, A.E.-D.H.**
Journal	**Environmental Science and Pollution Research 27(13), pp. 14581-14588**
Abstract	**Recently, research on the biological effects of microplastics (MPs) has grown exponentially. However, effects of MPs on freshwater fishes and the mechanisms of the biological effects of MPs were limited. So, the purpose of the current study was to clarify the effects of microplastics on oxidative stress response, DNA fragmentation, and proteinogram of the early juvenile stage of Nile Tilapia (Oreochromis niloticus). The fishes were assigned into four groups: one control, three MPs-exposed groups as 1 mg/L of MPs, 10 mg/L of MPs, and 100 mg/L of MPs respectively for 15 days and 15 days of recovery. The activities of superoxide dismutase, catalase, total peroxides, and oxidative stress index (OSI), as well as lipid peroxidation and DNA fragmentation, increased in groups exposed to MPs compared to the control group in a dose-dependent manner. In contrast, the activity of total antioxidant capacity decreased in groups exposed to MPs compared to the control group in a dose-dependent manner. The electrophoretic pattern of muscle proteins revealed alteration in the proteinogram in the MPs-exposed groups compared to control. After the recovery period, the activities of superoxide dismutase, catalase, total peroxides, total antioxidant capacity, lipid peroxidation, DNA fragmentation, and the electrophoretic pattern of muscle proteins returned to normal levels in 1 mg/L of MPs-exposed group. Combined with our previous work, these results suggest that MPs cause the overproduction of reactive oxygen species (ROS) and alters the antioxidants parameters, resulting in oxidative stress and DNA damage. The present study fosters a better understanding of the toxic effects of MPs on Tilapia as a freshwater model. [Figure not available: see fulltext.]**

Title	**Reflection of plane waves in thermoelastic microstructured materials under the influence of gravitation**
Authors	**Abo-Dahab, S.M., Jahangir, A., Abd-alla, A.-E.-N.N.**
Journal	**Continuum Mechanics and Thermodynamics 32(3), pp. 803-815**
Abstract	**This paper presents an analysis of wave propagation in a microstretch elastic medium in the context of the Green–Naghdi (GN) theory. Moreover, the dissipation and the influence of gravity on reflected waves have also been investigated. In the present article, five reflected waves propagate into the medium for any incident wave. The problem is solved numerically, and the amplitude ratios are graphically represented allowing for a comparison between the simple GN theory and the case in which one considers the effect of gravity on waves.**

Title	**Some features of the nonlocal correlation and geometric phase of the quantum system in two-mode nondegenerate entangled states**
Authors	**Alkhateeb, S.A., Abdel-Khalek, S.**
Journal	**Journal of Mathematical Chemistry 58(5), pp. 939-949**
Abstract	**We propose a quantum two-level system interacting with a two-mode nondegenerate entangled states (TMNESs). The dynamical properties of entropy squeezing component is investigated based on atomic density matrix in the absence and presence of classical field effect. Moreover, the dynamical properties of the nonlocal correlation between the atom and TMNESs are studied and compared with geometric phase. We examine the influence of the initial interaction conditions and classical field on the evolution of nonlocal correlation, linear entropy and geometric phase. Furthermore, we discuss the link between the geometric phase, field purity and nonlocal correlation during the time dynamics. Finally, the results clarified that a geometric phase and entanglement are strongly affected by the classical field and detuning parameter.**

Title	**Optimization of the synthesis of het/aryl-amidoximes using an efficient green chemistry**
Authors	**Albayati, M.R., Mohamed, M.F.A., Moustafa, A.H.**
Journal	**Synthetic Communications** **50(8), pp. 1217-1231**
Abstract	**This work focuses on optimizing an efficient green synthesis of arylamidoximes from appropriate nitrile and hydroxylamine hydrochloride in water and triethylamine (1.6 mol equivalent) as a base at room temperature for 6 h. This new green synthetic methodology is compared with previously known methods. The main advantages of this new process reported are good yield, easier work-up and short reaction times. Moreover, some of the synthesized arylamidoximes converted to 1,2,4-oxadiazole derivatives 13a,b and 14via the reaction with (4-acetylphenoxy)acetic acid 12.**

Title	**Balance of glandular and stromal Bcl2/Bax expression in pre-neoplastic and neoplastic endometrial tissues**
Authors	**Ahmed, A.R.H., Bakheet, R.A., Abdelmohsen, W., Mohammed, M., Adly, M.A.**
Journal	**European Journal of Gynaecological Oncology 41(2), pp. 265-272**
Abstract	**Apoptosis is regulated by estrogen in normal endometrium and it is essential for the monthly sequential endometrial changes. In this study, epithelial and stromal expression of apoptosis regulated molecules; Bcl-2 and Bax in pathological endometrial lesions, their correlation with progression of endometrial carcinoma, and their association with estrogen receptor (ER) and progesterone receptor (PR) expression were investigated. Tissue sections of 39 endometrial carcinomas and 37 endometrial hyperplastic lesions were evaluated for Bcl-2, Bax, ER, and PR expression by immunohistochemistry. Bcl-2 and Bax expression was detected in most hyperplastic and in 77% and 82% of neoplastic endometrial lesions, respectively. The expression of both molecules was predominantly glandular; however concomitant stromal expression was also demonstrated. Glandular and stromal Bcl-2 and Bax expression was significantly reduced in endometrial carcinoma. There was a strong association between Bcl-2 and Bax expression in hyperplastic endometrium, in neoplastic lesions and in different histological subtypes, different grades and different FIGO stages of endometrial carcinoma at glandular, but not at the stromal level. The glandular expression of both molecules was significantly associated with ER and PR expression in hyperplastic lesions with loss of Bax/ER and Bax/PR association in neoplastic lesions. There was a strong association of stromal Bcl-2 with stromal ER expression in malignant endometrium and a strong association of stromal Bax with stromal ER in hyperplastic, but not in neoplastic endometrial lesions. In conclusion, disruption of hormonal control of Bax in endometrial tissue and subsequent disturbed stromal but not epithelial Bcl-2/Bax association could help early progression of endometrial carcinoma.**

Title	**Development of biocompatible tri-layered nanofibers patches with endothelial cells for cardiac tissue engineering**
Authors	**Mousa, H.M., Hussein, K.H., Sayed, M.M., (...), Woo, H.-M., Abdal-hay, A.**
Journal	**European Polymer Journal 129,109630**
Abstract	**The development of biocompatible patches that can provide adequate mechanical properties and mimicking the physiological relevance still has enormous challenges in the field of tissue engineering. In this study, the aim is to engineer and develop tri-layered nanofiber patches to synchronous the mechanical properties and mimic the complex structure of living cardiovascular tissues. The developed patches consisting of blended silk fibrin (SF) and polyvinyl alcohol (PVA) composite as a hydrophilic middle layer. The upper and lower layers were composed of polycaprolactone polymer (PCL) and Poly (Lactic Acid) (PLA), respectively. Layer by layer of the developed patches were fabricated by electrospinning technique. The patches characteristics such as morphology, surface topography, and physiochemical, biodegradable and mechanical stability were investigated. Furthermore, a human endothelial cell line (EA. hy926) was exploited to assess the biological properties of the fabricated patches. The results show that the patches had high endothelial cells biocompatibility, mechanical elasticity, and unique nanofibers structure.**

Title	**Nonlinear analysis of dual-phase lag bio-heat model in living tissues induced by laser irradiation**
Authors	**Hobiny, A.D., Abbas, I.A.**
Journal	**Journal of Thermal Stresses 43(4), pp. 503-511**
Abstract	**This paper provides a method for determining a numerical solution of the thermal damage of living tissues using a nonlinear dual phase lag model. Due to the nonlinearity of the basic equations, the finite element approach is adopted to solve such problems. The numerical outcomes obtained by the finite element technique are also compared with the existing experimental study to verify the accuracy of the numerical calculations. Based on the formulation of Arrhenius, the thermal damages to the tissues are estimated by the denatured protein range. Numerical results for temperatures are presented graphically. Also, the comparisons between the numerical outcomes and the existing experimental data show that the present mathematical models are effective tools to evaluate the bioheat transfer in a spherical living tissue.**

Title	**Ant colony optimization for multi-objective multicast routing**
Authors	**Hamed, A.Y., Alkinani, M.H., Hassan, M.R.**
Journal	**Computers, Materials and Continua** **63(3), pp. 1159-1173**
Abstract	**In the distributed networks, many applications send information from a source node to multiple destination nodes. To support these applications requirements, the paper presents a multi-objective algorithm based on ant colonies to construct a multicast tree for data transmission in a computer network. The proposed algorithm simultaneously optimizes total weight (cost, delay and hop) of the multicast tree. Experimental results prove the proposed algorithm outperforms a recently published Multi-objective Multicast Algorithm specially designed for solving the multicast routing problem. Also, it is able to find a better solution with fast convergence speed and high reliability.**

Title	**The effect of fractional time derivative of bioheat model in skin tissue induced to laser irradiation**
Authors	**Hobiny, A., Alzahrani, F., Abbas, I., Marin, M.**
Journal	**Symmetry** **12(4),602, pp. 1-10**
Abstract	**This work uses the "fractional order bio-heat model" (Fob) model of heat conduction to offer a new interpretation to study the thermal damages in a skin tissue caused by laser irradiation. The influences of fractional order and the thermal relaxation time parameters on the temperature of skin tissue and the resulting thermal damage are studied. In the Laplace domain, the analytical solutions of temperature are obtained. Using the equation of Arrhenius, the resulting thermal injury to the tissues is assessed by the denatured protein ranges. The numerical results of the thermal damages and temperature are presented graphically. A parametric analysis is dedicated to the identifications of suitable procedures for the selection of significant design variables to achieve an effective thermal in the therapy of hyperthermia.**

Title	**Photo-thermal interactions in a semiconducting media with a spherical cavity under hyperbolic two-temperature model**
Authors	**Alzahrani, F.S., Abbas, I.A.**
Journal	**Mathematics** **8(4),585**
Abstract	**This article highlights the study of photo-thermoelastic interaction in an unbounded semiconductor medium containing a spherical cavity. This problem is solved using the new hyperbolic two-temperature model. The bounding surface of the cavity is traction free and loaded thermally by exponentially decaying pulse boundary heat flux. In addition, the carrier density is prescribed on the inner surface of the cavity in terms of the recombination speed. The techniques of Laplace transforms are used to get the analytical solutions of the problem in the transformed domain by the eigenvalues method. The inversions of Laplace transformations have been carried out numerically. The outcomes also display that the analytical schemes can overcome the mathematical problem to analyze this problem. Numerical outcomes for a semiconductor material are performed and demonstrated graphically. According to the numerical results, this new hyperbolic two-temperature model of thermoelasticity oers finite speed of the thermal wave and mechanical wave propagation.**

Title	**Puerperal metritis in crossbreed (tarentaise x baladi) cows: Metabolism-related biochemical and haematological changes**
Authors	**Ramadan, M.H., Mahmoud, A.E.Z., Zeidan, A.E.B., Ahmed, A.E., Hassaneen, A.S.A.**
Journal	**Journal of Advanced Veterinary Research 10(2), pp. 96-104**
Abstract	**Breeding of crossbreed cow is of great significance in tropical and subtropical countries in order to maintain both high productivity and high ability to accommodate. To understand the haematological and biochemical changes related with puerperal metritis in crossbred cows as well as the effect of puerperal metritis on the fertility, the current study evaluated the relations of some metabolic, and biochemical changes to the puerperal metritis. After thorough clinical and gynaecological examination, blood and urine samples were collected from both the control cows (n=20) and metritis cows (n=19). Haemoglobin (Hb) concentrations and leukocytes count was determined. The concentrations of glucose, triglycerides, cholesterol, non-esterified fatty acids (NEFA), calcium, phosphorus, sodium, potassium, albumin, total protein, urea and progesterone hormone (P4) in blood, and ketone bodies were detected in urine at the following time-points (prepartum, partum, 1-week postpartum, and 2-weeks postpartum). Cows in the metritis group showed low Hb and high leukocytes count in the postpartum period. The metritis cows showed low glucose, low cholesterol, high NEFA, and low calcium levels. Blood NEFA, glucose, triglycerides, and calcium levels change significantly in puerperal metritis in crossbreed cows.**

Title	**Fractional order thermoelastic wave assessment in a two-dimension medium with voids**
Authors	**Hobiny, A.D., Abbas, I.A**
Journal	**Geomechanics and Engineering** **21(1), pp. 85-93**
Abstract	**In this article, the generalized thermoelastic theory with fractional derivative is presented to estimate the variation of temperature, the components of stress, the components of displacement and the changes in volume fraction field in two-dimensional porous media. Easily, the exact solutions in the Laplace domain are obtained. By using Laplace and Fourier transformations with the eigenvalues method, the physical quantities are obtained analytically. The numerical results for all the physical quantities considered are implemented and presented graphically. The results display that the present model with the fractional derivative is reduced to the Lord and Shulman (LS) and the classical dynamical coupled (CT) theories when the fractional parameter is equivalent to one and the delay time is equal to zero and respectively.**

Title	**Cyanotoxins and their environmental health risk in marine and freshwaters of Saudi Arabia**
Authors	**Mohamed, Z.A., Hashem, M., Alamri, S., Mostafa, Y**
Journal	**Arabian Journal of Geosciences 13(7),285**
Abstract	**Occurrence of toxic cyanobacteria and cyanotoxins in drinking, recreational, and irrigation waters represents a health hazard to wildlife and humans. This review describes the most common cyanotoxins and their producing taxa and the potential environmental health risks in marine and freshwaters of Saudi Arabia. The most common genera of toxigenic cyanobacteria detected in Saudi waters included Anabaena/Dolichospermum, Anabaenopsis, Cylindrospermopsis, Lyngbya, Microcystis, and Oscillatoria. The cyanotoxins produced by these taxa and have been detected in Saudi Arabia are microcystins (MCYSTs), cylindrospermopsin (CYN), saxitoxins, and lyngbyatoxin-like toxins. Anatoxin has not been investigated in Saudi Arabia, and extensive research is running for this toxin. Studies have detected microcystins in treated drinking waters, groundwater wells, and hot springs and their accumulation in vegetables and fish. Toxin amounts in these commodities often exceeded the WHO guidance values for safe exposure. This indicates that a human health risk could be occurring upon exposure to such potent toxins. Beyond a comprehensive analysis of cyanotoxins in marine and freshwater environments, this paper also identifies and prioritizes research gaps and suggests future research on cyanotoxins in Saudi Arabia.**

Title	**Enhanced the protection capacity of poly(o-toluidine) by synergism with zinc or lanthanum additives at C-steel/HCl interface: A combined DFT, molecular dynamic simulations and experimental methods**
Authors	**Abd El-Lateef, H.M., Alnajjar, A.O.**
Journal	**Journal of Molecular Liquids 303,112641**
Abstract	**In this paper, poly(o-toluidine) (POT) is a prepared by situ chemical oxidative polymerization method. The structural configuration of the as-prepared POT is confirmed by Fourier-transform infrared spectroscopy (FT-IR), UV–vis spectroscopy, X-Ray Diffraction (XRD), Transmission electron microscopy (TEM), Field emission scanning electron microscope (FE-SEM) analyses. The inhibition action of POT alone and in the presence of Zn2+ or La3+ additives at C-steel/1.0 M HCl solution surface is examined using linear polarization resistance (LPR) corrosion rate, potentiodynamic polarization (PDP), and electrochemical impedance spectroscopy (EIS) measurements at various temperatures (30–60 °C). The POT prevents the C-steel from corrosion up to 82.8%. The addition of Zn2+ or La3+ cations to POT is found to synergistically improve the corrosion protection capability of POT with a capacity of ~96.8 and 98.9%, respectively. Temperature–protection capacity relation indicates the physisorption of POT onto a metal surface and chemical adsorption when POT was incorporated with Zn2+ or La3+ additives. PDP findings displayed that POT alone and POT + Zn2+ or La3+ systems behaved as inhibitors of mixed-type. The adsorption of POT onto the C-steel interface followed the Langmuir isotherm model. FTIR, XRD and FE-SEM/EDX are applied to investigate the surface morphology. The outcomes of molecular dynamic (MD) simulations and density functional theory (DFT) calculations indicate elevated adsorption probability of neutral POT than protonated form.**

Title	**Direct transesterification of fatty acids produced by Fusarium solani for biodiesel production: effect of carbon and nitrogen on lipid accumulation in the fungal biomass**
Authors	**Rasmey, A.-H.M., Tawfik, M.A., Abdel-Kareem, M.M.**
Journal	**Journal of Applied Microbiology** **128(4), pp. 1074-1085**
Abstract	**Aims: The present work aims to explore a new oleaginous Fusarium isolate potential to accumulate lipids in its biomass from inexpensive substrates. In addition, impacts of carbon and nitrogen sources and their ratios on lipid production by the interested fungal isolate were also studied. Methods and Results: Lipid was assayed by sulfo-phospho-vanillin colorimetric method. Among 11 Fusarium isolates obtained on potato dextrose agar from rhizosphereic soils, Fusarium RAS18 was selected as the highest producer that accumulates above 20% lipid. It was identified based on phenotypic characterization and the internal transcribed spacer sequence as Fusarium solani, that was recorded in the GenBank database under the accession number MK167372.1. The optimized lipid yield (34·5%) is obtained using glycerol (35 g l−1) and peptone (1·5 g l−1) as carbon and nitrogen sources respectively. The produced fatty acid methyl esters (biodiesel) is composed of linoleic acid (56·81%), palmitic acid (17·81%), oleic acid (11·81%) and stearic acid (11·12). The unsaturated fatty acids accounted for 69% and this is nearly similar to the plant oils commonly used in biodiesel production. Conclusions: These findings suggest the applicability of F. solani RAS18 as a promising strain to accumulate lipids from glycerol as a feedstock for biodiesel production. Significance and Impact of the Study: Fusarium solani RAS18 is a new oleaginous fungal isolate that is able to produce lipid (34·5%, g g−1) from glycerol. Glycerol is a cheap substrate and is formed as a byproduct from transesterification process and others industries. Thus, recyclation of glycerol for lipid production by micro-organisms is an important point of economic view. Direct transesterification of the produced fatty acids indicated its similarity to the plant oil composition used in biodiesel production. So, F. solani RAS18 might be a potential lipid source as a feedstock for biodiesel production.**

Title	**Phylogeny of new marine Dothideomycetes and Sordariomycetes from mangroves and deep-sea sediments**
Authors	**Jones, E.B.G., Devadatha, B., Abdel-Wahab, M.A., (...), Liu, F., Cai, L.**
Journal	**Botanica Marina** **63(2), pp. 155-181**
Abstract	**This paper documents six new saprobic marine fungi and one new genus based on morphology and multi-gene phylogenies. Three Dothideomycetes, and members of the Pleosporales, are introduced: Pseudomassariosphaeria triseptata sp. nov. was recognized as a mangrove species in Amniculicolaceae, and Salsuginea phoenicis sp. nov. was discovered as a second member of Salsugineaceae. A new genus Raghukumaria with Raghukumaria keshaphalae sp. nov., recovered from mangroves, is phylogenetically sister to Halomassarina and nests in the Trematosphaeriaceae. Three new species are referred to the Sordariomycetes: Coniochaeta marina (Coniochaetales, Coniochaetaceae) on driftwood; Fusicolla bharatavarshae (Hypocreales, Nectriaceae) is introduced with asexual and sexual morphs, on decayed mangrove wood of Avicennia marina; and Fusarium sedimenticola (Hypocreales, Nectriaceae) is new to the Fusarium solani species complex (FSSC) from deep-sea sediment.**

Title	**Nanostructured Metal Oxides Prepared from Schiff Base Metal Complexes: Study of the Catalytic Activity in Selective Oxidation and C–C Coupling Reactions**
Authors	**Abdel-Fatah, S.M., Díaz-Sánchez, M., Díaz-García, D., (...), Abdel-Rahman, L.H., Gómez-Ruiz, S.**
Journal	**Journal of Inorganic and Organometallic Polymers and Materials 30(4), pp. 1293-1305**
Abstract	**Abstract: Schiff base Cu(II), Co(II), Ni(II), Cr(III) and Fe(III) complexes have been synthesized via the reaction of the 2-amino-3-hydroxy-4-bromopyridine with 2-chloro-5-nitrobenzaldehyde and different transition metal salts. The complexes have been characterized by several methods. In addition, the prepared complexes were tested as precursors for the synthesis of their corresponding metal oxides nanoparticles by controlled aerobic thermal decomposition at 500 °C. The structure, composition, morphology and particle size of the prepared nanostructured metal oxides were characterized by FTIR, X-ray powder diffraction and by scanning and transmission electron microscopy. In addition, the corresponding materials have been tested as catalysts in the heterogeneous selective "solvent free" oxidation of benzyl alcohol giving high selectivities to benzaldehyde. In addition, the nanostructured metal oxides gave, in general, higher conversions than those of the starting Schiff base metal complexes. Finally, the nanostructured metal oxides have been treated with an organometallic Pd(II) precursor to prepare Pd-doped metal oxides, which have been tested as catalysts in two different C–C coupling reactions, namely, the coupling reaction between iodobenzene and phenylboronic acid and the double coupling of iodobenzene with 2,6-dibromopyridin. In all cases interesting conversions and yields were observed for the nanostructured metal oxides. Graphic Abstract: [Figure not available: see fulltext.]**

Title	**Preparation and characterization of nanostructured titanium oxynitride films for the application in self-cleaning and photoelectrochemical water splitting**
Authors	**Abd El-Rahman, A.M., Mohamed, S.H.**
Journal	**Thin Solid Films** **698,137864**
Abstract	**Titanium oxynitride (TiOxNy) films capped with 10 nm titanium oxide (TiO2) layer were prepared using reactive direct current magnetron sputtering from pure Ti target. Part of the samples was annealed. Energy dispersive analysis of X-ray revealed that all the samples contain nitrogen and the incorporation of nitrogen into the oxynitrides is not linear. Phase investigation by X-ray diffraction showed structural variation with changing oxygen and nitrogen gas flow rates as well as annealing. Anatase, brookite, rutile and titanium nitride were detected individually or mixed in the as-prepared and annealed samples. The optical properties were found to be controlled by a structure and chemical composition. Transmittance and reflectance measurements were carried out by a high performance double beam ultraviolet-visible-near infrared spectrophotometer. Based on that, the energy band gap, refractive index and extinction coefficient were derived. The obvious difference between the dark and light currents indicated the validity of the TiO2/TiOxNy bilayer samples to act as photoanodes. All the annealed samples have photoelectrochemical water splitting response better than the as-prepared samples. The as-prepared TiO2/TiOxNy bilayer films were hydrophobic (contact angels, 81° - 93°) and their contact angles were independent from the nitrogen content. The annealed samples have lower contact angles than the as-prepared samples. The wettability of the as-prepared and annealed samples was changed from hydrophobic to more hydrophilic with increasing illumination time. These results are of important interest for the self-cleaning surfaces.**

Title	**Green Method for the Synthetic Ugi Reaction by Twin Screw Extrusion without a Solvent and Catalyst**
Authors	**Ali El-Remaily, M.A.E.A.A., Soliman, A.M.M., Elhady, O.M.**
Journal	**ACS Omega** **5(11), pp. 6194-6198**
Abstract	**This study describes the solvent and catalyst-free Ugi reaction by way of twin screw extrusion (TSE). Multicomponent chemical synthesis can be converted into a single process without repeated use of solvents through TSE. High synthetic yields are achieved in short reaction times and produced in solvent-free conditions, which lead to a more environmentally friendly process.**

Title	**Enhancement of Adhesion Force and Surface Conductivity of Graphene Oxide Films Using Different Solvents**
Authors	**El-Hossary, F.M., Ghitas, A., Abd El-Rahman, A.M., (...), Fawey, M.H., Abdelhamid Shahat, M.**
Journal	**IOP Conference Series: Materials Science and Engineering 762(1),012001**
Abstract	**In this work, the nanotechnology procedure was utilized to improve both the adhesion force and surface properties of graphene oxide (GO) films. GO has been obtained in a powder form by oxidation purified graphite using the modified Hummer's technique. Different films of GO nanoparticles (NPs) were deposited using several types of solvents distilled water, acetone, ethanol, dimethyl formamide (DMF) or ethylene glycol. Examination of structural and optical properties of GO films were studied by XRD and UV-vis absorption spectroscopy. Moreover, electrical properties, surface roughness, contact angle, adhesion force, wetting energy and spreading coefficient were investigated. It was observed that the properties of the prepared films are influenced by the solvent type. The electrical resistivity of films is highly dependent on the solvent type which exhibited the lowest value with distilled water. Furthermore, GO film synthesized with distilled water has the best values of adhesion force and average surface roughness (Ra) 143.4 mN/m and ~ 7.83 µm, respectively. These results are mostly attributed to hydrophilic cites and GO NPs agglomeration in the surface of films and the effects of their size leading to an expansion in the surface roughness.**

Title	**Novel synthesized cationic surfactants based on natural piper nigrum as sustainable-green inhibitors for steel pipeline corrosion in CO_2-3.5%NaCl: DFT, Monte Carlo simulations and experimental approaches**
Authors	**Tantawy, A.H., Soliman, K.A., Abd El-Lateef, H.M.**
Journal	**Journal of Cleaner Production 250,119510**
Abstract	**CO2-Corrosion is a widespread issue in oil and gas production, and various storage media have different impacts on the corrosion performance of steel used for tubes. In this paper, three novel cationic surfactants based on natural piper nigrum for inhibiting CO2-corrosion have been synthesized. The structure configurations of the prepared surfactants were confirmed by various spectral and physico-chemical tools viz. FTIR, 1H NMR, 13C NMR and surface activity measurements. The measurement of contact angles was used to evaluate the wettability of all synthesized surfactants. The inhibition capacities of the titled surfactants, for steel pipelines (C1018-steel) corrosion in CO2-3.5%NaCl were studied by electrochemical (open-circuit potential vs. time, Tafel and EIS) measurements, surface morphology (FE-SEM/EDX) examinations, DFT, and Monte Carlo simulations. The empirical findings indicated that the prepared natural surfactants had superior inhibition action, and their maximum inhibition capacities were ranged from 96.7 to 98.9%. Tafel data displays the features of these surfactants are considered as inhibitors of the mixed-type; and their adsorption mode on the C1018-steel/medium interface is consistent with the Langmuir isotherm model. The formation of a protective layer on the C1018-steel interface was investigated using FE-SEM/EDX. DFT calculations were carried out to correlate theoretical parameters with experimental outcomes. The Monte Carlo simulations affirm the adsorption capability of the synthesized surfactants on the iron (110) crystal. The present report provides extremely significative findings in preparing and designing novel sustainable-green inhibitors with high inhibition power.**

Title	**Specialized study to perform complex phase synchronization of two chaotic complex systems including a similar structure of direct terms with modifying in nonlinear terms**
Authors	**E. Mahmoud, E., Ahmed Alyami, M.**
Journal	**Mathematical Methods in the Applied Sciences 43(4), pp. 1516-1529**
Abstract	**We ponder a different kind of complex synchronization. We name this sort "complex phase synchronization" (CPHS). This review concentrates on two chaotic complex structures, including a similar structure of direct terms with totally differing or incompletely in nonlinear terms. A novel plan is needed to complete the complex phase synchronization (CPHS) for the chaotic complex structures. In this plan, we have utilized the dependability hypothesis to decide diagnostically the complex control capacities that are expected to accomplish CPHS. From this plan, we found that CPHS holds or incorporates two sorts of synchronizations (phase and anti-phase synchronizations) and the state factors of the main structure synchronize with alternate state factors of the slave structure. We connected this plan, for instance, to study the CPHS of two chaotic complex Lü structures with incompletely changing in nonlinear terms. These complex (or mind-boggling) structures resemble in various imperative areas of mineral science and building. Numerical outcomes are sketched out to uncover the phases and modules errors of these chaotic attractors, subsequently communicating that CPHS is fulfilled. A specific application in secure communication is designed. Amongst this secure communication, CPHS between transmitter and collector is the key to the information signs are regained.**

Title	**Some Backward in Time Results for Thermoelastic Dipolar Structures**
Authors	**Marin, M.I., Abbas, I.A., Vlase, S., Craciun, E.-M**
Journal	**Frontiers in Physics** **8,41**
Abstract	**In our study, we define the linear backward in time problem for a thermoelastic body with a dipolar structure. In our first main result, we prove the uniqueness of the solution for this problem. Afterward, the issue of locating solutions of the backward in time problem in time will be approached as a consequence of the uniqueness result. In fact, we address the question of the impossibility of locating the solution of this problem in time.**

Title	**Cationic gemini-surfactants based on waste cooking oil as new 'green' inhibitors for N80-steel corrosion in sulphuric acid: A combined empirical and theoretical approaches**
Authors	**Khalaf, M.M., Tantawy, A.H., Soliman, K.A., Abd El-Lateef, H.M.**
Journal	**Journal of Molecular Structure 1203,127442**
Abstract	**The objective of this report is to investigate the inhibition of cationic gemini-surfactants based on waste cooking, as a green source of inhibitors against acidic corrosion of N80-steel. Two Gemini cationic surfactants have been prepared based on waste frying oil with full characterization by different spectral tools (FTIR, 1H NMR and 13C NMR), and investigated as sustainable inhibitors for N80-steel corrosion in 1.0 M sulphuric acid. The activities of the prepared Gemini cationic compounds were evaluated from the surface-tension studies. The corrosion protection capacity was evaluated by utilizing electrochemical tools namely; LPR corrosion rate, electrochemical impedance-spectroscopy (EIS) and potentiodynamic-polarization (PDP) methods. The PDP findings demonstrated that these surfactants behaved as mixed-typed inhibitors. The surfactants prohibited N80-steel corrosion at a lower [inhibitor] and supplied an inhibition capacity of 96.48–97.86% in 1 × 10−3 mol/l. The protection power increased with increasing both [surfactant] and alkyl group length. The surfactants adsorb on N80-steel in the studied corrosive medium through chemisorption interactions and their adsorption followed the adsorption model of Langmuir. Surface morphology observations (FE-SEM and FTIR) suggest that the surfactant species formed a defensive layer on the N80-steel interface. The electronic properties of the prepared surfactants were examined by using DFT calculations (density functional theory). Theoretical findings are consistent with the empirical outcomes.**

Title	**Synthesis and characterization of new Cr(III), Fe(III) and Cu(II) complexes incorporating multi-substituted aryl imidazole ligand: Structural, DFT, DNA binding, and biological implications**
Authors	**Abu-Dief, A.M., Abdel-Rahman, L.H., Abdelhamid, A.A., (...), Almaghrabi, O.A., Nafady, A.**
Journal	**Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy 228,117700**
Abstract	**Designing new metal-based molecular antibiotics is an efficient approach to overcome the growing threat of antimicrobial resistance. In this paper, novel Cr(III), Fe(III) and Cu(II) complexes comprising substituted aryl imidazole ligand (MSEB), namely (2-(1-(2-hydroxyethyl)-4,5-diphenyl-1H-imidazole-2-yl)(4-bromophenol)) have been synthesized and characterized using infra-red (IR), ultraviolet-visible (UV-Vis) and 1H, 13C NMR spectroscopic techniques, together with elemental (CHN) and thermogravimetric analyses, molar conductance, and magnetic susceptibility measurements. The combined results along with the DFT calculations revealed a 1:1 (M: L) stoichiometric ratio and the complexes adopted distorted-octahedral geometries to afford [Cr(MSEB)Cl2(H2O)2], [Fe(MSEB)(NO3)2(H2O)2] and [Cu(MSEB)Cl(H2O)3] respectively. Biological studies showed that all complexes exhibited powerful antimicrobial activity against various strains of bacteria and fungi, S. aureus (+ve), E. coli (-ve) and P. aeruginosa (-ve) bacteria and T. Rubrum, C. albicans, and A. flavus fungi. Moreover, the three metal-complexes showed high in vitro cytotoxicity against Colon (HCT-116), Breast (MCF-7), and hepatic cellular (HepG-2) carcinoma cell lines, with MSEBCu complex being the most cytotoxic one. Finally the binding interactions of the complexes with CT-DNA were explored using UV-Vis spectroscopy, viscosity and gel electrophoreses measurements.**

Title	**Electrochemical impedance investigation of urea oxidation in alkaline media based on electrospun nanofibers towards the technology of direct-urea fuel cells**
Authors	**Mohamed, I.M.A., Kanagaraj, P., Yasin, A.S., Iqbal, W., Liu, C.**
Journal	**Journal of Alloys and Compounds 816,152513**
Abstract	**Electrooxidation of urea was investigated by use of electrospun nanofibers through electrochemical impedance analyses (EIS) which is the best technique to study the electron transfer in anodic reactions. The effects of the fitting method, urea concentration and polarized potential on the impedance behavior are deeply studied to understand more about the anodic process of urea. The best-fitting equivalent circuit (Rh, R1/CPE1, R2/CPE2) should have two charge transfer processes in addition to electrolyte resistance, i.e., the formation of NiOOH and urea degradation. The Nyquist (Z/, -Z//) plots showed two semicircles in the presence of urea/KOH, which can be related to the conversion of Ni(OH)2 to NiOOH and urea oxidation at high and low-frequency regions, respectively. At higher urea contents, the electrode surface was covered by more urea beside OH−, and hence the Ni-activation process was decreased which interpreted the decreasing of oxidation at higher urea concentrations. Among the investigated polarized potentials, the best impedance behavior was observed at 0.40 V. The higher impedance behavior in the case of higher potentials can be interpreted via the adsorption of intermediates at the surface of the electroactive catalyst. The mechanism of electrooxidation was suggested deeply to understand the anodic behavior of urea-fuel cells.**

Title	**Synthesis, catalysis, antimicrobial activity, and DNA interactions of new Cu(II)-Schiff base complexes**
Authors	**Adam, M.S.S., Abdel-Rahman, L.H., Abu-Dief, A.M., Hashem, N.A.**
Journal	**Inorganic and Nano-Metal Chemistry 50(3), pp. 136-150**
Abstract	**Structural features and catalytic activities of five ternary copper (II)-Schiff base complexes are investigated. The ligands are derived from 3-methoxysalicylaldehyde (MS) or 4-diethylaminosalicylaldehyde (DS) and amino acids {L-phenylalanine (Phe), L histidine (His) or DL-tryptophan (Trp)}, as primary ligands, and 2,4′-bipyridyl (DP) as a secondary ligand. Cu(II)-complexes are characterized by various physicochemical tools. The catalytic efficiency of Cu(II)-complexes is studied in the oxidation of benzyl alcohol by an aqueous H2O2 in different reaction conditions. Temperature and catalyst features are involved in order to obtain the optimized catalytic oxidation conditions of benzaldehyde production. The Schiff base ligands and their ternary complexes are screened for their antimicrobial activities in various types of fungi and bacteria. The interaction between Cu(II)-complexes and (CT-DNA) was examined by employing various techniques, including viscosity, spectral and gel electrophoreses studies.**

Title	**A Novel Distributed Approach for Frequent Subgraphs Mining Across Cloud Computing System (DistFsm)**
Authors	**Elshrkawey, M., Refaat, H.E., Amin, H.H.**
Journal	**Applied Mathematics and Information Sciences 14(2), pp. 297-307**
Abstract	**In this paper, a novel approach known as DistFSM is presented for the FSM on a single graph. The DistFSM operation performed on a cloud computing system is framed on a set of heterogeneous clusters. Each cluster is a set of homogenous nodes. The input graph is converted into a sparse matrix. This matrix is partitioned horizontally into a sequence of non-equivalent chunks. Each chunk size is computed to be appropriate to the available worker resources in one of the clusters. In each cluster, the chunk is partitioned vertically into equivalent tasks. Each task is assigned to one of the worker nodes. The proposed partitioning method defined as the Hori-Vertical partition and aims to accomplish the load balancing among the different nodes in the different clusters. Each node performs its operation individually without any communication with other nodes. The non-equivalent chunks assigned to the different clusters allow them to finish their operation simultaneously. This strategy increases the resource usage by prohibiting or reducing the waiting time of the high-performance clusters. Finally, the results of all clusters are summarized and submitted to a distributed shared memory of the orchestration node to perform the required aggregation operations.**

Title	**Generalization of the Bernstein–Vazirani algorithm beyond qubit systems**
Authors	**Nagata, K., Geurdes, H., Patro, S.K., (...), Farouk, A., Nakamura, T.**
Journal	**Quantum Studies: Mathematics and Foundations** **7(1), pp. 17-21**
Abstract	**Here, we generalize the Bernstein–Vazirani algorithm beyond qubit systems. First, we review the Bernstein–Vazirani algorithm for determining a bit string. Second, we discuss the generalized Bernstein–Vazirani algorithm for determining a natural number string. The speed of determining the strings is shown to outperform the best classical case by a factor of the number of the systems in every cases.**

Title	**A GL model on thermo-elastic interaction in a poroelastic material using finite element method**
Authors	**Saeed, T., Abbas, I., Marin, M.**
Journal	**Symmetry 12(3),488**
Abstract	**The purpose of this study is to provide a method to investigate the effects of thermal relaxation times in a poroelastic material by using the finite element method. The formulations are applied under the Green and Lindsay model, with four thermal relaxation times. Due to the complex governing equation, the finite element method has been used to solve these problems. All physical quantities are presented as symmetric and asymmetric tensors. The effects of thermal relaxation times and porosity in a poro-thermoelastic medium are studied. Numerical computations for temperatures, displacements and stresses for the liquid and the solid are presented graphically.**

Title	**Bioaccumulation of heavy metals in urban tree leaves**
Authors	**Youssef, N.A.**
Journal	**Egyptian Journal of Botany** **60(1), pp. 261-273**
Abstract	**LEAVES of nine tree species (Pinus halepensis Mill, Pinus sylvestris L., Cupressus italica, Cupressus arizoneka Greene, Quercus robur L., Quercus ilex L., Ficus nitida L., Eucalyptus globulus Labill and Casuarina equisetifolia L.) were used to inspect accumulation of heavy metals emitted at areas with different pollution load in Baku (Azerbaijan). Concentrations of Cr, Cu, Mn, Pb, Zr, Ti, V, Bi, Cd, Ni, and Zn were determined by inductive coupled plasma (ICP-MS) and EDRF (energy dispersive X-ray fluorescence). Concerning Fe, Cd, Cu, Pb, Zn and Zr concentrations, the ICP results declared a relative increase. Unlike the rest species, the concentration of Ni in E. globulus, C. equisetifolia, F. nitida and C. italica leaf samples was higher than 10mg/kg, which is the beginning of toxic concentration. V concentration still in the normal range (0.2-1.5mg/kg). All tested tree leaves have Cr concentration within the toxic range (<5mg/kg), except P. halepensis, P. sylvestris and C. italica trees. The results showed a relatively high content of Zr in genus Quercus, ranging from 0.15 to 3.13ppm. The results of EDRF were slightly different, where higher Cu (8.07%), Zn (38.6%), I (55.12%) and Co (4.86%) characterizes the industrial site, whereas areas of high traffic dominated by elevated concentrations of Pb (9.91%), Cd (0.29%), Mo (0.17%) and Cr (59.05%). These variations enhanced the idea that these sites were influenced by different sources of pollution. The findings may be useful for future surveillance as preliminary reference values for levels of heavy metals in urban and industrial settings.**

Title	**Some optical properties for AG X $(GA_{0.4}\ SE_{0.6})_{100-x}$ system (x = 2.5, 5.0, 7.5, 10.0 and 12.5)**
Authors	**Gami, F., Mobarak, M., Dongol, M., (...), Sebak, M.A., Mahdy, H.T.**
Journal	**International Journal of Scientific and Technology Research 9(3), pp. 5388-5393**
Abstract	**Thin films for Agx(Ga0.4 Se0.6)100-x (x=2.5, 5, 7.5, 10 and12.5 at. %) which prepared by thermal evaporation technique in room temperature, The optical properties of Agx(Ga0.4Se0.6)100-x films as a function of Ag-content were studied by measurements (for spectrum range 400-1100 nm). Transmittance, T and reflectance, R were measured. The extinction coefficient, k and the refractive index, n were found to be practically dependence on the film composition, optical energy gap (Egopt), dispersion energy (Ed), oscillator energy (Eo) as well as, the high frequency dielectric constant (Ɛ∞) and the lattice dielectric constant (ƐL). The optical gap, Egopt decreases (2.7: 2.4 eV) as the Ag-content increase (2.5:12.5at%), this decrease was attributed to the increase of the density of localized states according to Mott and Davis model...**

Title	**Modified CQ-Algorithms for G -Nonexpansive Mappings in Hilbert Spaces Involving Graphs**
Authors	**Cholamjiak, W., Yambangwai, D., Dutta, H., Hammad, H.A.**
Journal	**New Mathematics and Natural Computation 16(1), pp. 89-103**
Abstract	**In this paper, we introduce four new iterative schemes by modifying the CQ-method with Ishikawa and S-iterations. The strong convergence theorems are given by the CQ-projection method with our modified iterations for obtaining a common fixed point of two G-nonexpansive mappings in a Hilbert space with a directed graph. Finally, to compare the rate of convergence and support our main theorems, we give some numerical experiments.**

Title	**Beta3-tubulin is critical for microtubule dynamics, cell cycle regulation, and spontaneous release of microvesicles in human malignant melanoma cells (A375)**
Authors	**Altonsy, M.O., Ganguly, A., Amrein, M., (...), Lauzon, G.J., Mydlarski, P.R.**
Journal	**International Journal of Molecular Sciences 21(5),1656**
Abstract	**Microtubules (MTs), microfilaments, and intermediate filaments, the main constituents of the cytoskeleton, undergo continuous structural changes (metamorphosis), which are central to cellular growth, division, and release of microvesicles (MVs). Altered MTs dynamics, uncontrolled proliferation, and increased production of MVs are hallmarks of carcinogenesis. Class III beta-tubulin (β3-tubulin), one of seven β-tubulin isotypes, is a primary component of MT, which correlates with enhanced neoplastic cell survival, metastasis and resistance to chemotherapy. We studied the effects of β3-tubulin gene silencing on MTs dynamics, cell cycle, and MVs release in human malignant melanoma cells (A375). The knockdown of β3-tubulin induced G2/M cell cycle arrest, impaired MTs dynamics, and reduced spontaneous MVs release. Additional studies are therefore required to elucidate the pathophysiologic and therapeutic role of β3-tubulin in melanoma.**

Title	**Entanglement and photon statistics of two dipole–dipole coupled superconducting qubits with Kerr-like nonlinearities**
Authors	**Aldaghfag, S.A., Berrada, K., Abdel-Khalek, S.**
Journal	**Results in Physics 16,102978**
Abstract	**The engineering of Kerr and time-dependent coupling interactions is of great attention for treating quantum information in quantum systems and for investigating the collective behavior of large numbers of interacting particles in a cavity-qubit network. In this manuscript, we investigate the time evolution of the entanglement and some nonclassical properties of two superconducting qubits interacting with a single-mode field in the presence of a Kerr-like medium and dipole–dipole interaction without and with time-dependent coupling effect. We show that a slight alteration in the interaction, detuning, and Kerr parameters might cause a change in the entanglement of subsystem states during the evolution. By taking into account the influence of the different physical parameters, we show the statistical distributions produced in the photons of the single mode field through the calculation of the Mandel's parameter. Finally, we find that the time-dependent Mandel's parameter not only provide the statistical properties of the field, but also include the information of quantum entanglement for the subsystem states.**

Title	**Weighted composition operator acting between some classes of analytic function spaces**
Authors	**Ahmed, A.E.-S., Al-Ahmadi, A**
Journal	**Journal of Computational Analysis and Applications 29(2), pp. 300-308**
Abstract	**In this paper, we define some general classes of weighted analytic function spaces in the unit disc. For the new classes, we investigate boundedness and compactness of the weighted composition operator uCφ under some mild conditions on the weighted functions of the classes.**

Title	**Environmental pollution assessment of Al-Musk Lake, Jeddah, Saudi Arabia**
Authors	**Hakami, B.A., Seif, E.-S.S.A., El-Shater, A.A.**
Journal	**Natural Hazards** **101(2), pp. 429-448**
Abstract	**Jeddah represents the second largest city in Saudi Arabia and has more than 3.5 million residents. The daily estimated water used per capita is 200 L. The absence of a well-done network of sewage in some places especially in south Jeddah (Old Jeddah) considered a serious environment. In Jeddah, the potable water used for municipal purposes is mostly returning to the surrounding environments as wastewater (e.g., Al-Musk Lake). The site Al-Musk Lake uses as sewage dumping lake without any purification processes till the year 2010. The wastewater of this lake caused various environmental dangers owing to heavy metal contamination of surface sediments, groundwater, soil and air. Its areal distribution has been increased during last 17 years (2000–2017). Its surface fine-grained sediments are including a huge amount of heavy metals and organic contaminants owing to accumulation of sewage water during the last two decades. The climate of the Saudi Arabia is mostly dry hot continental condition so that, the topmost clayey sediments of this lake are enriched in pollutants. That means, wind will carry these pollutants directly to Jeddah and the surrounding regions and are inhaled by residing citizens in these regions during respiration and thus could cause a variety of respiratory diseases or other infections. Owing to accumulation of sewage water-bearing organic materials during last 17 years, Al-Musk Lake subsurface sediments contain considerable amounts of heavy metals (Pb, Cd, As, Cu, Co and Hg) and organic materials. The organic matter content (OMC) of the studied surface soil samples varies from 4.2 to 11.3%. The OMC has a significant strong relationship with both silt and clay contents of the studied soil samples.**

Title	**Emission spectrum and geometric phase in deformed Jaynes-Cummings model**
Authors	**Altowyan, A.S., Abdel-Khalek, S., Berrada, K.**
Journal	**Results in Physics 16,102924**
Abstract	**The emission spectrum of a qubit (two-level atom) system that interacts with a field in the framework of parity deformations is investigated in this paper. The model consists of a qubit coupled to a single-mode field within the parity deformed Jaynes-Cummings model (PDJCM) based on the λ-analog of the quantum harmonic oscillator algebra. We numerically evaluate the atomic emission spectrum (AES), by considering the influence of the deformed parameter and half-band-width of the spectrometer. Moreover, the dependence of the spectrum peaks on the detuning parameter is discussed. Finally, we study the variation of the geometric phase of the whole system state modelled by the PDJCM in terms of the main physical parameters.**

Title	**Corynebacterium tuberculostearicum, a human skin colonizer, induces the canonical nuclear factor-κB inflammatory signaling pathway in human skin cells**
Authors	**Altonsy, M.O., Kurwa, H.A., Lauzon, G.J., (...), Almishri, W., Mydlarski, P.R.**
Journal	**Immunity, Inflammation and Disease** **8(1), pp. 62-79**
Abstract	**Introduction: Corynebacterium tuberculostearicum (C. t.) is a ubiquitous bacterium that colonizes human skin. In contrast to other members of the genus Corynebacterium, such as toxigenic Corynebacterium diphtheriae or the opportunistic pathogen Corynebacterium jeikeium, several studies suggest that C. t. may play a role in skin health and disease. However, the mechanisms underlying these effects remain poorly understood. Methods: To investigate whether C. t. induces inflammatory pathways in primary human epidermal keratinocytes (HEKs) and human cutaneous squamous carcinoma cells (SCCs), cell culture, reverse transcription-polymerase chain reaction (PCR), enzyme-linked immunosorbent assay, immunofluorescence microscopy, Western blot, chromatin immunoprecipitation-PCR, small interfering RNA knockdown and luciferase reporter expression system were used. Results: Herein, we demonstrate that C. t. upregulates the messenger RNA (mRNA) and protein levels of inflammatory mediators in two human skin cell lines, HEKs and SCCs. We further show activation of the canonical nuclear factor-κB (NF-κB) pathway in response to C. t. infection, including phosphorylation of the inhibitor of κB (IκB), the nuclear translocation of NF-κB subunit (NF-κB-P65) and the recruitment of NF-κB-P65 and RNA polymerase to the NF-κB response elements at the promoter region of the inflammatory genes. Lastly, the data confirm that C. t.-induced tumor necrosis factor mRNA expression in HEKs is toll-like receptor 2 (TLR2) dependent. Conclusion: Our results offer a mechanistic model for C. t.-induced inflammation in human keratinocytes via TLR2 and activation of IκB kinase and downstream signaling through the canonical NF-κB pathway. Relevance to chronic inflammatory diseases of the skin and cutaneous oncology is discussed.**

Title	**Toxicological potential of penconazole on early embryogenesis of white mice Mus musculus in either pre- or post-implantation exposure**
Authors	**El-Shershaby, A.E.-F.M., Lashein, F.E.-D.M., Seleem, A.A., Ahmed, A.A.**
Journal	**Environmental Science and Pollution Research 27(9), pp. 9943-9956**
Abstract	**The present investigation was conducted to evaluate the effect of penconazole (PEN) fungicide on early embryogenesis of white mice. In the first experiment, 48 pregnant females were divided into different groups; the first group is control (G1). The second group (G2) was treated daily with PEN (30-, 20-, 10-, 5-mg/kg BW). The third group (G3) was treated with PEN (5-mg/kg BW; day after the other day). The fourth group (G4) was treated with PEN (2.5-mg/kg BW daily) during pre-implantation stage (from the 1st to the 4th day of gestation). The fifth group (G5) was treated with PEN (2.5-mg/kg BW daily) during post-implantation (from the 5th to the 8th day of gestation). The pregnant females were sacrificed at the 14th day of gestation. In the second experiment, 63 pregnant females were classified into control, PEN-treated during pre-implantation period (2.5-mg/kg BW), and PEN-administered during post-implantation period (2.5-mg/kg BW). Each group was sacrificed at stages E6.5, E7.5, E8.5, E9.5, E11.5, E14.5, and E18.5. The high doses of PEN in the first experiment showed failed pregnancy, foetoresorption, and embryo disorganization. High doses of PEN induce alterations in the uterus tissue at the level of histology and immunohistochemistry for the expression of TGFβ2, TNFR2, Caspase 10, and HSP70. The low doses of PEN in the second experiment showed upregulated expression of TGFβ2, TNFR2, Caspase 10, and HSP70 at stages E6.5 and E7.5. In conclusion, PEN was found to alter the suitable uterine environment for proper implantation and development at the levels of histological and immunohistochemical that could create a risk during the full course of embryogenesis.**

Title	**Optical soliton solutions for a space-time fractional perturbed nonlinear Schrödinger equation arising in quantum physics**
Authors	**Abdou, M.A., Owyed, S., Abdel-Aty, A., Raffah, B.M., Abdel-Khalek, S.**
Journal	**Results in Physics 16,102895**
Abstract	**Based on the work of Atangana-Baleanu [Open Math. 13 1 (2015)] we obtain new solutions of space-time fractional nonlinear Schrödinger equation, where [Formula presented]-expansion and generalised Kurdyashov methods are suggested. The results obtained here include the hyperbolic, rational and trigonometric functions. Also, the behavior of the solutions is tested with changing of the values of fractional order, we can note that the obtained solutions reduced back to the results reported previously to the normal case i.e, $\alpha = 1$ and $\beta = 1$, that we can say that the fractional order can be used as a controlling parameter of the system solutions. We can see from the obtained results the all solutions almost same, the difference only on the initial point, where we can say that the proposed methods and the steps to find the solutions are more efficient and accurate.**

Title	**Influence of synthesis conditions on physico-chemical and photocatalytic properties of rare earth (Ho, Nd and Sm) oxides**
Authors	**Narasimharao, K., Ali, T.T.**
Journal	**Journal of Materials Research and Technology 9(2), pp. 1819-1830**
Abstract	**Three different rare earth metal (samarium, neodymium and holmium) oxides were synthesized by adapting organic and inorganic routes. The influence of synthesis route over the physico-chemical characteristics of the rare earth metal oxides was studied using X-ray diffraction, FT-IR, thermogravimetric analysis, microscopy (FESEM and HRTEM), N2-physisorption and diffusive reflective ultraviolet-visible spectroscopy techniques. The XRD, electron microscopy and N2-physisorption results indicated that the samples synthesized by organic route possessed smaller crystallite/particle size and high surface area with macro size pores compared to the samples synthesized by inorganic route. The synthesis conditions also influenced the morphology of the samples. The samples synthesized by organic route possessed sheets like morphology with large spaces in between the sheets, in contrast highly agglomerated particles were observed in case of samples synthesized by inorganic route. All the synthesized rare earth oxides were utilized as photocatalysts for degradation of crystal violet dye under visible light irradiation. The samples synthesized by organic route exhibited high photocatalytic efficiencies. Samarium oxide synthesized using organic route offered the superior photocatalytic performance as this sample possessed low band gap energy, high surface area, pore volume and presence of surface reactive -OH groups. In addition, the synthesized rare earth metal oxide catalysts exhibited excellent recyclability for photocatalytic crystal violet degradation.**

Title	**Linear and Non-linear Optical Parameters of Diluted Magnetic Semiconductor $CdS_{0.9}Mn_{0.1}$ Thin Film: Influence of the Film Thickness**
Authors	**Abdelraheem, A.M., Abd-Elrahman, M.I., Mohamed, M., Hadia, N.M.A., Shaaban, E.R.**
Journal	**Journal of Electronic Materials 49(3), pp. 1944-1956**
Abstract	**The optical properties of CdS0.9Mn0.1 thin film with different thicknesses (d = 300, 450, 600, 750, 900 and 1000 nm) were explored. The Swanepoel method was employed to calculate the thickness of the studied films. Analyses of the absorption spectra indicated the existence of allowed indirect and direct transition mechanism in the CdS0.9Mn0.1 thin films. Both the absorption coefficient and optical band gap decreased while Urbach energy increased as the film thickness increased. The Wimple–DiDomenico single oscillator model was used to describe the dispersion of the refractive index. The film thickness dependence of the dispersion parameters was studied. The optical dielectric constants, optical conductivity, electrical susceptibility, and non-liner optical parameters such as the refractive index, first-order susceptibility (χ(1)) and third-order susceptibility (χ(3)) were determined. The present results show that the film thickness is an important factor which affected the optical parameters.**

Title	**Inactivation by helium cold atmospheric pressure plasma for Escherichia coli and Staphylococcus aureus**
Authors	**Lotfy, K., Khalil, S.M., El-Raheem, H.A.**
Journal	**Journal of Theoretical and Applied Physics 14(1), pp. 37-45**
Abstract	**A helium cold atmospheric pressure plasma jet (HCAPPJ) driven by a commercial neon power supply was designed and utilized for inactivation bacteria. The generated reactive spices by HCAPPJ were investigated by optical emission spectroscopy. The reactive species of OH, OI, OI, N21+, N21+ and He were identified in the UV–Vis wavelength region. The reactive species was not detected between 200 nm and 300 nm, as the flow rate of helium gas increased that led to the plasma temperature reducing to a value near to the room temperature. In this work, we studied the impact of HCAPPJ on Gram-positive and Gram-negative bacteria. The survival amounts of the two types of bacteria were decreased vastly when the rate flow rate was equal to 10 L/min.**

Title	**Enhanced thermoelectric figure of merit in Bi-containing Sb_2Te_3 bulk crystalline alloys**
Authors	**Adam, A.M., El-Khouly, A., Novitskii, A.P., (...), Salem, M.M., Khovaylo, V.**
Journal	**Journal of Physics and Chemistry of Solids 138,109262**
Abstract	**In the present work, the structural and thermoelectrical properties of Sb2-xBixTe3 samples prepared by the usual melting method were studied. The samples were milled, pressed and then annealed under vacuum for 3 h at 250 °C. Investigations of the microstructure and surface morphology were carried out using X-ray diffraction analysis, scanning electron microscopy and energy-dispersive X-ray spectroscopy. The Seebeck coefficient and electrical and thermal conductivities were measured from 300 to 473 K. Thermopower data indicated a p-type conduction in the samples. Structural defects were present in Sb2Te3 during Bi addition, acting as scattering centers and leading to a decrease in thermal conductivity, thus increasing the thermopower and power factor. The power factor showed its maximum value of around 24.7 μW/cm K2 for the sample containing the highest Bi content. High figure of merit of 1.14 was recorded for the same sample, indicating that the Bi-containing Sb2Te3 and the related alloys are promising materials for more efficient thermoelectric devices.**

Title	**Entanglement, photon statistics and Wehrl entropy for a time-dependent qubit–field system in the presence of phase decoherence effect**
Authors	**Abdel-Khalek, S.**
Journal	**Optik** **206,163579**
Abstract	**We investigate the effect of qubit motion in terms of speed and acceleration on the variation in dynamic behavior of Wehrl entropy, second order correlation function and qubit–field entanglement. We consider three different coherent states of low-power potential (CSLPP) through the value of its exponent, specifically, the infinite-square, triangular, and harmonic potential wells. The relationship between the photon statistics quantified by the second order correlation function and nonclassical correlation of the qubit–field system is explored as the system evolves. The results show that the proposed scheme is very sensitive to the value of the exponent for both a moving and a stationary qubit. A high correlation between the qubit and CSLPP field is achieved by a proper choice of exponent, qubit speed, and acceleration.**

Title	**Integration of 2D geoelectrical resistivity imaging and boreholes as rapid tools for geotechnical characterization of construction sites: A case study of New Akhmim city, Sohag, Egypt**
Authors	**Abudeif, A.M., Mohammed, M.A., Fat-Helbary, R.E., El-Khashab, H.M., Masoud, M.M.**
Journal	**Journal of African Earth Sciences 163,103734**
Abstract	**Due to the increasing in the population density, the restriction of the agricultural areas and the scarcity of building's lands and their highly costs in Egypt, especially in Sohag province which led the officials and decision-markers to search for alternatives in the desert places to solve this problems. Therefore, New Akhmim area was proposed as a new site for constructing a new city. The main aim of this research is to delineate the engineering characteristic of the soil, identify of the bedrock depth and determine the subsurface structures and lithology of the investigated site. Great effort should be done to determine the depth to competent layer (bedrock) within the proposed site and correlate the results with the available boreholes. Complementary geophysical tool was implemented for the engineering designs in order to ensure stability of building construction and evade the shocking effects of building collapse later. Thus, electrical resistivity tomography (ERT) was undertaken on the present site for monitoring these subsurface engineering issues. The field geometry was made up of eight profiles using Wenner configuration. The data of the 2D resistivity tomography along these profiles with smallest electrode separation of 5 m were interpreted using Res2dinv software. The subsurface is characterized by three different resistivity zones, which were interpreted as gravel intercalated with coarse sands at the top, sand beneath it and shale beneath the sand layer. The ERT results were in consistent with the results of ten engineering boreholes drilling in the study area. The presence of shale was correlated to the cause of chronic differential settlements of some engineering structures like slickensides due to drying and wetting within the area. No serious structural features were detected as faults, karstification phenomena or caving. So the area is valid for construction proposes.**

Title	**Synthesis of mesoporous nickel ferrite nanoparticles by use of citrate framework methodology and application for electrooxidation of glucose in alkaline media**
Authors	**Mohammed, F.A., Khalaf, M.M., Mohamed, I.M.A., Saleh, M.M., Abd El-Lateef, H.M.**
Journal	**Microchemical Journal 153,104507**
Abstract	**Electrooxidation of glucose in alkaline media is a critical issue as a clean source for Fuel cell application. The using of noble metals as anodes obstructs the economic cost of the glucose fuel cells (GFCS). That is why the trend is towards the recent doped metal oxides designs as low-cost anodes electrocatalysts. Here, Nickel ferrite (NiFe2O4) nanoparticles (NFNPs) were simply prepared by the formation of citrate framework followed by combustion and calcination as a promising anode for GFCS at high pH. The as-designed NFNPs were investigated in terms of FE-SEM, TEM, EDX, and XRD analyses. The crystallinity study confirms the formation of NiFe2O4 cubic spinel with a crystallite size of around 13.7 nm. The surface morphology has a sponge-like structure with an irregular shape of pores. The diameters of sponge are varying, and the average is around ~ 572 nm. The successful formation of a porous network can be related to the releasing of considerable amounts of gaseous products during the combustion process at 180 °C and calcination process at 400 °C. The synthesized NFNPs showed enhanced electrocatalytic characteristics at different glucose contents up to 60.0 mM. Besides the high produced current, the enhanced stability and charge transfer were observed for the application of NFNPs in GEO.**

Title	**Detection of free and bound microcystins in tilapia fish from Egyptian fishpond farms and its related public health risk assessment**
Authors	**Mohamed, Z., Ahmed, Z., Bakr, A., Hashem, M., Alamri, S.**
Journal	**Journal fur Verbraucherschutz und Lebensmittelsicherheit 15(1), pp. 37-47**
Abstract	**Microcystins (MCs), the most common cyanobacterial toxins in freshwaters, can accumulate in aquatic animals in free and bound forms. MCs therefore pose a risk to human health upon consumption of contaminated fish tissues, as they cause severe liver damage and death with potential carcinogenic effects. While there have been extensive studies on free MC contents in fish tissues, the detection of bound MCs in fish is largely unexplored. In the present study, both free and bound MCs were monthly monitored in tilapia fish from three tropical fishponds in Egypt for one year. Fishpond waters contained high concentrations of MCs (18–44 µg/l). Free MCs were estimated in tilapia fish organs at levels up to 11.8 ng/g in intestines, 8.3 ng/g in livers and 0.38 ng/g in edible tissues. Concentrations of bound MCs in edible tissues as determined by Lemieux oxidation technique (15,000–19,000 ng/g fresh weight, FW) were several-folds higher than free MCs. The estimated daily intake (EDI) for free MCs (0.0006–0.002 µg/kg/day MCs) in edible tissues was lower than the WHO limit (0.04 µg/kg/day), while EDI of bound MCs exceeded this limit by a factor of 77–2396. Therefore, both free and bound MCs in fish tissues should be considered when fish are monitored for human consumption.**

Title	**Solution of Nonlinear Integral Equation via Fixed Point of Cyclic αLψ - Rational Contraction Mappings in Metric-Like Spaces**
Authors	**Hammad, H.A., De la Sen, M.**
Journal	**Bulletin of the Brazilian Mathematical Society 51(1), pp. 81-105**
Abstract	**In this paper, we introduce the notions of αLψ-rational contractive and cyclic αLψ- rational contractive mappings and establish the existence and uniqueness of fixed points for such mappings in complete metric-like spaces (dislocated metric spaces). The results presented here substantially generalize and extend several comparable results in the existing literature. As an application, we prove new fixed point results for ψL-graphic and cyclic ψL-graphic rational contractive mappings. Moreover, some examples and an application to integral equation are presented here to illustrate the usability of the obtained results.**

Title	**Chemoenzymatic Halocyclization of 4-Pentenoic Acid at Preparative Scale**
Authors	**Höfler, G.T., But, A., Younes, S.H.H., (...), Arends, I.W.C.E., Hollmann, F.**
Journal	**ACS Sustainable Chemistry and Engineering 8(7), pp. 2602-2607**
Abstract	**The scale-up of chemoenzymatic bromolactonization to 100 g scale is presented, together with an identification of current limitations. The preparative-scale reaction also allowed for meaningful mass balances identifying current bottlenecks of the chemoenzymatic reaction.**

Title	**Investigation of soliton solutions with different wave structures to the (2 + 1)-dimensional Heisenberg ferromagnetic spin chain equation**
Authors	**Osman, M.S., Tariq, K.U., Bekir, A., (...), Younis, M., Abdel-Aty, M.**
Journal	**Communications in Theoretical Physics 72(3),035002**
Abstract	**The principal objective of this article is to construct new and further exact soliton solutions of the (2 + 1)-dimensional Heisenberg ferromagnetic spin chain equation which investigates the nonlinear dynamics of magnets and explains their ordering in ferromagnetic materials. These solutions are exerted via the new extended FAN sub-equation method. We successfully obtain dark, bright, combined bright-dark, combined dark-singular, periodic, periodic singular, and elliptic wave solutions to this equation which are interesting classes of nonlinear excitation presenting spin dynamics in classical and semi-classical continuum Heisenberg systems. 3D figures are illustrated under an appropriate selection of parameters. The applied technique is suitable to be used in gaining the exact solutions of most nonlinear partial/fractional differential equations which appear in complex phenomena.**

Title	**Numerical study for Carreau nanofluid flow over a convectively heated nonlinear stretching surface with chemically reactive species**
Authors	**Eid, M.R., Mahny, K.L., Dar, A., Muhammad, T.**
Journal	**Physica A: Statistical Mechanics and its Applications 540,123063**
Abstract	**An analysis has been carried out to study a problem of the boundary-layer flow of Carreau nanofluid over a non-linearly stretched sheet with chemical reaction and the heat generation/absorption in a porous medium. A power-law model includes a two-phase model for Carreau nanofluid with a convective condition. The governing PDEs with the corresponding boundary conditions are modified to a system of non-linear ODEs with the appropriate boundary conditions by picking local similarity conversions and solved numerically by using Runge–Kutta–Fehlberg 4th–5th order numerical method (RKF45) on based shooting technique. This investigation discusses the effects of study parameters like the porosity parameter K1, the heat source $\lambda>0$ or sink $\lambda<0$ parameter, the chemical reaction parameter $\gamma 1$ and the Biot number Bi on flow velocity, temperature and nanofluid volume fraction in addition to the heat and mass transfer rates tabular and graphically. A comparative study is likewise revealed showing the comparison of current results with previously published data.**

Title	**Synthesis, surface characterization and electrochemical performance of ZnO @ activated carbon as a supercapacitor electrode material in acidic and alkaline electrolytes**
Authors	**Mohamed, I.M.A., Yasin, A.S., Liu, C.**
Journal	**Ceramics International 46(3), pp. 3912-3920**
Abstract	**The chemical and surface modification of activated carbon (AC) through the incorporation of nanoparticles (NPs) is a simple and efficient strategy to enhance the charge transfer as well as the capacitance behavior of AC. Herein, ZnO-NPs were successfully attached at the surface of AC via one-step hydrothermal process to form ZnO-NPs@AC (ZAC). The introduced ZAC-material was studied by surface characterization techniques including transmission electron microscopy (TEM), field emission scanning electron microscope (FESEM), X-ray powder diffraction (XRD), X-ray photoelectron spectroscopy (XPS) and Fourier-transform infrared spectroscopy (FT-IR) to investigate the morphological and chemical characteristics of ZAC. After that, ZAC was utilized as a working electrode (WE) material for supercapacitor in alkaline and acidic electrolytes. The specific capacitance (Cs) values of ZAC showed an enhanced performance as compared with that of the pristine AC. Moreover, the low series resistance and high Warburg co-efficient of ZAC as compared to those of the AC indicated the faster −OH diffusion inside the ZAC working electrode. Additionally, the phase angle of ZAC is closer to the ideal capacitor than that of AC. Overall, this study proved that ZnO-NPs can enhance the AC capacitance behavior through the easy chemical modification of AC.**

Title	**'Atypical Ugi' tetrazoles**
Authors	**Abdelraheem, E.M.M., Goodwin, I., Shaabani, S., (...), Kalinowska-Tłuścik, J., Dömling, A.**
Journal	**Chemical Communications** **56(12), pp. 1799-1802**
Abstract	**Amino acid-derived isocyano amides together with TMSN3, oxocomponents and 1° or 2° amines are common substrates in the Ugi tetrazole reaction. We surprisingly found that combining these substrates gives two different constitutional isomeric Ugi products A and B. A is the expected classical Ugi product whereas B is an isomeric product ('atypical Ugi') of the same molecular weight with the tetrazole heterocycle migrated to a different position. We synthesized, separated and characterized 22 different isomorphic examples of the two constitutional isomers of the Ugi reaction to unambiguously prove the formation of A and B. Mechanistic studies resulted in a proposed mechanism for the concomitant formation of A and B.**

Title	**Cephradine-Capped Gold Nanoparticle Modified Glassy Carbon Electrode for Trace Level Sensing of Triphenyltin Hydroxide**
Authors	**Memon, S.S., Sirajuddin, Nafady, A., (...), Memon, S., Abro, M.I.**
Journal	**Journal of the Electrochemical Society 167(13),137503**
Abstract	**Synthesis of highly stable gold nanoparticles (AuNps) was accomplished using cephradine (Cep) drug as the capping molecule and sodium borohydride as the reducing agent. Characterization studies such as ultraviolet-visible (UV-vis) spectroscopy confirmed the formation of AuNps while fourier transform infra-red (FT-IR) spectroscopy showed the interaction of AuNps with Cep. The size and shape of Cep-AuNps were investigated using atomic force microscopy (AFM) while their crystallinity was determined through X-ray diffractometry (XRD). The synthesized Cep-AuNps, after getting deposited on a glassy carbon electrode (GCE), proved as a highly responsive sensor for low-level detection of triphenyltin hydroxide (TPTH) using cyclic voltammetry (CV) as the determining mode in stirred solution. The developed sensor linearly responded to TPTH in the range of 1-80 nM with a lower detection limit (LDL) of 0.12 nM and R2 value of 0.9948 under optimized conditions. Importantly, the sensor was highly stable and reproducible, showing a relative standard deviation (RSD) value of 1.1% based on 15 replicative runs and proved to be extremely selective for TPTH with negligible interference in the presence of expected interfering species. The developed sensor was effectively utilized for monitoring TPTH in natural water samples.**

Title	**On the Jacobian of Kuribayashi curves**
Authors	**Kamel, A., Elshareef, W.K.**
Journal	**Communications in Algebra** **48(1), pp. 291-298**
Abstract	**Kuribayashi quartic curves: (Formula presented.) have total sextactic points if and only if a = 14 or a is a zero of P(a)=a3+68a2+98, c.f. [2]. In [1], the first author described the group generated by the total sextactic points in the Jacobian of Kuribayashi quartic when a=14 In this paper, we describe this group when a is a zero of P(a).**

Title	**Synthesis of some new indeno[1′,2′:3,4]fluoreno[1,2-d]oxonine-5,11,16,21-tetraones and oxocyclohex-1-en-1-yl-hydro-1H-xanthen-1-ones**
Authors	**Abdelhamid, A.A., Mohamed, S.K., Amer, A.A.**
Journal	**Synthetic Communications** **50(1), pp. 63-70**
Abstract	**The novel oxonine 2, 4 have been synthesized by the reaction of 1,3-indandione with 4-bromo-2-hydroxybenzaldehyde and/or 2-hydroxy-1-naphthaldehyde in the presence of 1,3-diaminopropan-2-ol as green basic catalyst. On the other hand, the reaction of 1,3-cyclohexanediones with 2-hydroxy aromatic aldehydes under the same reaction condition afforded xanthenone derivatives 9-11.**

Title	**Progressive First-Failure Censored Samples in Estimation and Prediction of NH Distribution**
Authors	**Abou-Elheggag, N.A., Farghal, A.-W.A., Abd-Elmougod, G.A., Taha, O.M.**
Journal	**Journal of Statistics Applications and Probability 11(1), pp. 189-204**
Abstract	**In this paper, we adopt the problem of estimation and prediction for Nadarajah and Haghighi (NH) distribution under the progressive first-failure censoring scheme. The obtained results can be specialized to the first-failure, progressive type-II, type-II, and complete data. The estimation results are formulated with maximum likelihood (ML) and Bayes methods of the unknown model parameters. The approximate confidence interval as well as Bayes highest posterior density (HPD) intervals are constructed with the help of MCMC method. Furthermore, two sample point and interval prediction of the sets of order and record samples are constructed. The estimation results are assessed and compared with the Monte Carlo study. The set of data are analyzed for illustration purposes. Finally, some brief comments are summarized.**

Title	**Growth inhibition of the toxic cyanobacterium Cylindrospermopsis raciborskii by extremely low-frequency electromagnetic fields Open Access**
Authors	**Mohamed, Z., Ali, F., Abdel-Lateef, M., Hosny, A.**
Journal	**Acta Botanica Croatica 79(2), pp. 193-200**
Abstract	**This study investigates the effects of extremely low-frequency electromagnetic fields (ELF-EMFs) on the growth and antioxidant defence enzymes of the toxic cyanobacterium Cylindrospermopsis raciborskii (Woloszynska) Seenayya et Subba Raju. To determine resonance frequency of growth inhibition of C. raciborskii, cells were subjected to ELF square amplitude modulated waves (QAMW) with a range of frequencies (0.1, 0.3, 0.5, 0.7, 0.9 Hz) at single intensity of 100 V m–1 for 30 minutes. The results revealed that the highest growth inhibition of Cylindrospermopsis occurred upon exposure to 0.7 Hz QAMW for 30 min. ELF-EMF-exposed cultures exhibited a marked decrease in cell number, chlorophyll-a content and activity of antioxidant enzymes compared to control cultures, and this effect increased with the prolongation of exposure time. Moreover, ELF-EMF induced morphological changes in Cylindrospermopsis cells upon exposure to 0.7 Hz QAMW for 120 min, including shrinking and disintegration of cytoplasmic contents, and thickening of the cell wall. Changes in dielectric properties, as a measure of interaction of cellular constituents (e.g., plasma membrane, cell wall and cytoplasm), with electromagnetic fields were also observed for treated cells. Our results provide a new possibility for using ELF-EMFs to eliminate toxic cyanobacteria from drinking and recreational water sources.**

Title	**Chromosomal changes linked with the effect of high dose of aluminum on faba bean (Vicia faba l.) root tips**
Authors	**Hassanein, A.M., Mohamed, A.H., Abd Allah, H.A., Zaki, H.**
Journal	**Caryologia** **73(4), pp. 141-151**
Abstract	**In this work, we cytogenetically described the effects of different relatively high doses of aluminum (5, 15 and 25 mM AlCl3) on mitotic activity and DNA integrity of faba bean (Misr 3 cultivar). Under Al stress, mitotic index (MI) decreased but total chromosomal abnormalities increased significantly compared to that of control. In addition, the detected chromosomal abnormalities in each mitotic phase increased significantly in comparison to that of control. All the used concentrations of Al enhanced micronuclei formation; no correlation could be detected between the size or number of micronuclei/cell and the applied conditions. Metaphase was the most sensi-tive stage to Al stress compared to the other stages of mitosis; C-metaphase was the common abnormalities and it increased strongly when the exposure time was more than 6 h. Under the influence of Al stress for 24 h, the appearance C-metaphase in high frequency decreased the frequency of appearance of other forms of abnormalities during metaphase or ana-telophase. The previous cytological events created alteration either at or between the primer binding sites which could be detected by RAPD and ISSR techniques. Application of ten RAPD primers resulted in amplification of 59 fragments including 20 monomorphic, seven unique and 32 polymorphic bands with poly-morphism average of 60.09%. ISSR primers amplified 75 DNA fragments including 18 monomorphic, eight unique and 45 polymorphic bands with polymorphism average of 72.90%. These data indicated that faba bean cultivar suffered from harmful effect of Al on its genome when the duration of Al treatment was more than 6 hr. ISSR was better than RAPD to study genome stability of faba bean under abiotic stress agent.**

Title	**Global residue harmonic balance method for obtaining higher-order accurate solutions to the strongly nonlinear oscillator**
Authors	**Hamed, A.Y., Alkinani, M.H., Hassan, M.R.**
Journal	**Intelligent Automation and Soft Computing 26(6), pp. 1201-1216**
Abstract	**Many applications require to send information from a source node to multiple destinations nodes. To support these applications, the paper presents a multi-objective based genetic algorithm, which is used in the construction of the multicast tree for data transmission in a computer network. The proposed algorithm simultaneously optimizes total weights (cost, delay, and hop) of the multicast tree. Experimental results prove that the proposed algorithm outperforms a recently published Multi-objective Multicast Algorithm specially designed for solving the multicast routing problem. Also, the proposed approach has been applied to ten-node and twenty-node network to illustrate its efficiency. In addition, the execution time is reported for each studied case and the obtained results are compared with the results obtained by the previously based ant colony algorithm presented recently to solve the same problem. Finality, summing up the three objectives (cost, delay, and hop) to be one objective called the weight of the tree to speed up the searching process by using the proposed algorithm to find the best solutions.**

Title	**A rotational gravitational stressed and voids effect on an electromagnetic photothermal semiconductor medium under three models of thermoelasticity**
Authors	**Bayones, F.S., Kilany, A.A., Abouelregal, A.E., Abo-Dahab, S.M.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**In the current article, the main aim is to investigate a new model on a volume fraction, photothermal, initial stress, electromagnetic field, gravity, and rotation effect on an isotropic homogeneous semiconducting generalized thermoelasticity solid under three thermoelastic models viz: classical dynamical (CD), Lord–Shulman (LS), and dual-phase-lags (DPL). The basic governing equations of the problem are presented considering voids, electromagnetic field, photothermal, initial stress, gravitational, rotation, and semiconducting in the context of the model of generalized thermoelasticity. The normal mode analysis method has been applied for solving the partial differential equations to this phenomenon under the assumption boundary conditions. The obtained results see that the photothermal, rotation, electromagnetic field, voids, the process of semiconductor, initial stress, gravity, and thermal relaxation time took a significant role on the phenomenon. The physical quantities with some comparisons are introduced analytically and presented by figures to clear the impact of the external parameters and agreement with the previous and practical results.**

Title	**Weak and strong convergence results for the modified noor iteration of three quasi-nonexpansive multivalued mappings in hilbert spaces**
Authors	**Chaolamjiak, W., Khan, S.A., Hammad, H.A., Dutta, H.**
Journal	**Filomat** **34(8), pp. 2495-2510**
Abstract	**The paper aims to present an advanced algorithm by taking help of the Noor-iteration scheme along with the inertial technical term for three quasi-nonexpansive multivalued in Hilbert spaces. A weak convergence theorem under certain conditions has been given and added the CQ and shrinking projection methods to our algorithm to obtain certain strong convergence results. Furthermore, numerical experiments are provided by constructing an example and comparison results have also been incorporated.**

Title	**Product Replacement Policy in a Production Inventory Model with Replacement Period-, Stock-, and Price-Dependent Demand**
Authors	**Das, S., Manna, A.K., Mahmoud, E.E., (...), Abdel-Aty, A.-H., Shaikh, A.A.**
Journal	**Journal of Mathematics**
Abstract	**In the competitive market situation, several companies confer various types of incentives and facilities during product sell to their customers with certain terms and conditions. For the products such as mobile, TV, water purifiers, marshal products, and many more, its corresponding companies offer replacement facility during the guarantee period to enhance the customers' demand. In this study, we have formulated a production inventory model with considering product's replacement facility of the failure product within guarantee periods to their customers. This work also leads two vital assumptions: (I) customers' demand is depending on the replacement period, stock level, and selling price of the product and (II) the rate of replacement loss of manufacturer's capital is dependent on the replacement period, and it is a nonlinear function. Since the corresponding optimization problem is highly nonlinear, we have solved it by MATHEMATICA software. The concavity of the centre of interval-valued average profit of the proposed model is shown graphically. In order to justify the validity of the proposed model, a numerical example is considered and solved. Finally, the sensitivity analyses are carried out with respect to the different model parameters.**

Title	**A highly stable and efficient electrodeposited flowered like structure Ni-Co alloy on steel substrate for electrocatalytic hydrogen evolution reaction in HCl solution**
Authors	**Elrouby, M., Sadek, M., Mohran, H.S., El-Lateef, H.M.**
Journal	**Journal of Materials Research and Technology 9(6), pp. 13706-13717**
Abstract	**Ni-Co alloy of flowered like structure is successfully electrodeposited from neutral aqueoussolutions of NiCl2and CoCl2salts as precursors at room temperature. The prepared alloy atour optimized conditions has a high protection effect from the electrochemical corrosion ofsteel in the hydrochloric acid solution. The electrochemically deposited alloys are examinedvia X-ray diffraction (XRD) giving two main phases of (fcc) and (hcp). The morphology isinvestigated via scanning electron microscope (SEM) showing flowered like structure forthe alloy that is electrodeposited at -1.0 V only. The obtained data of the potentiodynamicpolarization (PDP) and spectroscopy of electrochemical impedance (EIS) demonstrates thatNi-Co coatings have high stability in the highly corrosive media, especially the alloy of theflowered like structure. This alloy of unique properties is subjected to be an efficaciouselectrocatalyst for the reaction of hydrogen evolution (HER) in HCl solution.**

Title	**Solving a stochastic nonlinear integral equation via random fixed point technique in ordinary metric spaces**
Authors	**Albaqeri, D.M., Hammad, H.A., Dutta, H.**
Journal	**Mathematics in Engineering, Science and Aerospace 11(4), pp. 889-901**
Abstract	**In this manuscript, a stochastic version of one of Ciric's fixed point theorems is applied to find a unique solution for a nonlinear stochastic integral equation. Further, we give an example to support the findings.**

Title	**Unified Framework of Approximating and Interpolatory Subdivision Schemes for Construction of Class of Binary Subdivision Schemes**
Authors	**Ashraf, P., Mustafa, G., Ghaffar, A., (...), Mahmoud, E.E., Alharbi, W.R.**
Journal	**Journal of Function Spaces 2020,6677778**
Abstract	**In this paper, a generalized algorithm to develop a class of approximating binary subdivision schemes is presented. The proposed algorithm is based on three-point approximating binary and four-point interpolating binary subdivision schemes. It contains a parameter which classifies members of the new class of subdivision schemes. A set of efficient properties, for instance, polynomial generation and reproduction, support, continuity, and Hölder continuity, is discussed. Moreover, applications of the proposed subdivision schemes are given in order to demonstrate their variety, flexibility, and visual performance**

Title	**Fractional order gl model on thermoelastic interaction in porous media due to pulse heat flux**
Authors	**Alzahrani, F.S., Abbas, I.A.**
Journal	**Geomechanics and Engineering 23(3), pp. 217-225**
Abstract	**In this paper, the thermoelastic interactions in a two-dimension porous body are studied. This problem is solved by using the Green and Lindsay (GL) generalized thermoelasticity model under fractional time derivative. The derived approaches are estimated. with numeral results which are applied to the porous mediums in simplifying geometrical. The bounding plane surface of the present half-space continuum is subjected to a pulse heat flux. We use the Laplace-Fourier transforms methods with the eigenvalues approach to solve the problem. The numerical solutions for the field functions are obtained numerically using the numerical Laplace inversion technique. The effects of the fractional parameter and the thermal relaxation times on the temperature field, the displacement field, the change in volume fraction field of voids distribution and the stress fields have been calculated and displayed graphically and the obtained results are discussed.**

Title	**MAGNETIC FIELD ON SURFACE WAVES PROPAGATION IN GRAVITATIONAL THERMOELASTIC MEDIA WITH TWO TEMPERATURE AND INITIAL STRESS IN THE CONTEXT OF THREE THEORIES**
Authors	**BOUSLIMI, J., ABO-DAHAB, S.M., LOTFY, K., (...), KHALIL, E.M., OMR, M.**
Journal	**Thermal Science** **24(1), pp. S285-S299**
Abstract	**In this paper is investigating the theory of generalized thermoelasticity under two temperature is used to solve boundary value problems of 2-D half-space its boundary with different types of heating under gravity effect. The governing equations are solved using new mathematical methods under the context of Lord-Shulman, Green-Naghdi theory of type III (G-N III) and the three-phase-lag model to investigate the surface waves in an isotropic elastic medium subjected to gravity field, magnetic field, and initial stress. The general solution obtained is applied to a specific problem of a half-space and the interaction with each other under the influence of gravity. The physical domain by using the harmonic vibrations is used to obtain the exact expressions for the Waves velocity and attenuation coefficients for Stoneley waves, Love waves, and Rayleigh waves. Comparisons are made with the results between the three theories. Numerical work is also performed for a suitable material with the aim of illustrating the results. The results obtained are calculated numerically and presented graphically with some comparisons in the absence and the presence the influence of gravity, initial stress and magnetic field. It clears that the results obtained agree with the physical practical results and agree with the previous results if the gravity, two temperature, and initial stress neglect as special case from this study.**

Title	**Third-Order Neutral Delay Differential Equations: New Iterative Criteria for Oscillation**
Authors	**Moaaz, O., Mahmoud, E.E., Alharbi, W.R.**
Journal	**Journal of Function Spaces 2020,6666061**
Abstract	**This study is aimed at developing new criteria of the iterative nature to test the oscillation of neutral delay differential equations of third order. First, we obtain a new criterion for the nonexistence of the so-called Kneser solutions, using an iterative technique. Further, we use several methods to obtain different criteria, so that a larger area of the models can be covered. The examples provided strongly support the importance of the new results.**

Title	**Entanglement and Geometric Phase of the Coherent Field Interacting with a Three Two-Level ATOMS in the Presence of Non-Linear Terms**
Authors	**Hilal, E., Alkhateeb, S., Abdel-Khalek, S., Khalil, E.M., Almowalled, A.**
Journal	**Thermal Science** **24, pp. 39-48**
Abstract	**We study the interaction of a three two-level atoms (3-2LA) with a one-mode optical coherent field in coherent state in the presence of non-linear Kerr medium.The three atoms are initially prepared in upper and entangled states while the field mode is in a coherent state. The constants of motion, 3-2LA andfield density matrix are obtained. The analytic results are employed to perform some investigations of the temporal evolution of the von Neumann entropy as measure of the degree of entanglement between the 3-2LA and optical coherent field. The effect of the detuning and the initial atomic states on the evolution of geometric phase and entanglement is analyzed. Also, we demonstrate the link between the geometric phase and non-classical properties during the evolution time. Additionally the effect of detuning and initial conditions on the Mandel parameter is studied. The obtained results are emphasize the impact of the detuning and the initial atomic states of the feature of the entanglement, geometric phase and photon statistics of theoptical coherent field.**

Title	**INFLUENCE OF CLASSICAL FIELD ON ENTANGLEMENT AND PHOTON STATISTICS OF N-LEVEL ATOM INTERACTING WITH A TWO TWO-LEVEL ATOM**
Authors	**ALOTAIBI, H., KHALIL, E.M., ABDEL-KHALEK, S., Al-BARAKATY, A.**
Journal	**Thermal Science** **24(1), pp. S177-S186**
Abstract	**In this study, we consider three interacting atoms, one of them represented by N-level atom based on SU(2) Lie algebra and the other represented by a two two-level atom in presence of the external field. The effect of the external field on the dynamics of the proposed system is discussed in detail for certain values for the external field. The dynamical expression of the observable operators is obtained by using the Heisenberg equation of motion. The general solution via solving Schrodinger equation is obtained. The fidelity and concurrence formula as a measure of entanglement between two two-level atom are calculated and discussed in detail. We explore the sudden death and sudden birth phenomena with and without the presence of external field. Finally, we compare the results of the fidelity, concurrence and second-order correlation function for some values of the initial state and the external field parameters.**

Title	**Removal of heavy metals from wastewater by natural growing plants on river nile banks in Egypt**
Authors	**Abd-Elaal, A.-E.M., Aboelkassem, A., Gad, A.A.M., Ahmed, S.A.S.**
Journal	**Water Practice and Technology** **15(4), pp. 947-959**
Abstract	**Green remediation is a known technology that uses different types of plants to extract contaminants from the environment. This study aims to remove heavy metals from treated wastewater by using natural growing plants on River Nile banks in Egypt. Secondary treated effluent was collected from West Gerga wastewater treatment plant, located in Sohag city, Egypt. Experiments using two types of aquatic plants were carried out. They were planted individually and in combination with different densities on the secondary treated wastewater surface for 10 days' retention time to remove cadmium (Cd), nickel (Ni) and lead (Pb). It was concluded that both plants have high capabilities to remove heavy metals directly from treated wastewater. The removal efficiency of Cd and Pb was higher when they were planted together than when individually planted. A positive relationship was observed between detention time and heavy metals removal. The removal efficiency of heavy metals increased with the increase of plant density for both plant types. Also, the availability of aquatic plants and their free cost makes their use an economically attractive alternative. In addition, the removal of these plants from River Nile improves the performance of water distribution networks in Egypt.**

Title	**Unraveling urea pre-treatment correlated to activate $Er_2(WO_4)_3$ as an efficient and stable counter electrode for dye-sensitized solar cells**
Authors	**Makhlouf, M.M., Abdulkarim, S., Adam, M.S.S., Qiao, Q.**
Journal	**Electrochimica Acta 333,135540**
Abstract	**The interest has been rapidly increased in oxygen vacancies and defects of metal oxides in view of their intimate connection with the key electrocatalytic performance of these materials, especially in photovoltaic applications. In this work, Erbium tungstate, Er2(WO4)3, has been synthesized and used as a novel counter electrode for the DSSCs. A facile method has been utilized to introduction oxygen vacancies in Er2(WO4)3 via doping different weight percentages (0–15 wt%) of urea-pretreatment under air or N2 gas atmosphere. The structural investigation of pristine and urea-treated Er2(WO4)3 films using different techniques. The SEM micrograph images revealed the creation of pores and voids are introduced in the morphology surface of Er2(WO4)3 films after urea pretreatment which confirms the creation of oxygen vacancies. This may facilitate the charge transfer at Er2(WO4)3 counter electrode/electrolyte interface. The optical band gap of the Er2(WO4)3 film reduced from 2.05 to 1.57 eV attributed to the creation of vacancies. Different electrical aspects were used to evaluate the electrocatalytic performance of Er2(WO4)3 as a counter electrode. The addition of urea (5 wt%) to Er2(WO4)3 as counter electrode in presence N2 environment jumped the power conversion efficiency of dye-sensitized solar cell (DSSC) from ~ 0.12% to 4.18% revealed an efficient catalytic performance of urea-treated Er2(WO4)3 as counter electrode for the present DSSCs.**

Title	**Design and assessment of a novel poly(urethane-semicarbazides) containing thiadiazoles on the backbone of the polymers as inhibitors for steel pipelines corrosion in CO_2-saturated oilfield water**
Authors	**Al-Shihry, S.S., Sayed, A.R., Abd El-lateef, H.M.**
Journal	**Journal of Molecular Structure 1201,127223**
Abstract	**In this investigation, a novel class of poly(urethane-semicarbazides) containing thiadiazoles on the backbone of the polymers (SR-16 and SR-17) was synthesized and characterized by different spectroscopic methods (FTIR, 1H NMR, and 13C NMR). The inhibition action of the synthesized polymers on steel pipelines in carbon dioxide-containing oilfield formation water has been studied using electrochemical measurements namely, electrochemical impedance spectroscopy (EIS), potentiodynamic polarization (PDP), and surface morphology tools such as energy-dispersive spectroscopy (EDX) and a field emission-scanning electron microscopy (FE-SEM). The findings indicate that the fabricated polymers SR-16 and SR-17 exhibits superior corrosion performance on steel in oilfield formation water saturated with CO2. The protection capacity is found to increase by increasing the polymer concentration up to maximum values 92.12 and 96.52% for 150 ppm at 50 °C in the presence of SR-16 and SR-17, respectively. The FE-SEM and EDX measurements indicate that the steel surface is protected by studied polymers. The current study provides very significative data in fabricating and designing novel polymer inhibitors with high protection efficiency.**

Title	**Pleurotheciella nilotica sp. Nov. (pleurotheciales, ascomycota) from freshwater habitats in Egypt**
Authors	**Abdel-Aziz, F.A., Bahkali, A.H., Elgorban, A.M., Abdel-Wahab, M.A.**
Journal	**Nova Hedwigia** **110(1-2), pp. 91-98**
Abstract	**A new species, Pleurotheciella nilotica is described and illustrated from the River Nile, Sohag, Egypt. Molecular phylogenetic analyses of the combined SSU and LSU rDNA placed the new species within Pleurotheciella as a phylogenetically distinct species. P. nilotica formed a basal clade to a node containing P. krabiensis and P. tropica. The new species is characterized by its conidial dimensions being smaller than those recorded in the eleven described species of Pleurotheciella.**

Title	**Enhanced Magnetic and DC Electrical Properties of Sm-Doped $Bi_2Fe_4O_9$ Nanoplates Synthesized by Sol-Gel Method**
Authors	**Ibrahim, E.M.M., Farghal, G., Khalaf, M.M., Abd El-Lateef, H.M.**
Journal	**Nano 15(2),2050020**
Abstract	**In this work, Bi2-xSmxFe 4O9 (x=0.0, 0.02, 0.06, 0.08, 0.1) nanoplates with an average thickness of 62-125nm were synthesized using a sol-gel method. The samples were characterized by X-ray diffraction, Fourier transform infrared spectroscopy, and scanning electron microscopy. The magnetic measurements show that the nanoplates have weak ferromagnetic ordering. The saturation magnetization of the nanoplates increases as the Sm content increases. The DC electric transport properties were studied by measuring the temperature dependence of the resistivity in the temperature range 300-680K. The materials show typical semiconductor features, and the conduction mechanisms are governed by electron and small polaron hopping in the low and high temperature measurement ranges, respectively. The Sm doping results in a significant enhancement in the electrical conductivity of the Bi2Fe4O9 nanoplates.**

Title	**In vivo evaluation of the toxic and genotoxic effects of exposure to cobalt nanoparticles using Drosophila melanogaster**
Authors	**Alaraby, M., Demir, E., Domenech, J., (...), Hernández, A., Marcos, R.**
Journal	**Environmental Science: Nano** **7(2), pp. 610-622**
Abstract	**Nanomaterials in general and cobalt nanoparticles (CoNPs) in particular are of great interest not only because of their multiple applications and environmental impact, but also for their potential toxicity and safety issues. Since most of the mechanisms involved in the toxicity of CoNPs are not very well known, mainly in vivo, we used Drosophila melanogaster as a simple and reliable in vivo model to investigate some toxicity-involved mechanisms. Thus, several toxicity-related approaches are used in this study including physicochemical characterization, viability, internalization, intracellular oxidative stress, and DNA damage (comet assay). In addition, changes in the expression of genes involved in general stress and antioxidant response, as well as in DNA repair response were evaluated, to better understand the underlying molecular mechanisms. The effects of CoNPs were compared with those induced by cobalt chloride (CoCl2), as a model ion releasing agent, to determine the role of the nanosized shapes in the observed responses. The obtained results indicate that ingested CoNPs translocate through the intestinal barrier of Drosophila larvae affecting hemolymph cells. Hemocytes, as targeted cells, show higher levels of intracellular reactive oxygen species (ROS) after CoCl2 exposure, but lower levels of DNA damage, in comparison with those induced by CoNPs. In addition, different genes showed an altered expression pattern, accordingly, if larvae were exposed to CoCl2 or to CoNPs. Subsequently, the effects induced by CoNPs cannot be associated only with their chemical nature.**

Title	**Entanglement control of two-level atoms in dissipative cavities**
Authors	**Salah, R., Farouk, A.M., Farouk, A., (...), Eleuch, H., Obada, A.-S.F.**
Journal	**Applied Sciences (Switzerland)** **10(4),1510**
Abstract	**An open quantum bipartite system consisting of two independent two-level atoms interacting nonlinearly with a two-mode electromagnetic cavity field is investigated by proposing a suitable non-Hermitian generalization of the Hamiltonian. The mathematical procedure of obtaining the corresponding wave function of the system is clearly given. Pancharatnam phase is studied to give a precise information about the required initial system state, which is related to artificial phase jumps, to control the degree of entanglement (DEM) and get the highest concurrence. We discuss the effect of time-variation coupling, and dissipation of both atoms and cavity. The effect of the time-variation function appears as frequency modulation (FM) effect in the radio waves. Concurrence rapidly reaches the disentangled state (death of entanglement) by increasing the effect of field decay. On the contrary, the atomic decay has no effect.**

Title	**A screen-printed electrochemical sensing platform surface modified with nanostructured ytterbium oxide nanoplates facilitating the electroanalytical sensing of the analgesic drugs acetaminophen and tramadol**
Authors	**Khairy, M., Banks, C.E.**
Journal	**Microchimica Acta 187(2),126**
Abstract	**An electrochemical sensing platform based upon screen-printing electrodes (SPEs) modified with nanostructured lanthanide metal oxides facilitate the detection of the widely misused drugs acetaminophen (ACP) and tramadol (TRA). Among the metal oxides examined, Yb2O3 nanoplates (NPs) were found to give rise to an optimal electrochemical response. The electroanalysis of ACP and TRA individually, and within mixtures, was performed using cyclic and differential pulse voltammetry. The ACP and TRA exhibited non-overlapping voltammetric signals at voltages of +0.30 and + 0.67 V (vs. Ag/AgCl; pH 9) using Yb2O3-SPEs. Pharmaceutical dosage forms and spiked human fluids were analyzed in wide linear concentration ranges of 0.25–654 and 0.50–115 µmol.L−1 with limits of detection (LOD) of 55 and 87 nmol.L−1 for ACP and TRA, respectively. The Yb2O3-SPEs offer a sensitive and chemically stable enzyme-free electrochemical platform for ACP and TRA assay. [Figure not available: see fulltext.].**

Title	**Geopressure evaluation using integrated basin modelling, well-logging and reservoir data analysis in the northern part of the Badri oil field, Gulf of Suez, Egypt**
Authors	**Radwan, A.E., Abudeif, A.M., Attia, M.M., (...), Abdelghany, W.K., Kasem, A.A.**
Journal	**Journal of African Earth Sciences 162,103743**
Abstract	**The evaluation of pore and fracture pressures represents the gist of well planning and execution in drilling operation and exploration, where accurate pore and fracture pressures modelling enables the oil and gas companies to drill targets safely. The scope of this paper is to evaluate pore and fracture pressures in the northern part of the Badri Field, in the Gulf of Suez, Egypt to determine the convenient pore pressure fracture gradient model (PPFG) and to define the pore pressure regime in the subsurface within the Zeit, South Gharib, Belayim and Kareem formations from the top downwards. The pore pressure and fracture gradient model has been assessed using integrated data that include: burial history, well logs (sonic, resistivity and density), offset wells drilling problems, and reservoir pressure. The Amoco overburden equation and Eaton's sonic and resistivity methods were used to estimate the overburden stress and the pore pressure values respectively, while fracture pressure was calculated using the Eaton method. Results show that the maximum pore pressures is in the South Gharib Formation and the lowest pore pressure is within the reservoir sections. Six abnormal pressure zones were detected, these includes four overpressure zones and two sub-normal pressure zones, where the maximum estimated pore pressure was up to 10.5 pound per gallon (ppg) equivalent gradient, which was recorded in the South Gharib Formation. While the minimum measured pore pressure value was recorded at 4.7 (ppg) in the Kareem sandstone reservoir. The fracture gradient ranged between 11.5 and 13.1 (ppg) equivalent density for both the Belayim (Hammam Faraun Member) and Kareem sandstone reservoirs. The main conclusions of this study are, 1) the pore pressure profile is normal, sub-normal and over-pressurized in the study area, 2) the integration of basin modelling, well-logging, drilling problems and direct measurements allow us to evaluate the geopressures in the subsurface horizons, 3) the use of low mud density while drilling into the depleted reservoir zones is the best solution for fluid losses mitigation, 4) the modified surface, intermediate and production casing seats is adequate for the future planned wells profile. 5) providing insights on downhole pressure behavior across stratigraphy in the area of study, to achieve optimum drilling mud designing and adequate casing seats as well as safe and successful operational planning.**

Title	**A robust in vitro Anticancer, Antioxidant and Antimicrobial Agents Based on New Metal-Azomethine Chelates Incorporating Ag(I), Pd (II) and VO (II) Cations: Probing the Aspects of DNA Interaction**
Authors	**Abu-Dief, A.M., Abdel-Rahman, L.H., Abdel-Mawgoud, A.A.H.**
Journal	**Applied Organometallic Chemistry 34(2),e5373**
Abstract	**A novel azomethine ligand (HNAP) [HNAP = 1-(Pyridin-3-yliminomethyl)-naphthalen-2-ol] and its Ag(I), Pd (II) and VO (II) chelates have been synthesized and structurally inspected using a wide range of spectroscopic and analytical tools, including infra-red (IR), ultraviolet-visible (UV-Vis) and 1H NMR spectroscopy techniques, CHN analysis, molar conductance, magnetic susceptibility, and thermogravimetric analysis. The molar conductance measurements reveal that the chelates are non-electrolytes. The thermal behavior of the investigated metal chelates shows that the hydrated, coordinated water molecules and the anions are removed in successive steps followed immediately by decomposition of the ligand in the subsequent steps. The activation thermodynamic parameters are calculated from the TG curves and discussed. Complexes formation study via continuous variation m molar ratio has been investigated, and results were consistent to those found in the solid complexes with a ratio of (M:L) as (1:1) or 1:2 (M:L) molar ratio for all the monolithic and bi-valent metal complexes with square planar for Pd (II), and Ag(I) cations while, square pyramidal geometry for VO (II) cation. DFT calculations for the titled different metal-chelates have been studied and showed a good correlation with the experimental data. The prepared compounds had been checked In vitro towards numerous sorts of plant pathogenic fungi and bacteria to evaluate their antimicrobial properties and compared with some known antibiotics. Significantly, all the complexes show excellent antimicrobial activity against various strains of bacteria and fungi, including both Gram-negative and Gram-positive bacteria. Besides, the complexes exhibited high cytotoxicity against various carcinoma cell lines, including HCT-116, MCF-7, and HepG-2. Moreover, the effect of the new synthesized compounds as antioxidants was determined by reduction of 1,1-diphenyl-2-picryl hydrazyl (DPPH) and compared with that of Vitamin C. Furthermore, the binding interactions of the complexes with CT-DNA were explored using UV-Vis spectroscopy, viscosity and gel electrophoreses measurements. They cooperatively bind to DNA possibly through intercalations. The binding ability of the complexes was shown as HNAPAg > HNAPPd > HNAPVO complex.**

Title	**Engineering geotechnical evaluation of soil for foundation purposes using shallow seismic refraction and MASW in 15th Mayo, Egypt**
Authors	**Mohammed, M.A., Abudeif, A.M., Abd el-aal, A.K.**
Journal	**Journal of African Earth Sciences 162,103721**
Abstract	**Despite the modernity of the 15th Mayo city, buildings suffer progressively from engineering problems which are increased over the last 10 years like cracks, fissures, cavities and tilting of building. The main target of this work is to delineate the dynamic engineering characteristics of subsurface rocks and soils through interpretation of P- and S-wave velocities, knowledge of probable causes of structural construction damages and calculate Vs30 for determining site class. Therefore, field work of shallow seismic refraction (SSR) and multichannel analysis of surface waves (MASW) were undertaken in this work to evaluate causes of these effects. Nineteen profiles for both SSR and one dimension (1D) MASW were performed to assess the geotechnical characteristics of subsurface soil for building purposes and calculating Vs30 for site class evaluation. SSR survey was implemented using a seismograph of 48-channel with vertical geophones of 40 Hz. The first breaks were analyzed employing SIPT2 program. S-waves were generated using 1D MASW technique with seismograph of 24-channel model Strata View with 2 m offset distance and two shooting. Field-work was undertaken employing vertical geophone of low-frequency (4.5 Hz). SeisImager/SW program package was employed for processing seismic results. Some important elastic moduli, engineering and petrophysical characteristics were evaluated. Findings of VP and VS revealed that the proposed site composed mainly of three geoseismic zones; the first zone is the surface layer of weathered limestone, fragments of gravels and fractured marl which characterizes by incompetent to slightly competent rock quality. The second zone is underlain the previous layer, its lithology is clayey marl of fairly to moderately quality of competent rock, which causes serious problems for the buildings due to presence of clay. The third zone is the hardest layer of limestone content and was employed as a bedrock layer which characterizes by good quality of competent rock. VS30 (averaging VS for the uppermost of 30 m) was calculated for near-surface geologic units applying NEHRP's rules. The proposed site was categorized into two classes: class C (very dense soil and soft rock), that characterizes majority of the sites, and class D (stiff soil). These parameters are principally used as key inputs for building design.**

Title	**Multi-criteria decision-making for the analysis of flash floods: A case study of Awlad Toq-Sherq, Southeast Sohag, Egypt**
Authors	**Abu El-Magd, S.A., Amer, R.A., Embaby, A.**
Journal	**Journal of African Earth Sciences 162,103709**
Abstract	**The multi-criteria method is a widely used technique to study and analyze the impact and causes of natural hazards. Our study area, that forms a part of the governorate of Sohag, lies in Southeast Sohag and is one of the most flash flood prone regions of Egypt's Eastern Desert. In the last decades, this area of Sohag has suffered from frequent flash floods, with some flood events resulting in human casualties. In our study, we use a multi-criteria process combined with geographical information system (GIS) and remotely sensed data to produce a flash flood susceptibility map. In addition, we discuss the various factors related to flash flooding such as elevation, slope, drainage network, lithology, topographic wetness index, as well as land use, and reclassify these based on their contribution and their effect on flood probability. To calculate the weighted factor for each raster, a pairwise matrix was constructed. Results from our multi-criteria analysis for flash flooding indicate that approximately 5% of the total study area is at a very high risk of flooding, 10% at a high risk, and 25% at a moderate flood risk. Furthermore, our results highlight the areas at risk of flooding and the need for the development of relevant warning systems. Our results also indicate that the southeastern part of the study area is most susceptible to flash floods and we suggest that the necessary focus be given to this region as well as the implementation of a flood warning system. A consistency index was used to determine the accuracy of our model and was calculated to be 0.058, indicating a well-performing model.**

Title	**Synthesis of imidazole derivatives: Ester and hydrazide compounds with antioxidant activity using ionic liquid as an efficient catalyst**
Authors	**Abdelhamid, A.A., Salah, H.A., Marzouk, A.A.**
Journal	**Journal of Heterocyclic Chemistry 57(2), pp. 676-685**
Abstract	**The pyrrolidinium hydrogen sulfate (PHS) was used as an excellent ionic liquid catalyst for the preparation of many imidazoles moiety, which have biologically application via one-pot multicomponent reaction. Imidazoles were afforded through the reaction of equimolar from 1,2-diphenylethane-1,2-dione, ammonium acetate, different aromatic aldehydes, and ethyl glycinate hydrochloride. This method has the advantages of giving excellent yield, shortened reaction times, and ease of establishment. Moreover, the yielded of imidazoles components can be purified and crystallized by a nonchromatographic technique, and the catalyst can be reused. These entire novel synthesized components have been identified by spectral data: IR, NMR and mass spectra. These compounds have an in vivo antioxidant activity on experimental animals (rats).**

Title	**Correction to: TiO_2/TiO_xN_Y hollow mushrooms-like nanocomposite photoanode for hydrogen electrogeneration (Journal of Porous Materials, (2020), 27, 1, (133-139), 10.1007/s10934-019-00792-0)**
Authors	**Rabia, M., Mohamed, S.H., Zhao, H., (...), Lei, Y., Ahmed, A.M.**
Journal	**Journal of Porous Materials** **27(1), pp. 329**
Abstract	**The original version of the article unfortunately contained an error in the author name. In the author group the correct name is "Sodky H. Mohamed". The original article has been corrected.**

Title	**TiO_2/TiO_xN_Y hollow mushrooms-like nanocomposite photoanode for hydrogen electrogeneration**
Authors	**Rabia, M., Mohamed, S.H., Zhao, H., (...), Lei, Y., Ahmed, A.M.**
Journal	**Journal of Porous Materials** **27(1), pp. 133-139**
Abstract	**TiO2/TiOxNy hollow mushrooms-like nanocomposite photocatalyst was prepared using atomic layer deposition (ALD) and reactive direct current magnetron sputtering, respectively. The preparation process depends on the aluminum oxide template (AOT) that was fabricated using the two-step anodization process after the Ni imprinting process. The chemical, morphological, and optical properties were recorded using different analyses such as XRD, SEM, EDX, and UV–Vis. From the SEM analyses, the AOT pore size increases from 177 to 305 nm after the pore widening process in H3PO4. The diameter of the TiO2 in the upper part is 352 nm, while the diameter of the TiO2/TiOxNy composite is 355 nm in the upper part. The estimated band gap values of TiO2 and TiO2/TiOxNy are 3.1 and 2.25 eV, respectively. From the values of band gaps, there is a clear enhancement in the optical absorption of the nanocomposite bilayers. The photoelectrochemical (PEC) behaviors of the TiO2/TiOxNy electrodes supported in Au/Ni metal thin film was measured in 1 M NaOH as scarifying reagent. The thermodynamic parameters were calculated, in which ΔE, ΔH*, and ΔS* values are 16.75 kJ mol−1, 15.87 kJ mol−1 and − 115.65 kJ mol−1 K−1, respectively.**

Title	**Some results on the first Appell matrix function $F_1(A,B,B',C;z,w)$**
Authors	**Abd-Elmageed, H., Abdalla, M., Abul-Ez, M., Saad, N.**
Journal	**Linear and Multilinear Algebra**
Abstract	**New relations for the first Appell hypergeometric matrix function F1(A, B, B', C;z,w) are obtained including generating matrix functions, contiguous relations, recursion formulas, differentiations and series.**

Title	**Corrosion inhibition characteristics of a novel salycilidene isatin hydrazine sodium sulfonate on carbon steel in HCl and a synergistic nickel ions additive: A combined experimental and theoretical perspective**
Authors	**Abd El-Lateef, H.M.**
Journal	**Applied Surface Science 501,144237**
Abstract	**Salycilidene isatin hydrazine sodium sulfonate (SHMB) is synthesized and characterized by different spectroscopic tools. The inhibition performance of the individual SHMB, and that in a combination with various [Ni2+] ions on the carbon steel (CS) corrosion in hydrochloric acid are investigated, using electrochemical impedance spectroscopy (EIS), linear polarization resistance (LPR) corrosion rate and potentiodynamic polarization (PDP) methods. The SHMB inhibits the corrosion of CS in 1.0 M HCl up to 87.8%. The synergism of this SHMB Schiff base and Ni2+ is confirmed from the findings. Combining the SHMB with nickel ions increases the inhibition capacity of up to 99.2%. PDP studies indicate that the individual SHMB and SHMB + nickel cations systems can act as inhibitors of the mixed-type. The best fitted Langmuir isotherm model reveals that the adsorption process occurs through both physical and chemical adsorption in the case of individual SHMB and chemisorption in the presence of a mixed system. X-ray diffraction, UV–Visible spectroscopy, Fourier transform infrared spectroscopy (FTIR) and Field-emission scanning electron microscope/energy-dispersive X-ray spectroscopy (FE-SEM/EDX) are utilized to study the surface morphology and corrosion product phases of CS specimens. The findings of density functional theory (DFT) calculations and molecular dynamic (MD) simulations suggest high adsorption feasibility of molecular and protonated SHMB.**

Title	**Bioaccumulation of heavy metals air pollutants by urban trees**
Authors	**El-Khatib, A.A., Barakat, N.A., Youssef, N.A., Samir, N.A.**
Journal	**International Journal of Phytoremediation 22(2), pp. 210-222**
Abstract	**Leaf and bark of trees are tools for assessing the effects of the heavy metals pollution and monitoring the environmental air quality. In this study, the possibility of using leaves and bark of two urban trees, namely, Ficus nitida and Eucalyptus globulus as a bioindicator of atmospheric pollution was evaluated by determining the composition of heavy elements in the tree leaves, bark, soil, and the atmospheric dust. Two common tree species, namely, F. nitida and E. globulus were selected in the heavily industrial zone of surrounding Minya governorate, Upper Egypt. Two urban areas with heavy traffic load (sites 1 and 2), three industrial zones (sites 3, 4, and 5) and an uncontaminated area as a control were selected (site 6). Sampling from leaf, bark, soil, deposited dust of trees was carried out in winter and summer seasons (from November 2016 to March 2017). The concentrations of heavy metals in dust, soil, leaves, and bark possess the same trend: Pb>Cu>Cd. The highest concentration of cadmium, lead, and copper was found in the leaf of F. nitida and E. globulus higher than bark samples of the studied species, supporting the idea suggesting that tree leaves can be used as a good indicator of heavy metals accumulation. A high and statistically significant correlation ($p < .05$) was found between Pb concentrations in the atmospheric dust and those in the leaves of both species throughout the two growing seasons, confirming that the main source of incorporated Pb is the atmospheric dust. Otherwise, the obtained results showed that F. nitida tree does not seem to be a good accumulator of Cu. According to the obtained results, F. nitida and E. globulus trees are more likely to capture cadmium and lead from air, so planting these trees in industrial areas with such atmospheric pollutants would be beneficial.**

Title	**Design of ultrafine nickel oxide nanostructured material for enhanced electrocatalytic oxidation of urea: Physicochemical and electrochemical analyses**
Authors	**Abd El-Lateef, H.M., Almulhim, N.F., Alaulamie, A.A., Saleh, M.M., Mohamed, I.M.A.**
Journal	**Colloids and Surfaces A: Physicochemical and Engineering Aspects 585,124092**
Abstract	**Ultrafine nanostructured-NiO is designed via a simple electrodeposition process on a glassy carbon surface. The morphological and structural characteristics of the nickel oxide/glassy-carbon (NiO/GC) are investigated through field-emission scanning electron microscopy (FE-SEM), energy dispersive X-ray (EDX), transmission electron microscopy (TEM), and X-ray diffraction (XRD) techniques. The electrocatalytic performance of the designed material towards urea oxidation in 1.0 M KOH is studied under different conditions of deposition time, scan rate and urea concentration. Electrochemical characterizations of urea oxidation are accomplished using cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS) and chronoamperometry (CA). The electrodeposited ultrafine NiO displays a distinctive electrocatalytic urea oxidation performance. Numerically, the produced anodic current reached up to 1.089 mA for 0.25 M urea, with clear peaks for electrooxidation of urea in the forward and reverse sweep. EIS measurements showed that the diameter of semicircles is dependent on the experimental conditions, and the resistances of charge transfer values are found to be lower in the solutions containing urea, which is related to the excellent urea electrooxidation performance. Here, ultrafine nanostructured NiO is introduced to serve a critical function as a catalytic moderator to accelerate the charge transfer in the anodic part of the urea fuel-cell (UFC), which can affect both the efficiency and cost of UFCs.**

Title	**Effect of rotation on wave propagation through a poroelastic wet bone with cavity**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Ateeq, R., Khder, M.A.**
Journal	**Multidiscipline Modeling in Materials and Structures 16(1), pp. 53-72**
Abstract	**Purpose: The purpose of this paper is to investigate the wave propagation of wave in an infinite poroelastic cylindrical bone. The dynamic behavior of a wet long bone that has been modeled as a piezoelectric hollow cylinder of crystal class 6 is investigated. Design/methodology/approach: An exact closed form solution is presented by employing an analytical procedure. The frequency equation for poroelastic bone is obtained when the boundaries are stress free and is examined numerically. Findings: The study of wave propagation over a continuous medium is of practical importance in the field of engineering, medicine and bio-engineering. Application of the poroelastic materials in medicinal fields such as orthopedics, dental and cardiovascular is well known. In orthopedics, wave propagation over bone is used in monitoring the rate of fracture healing. There are two types of osseous tissue, such as cancellous or trabecular and compact or cortical bone, which are of different materials, with respect to their mechanical behavior. Originality/value: The frequencies are calculated for poroelastic bone for various values for different values of rotation, angular velocity and density. In wet bone little velocity dispersion was observed, in contrast to the results of earlier studies on wet bone. Large values of attenuation were observed. Such a model would in particular be useful in large-scale parametric studies of bone mechanical response.**

Title	**Facile synthesis, X-Ray structure of new multi-substituted aryl imidazole ligand, biological screening and DNA binding of its Cr(III), Fe(III) and Cu(II) coordination compounds as potential antibiotic and anticancer drugs**
Authors	**Abdel-Rahman, L.H., Abdelhamid, A.A., Abu-Dief, A.M., Shehata, M.R., Bakheet, M.A.**
Journal	**Journal of Molecular Structure 1200,127034**
Abstract	**A simple highly adjustable and effective synthesis of aryl imidazole ligand HL namely (2-(1-butyl-4,5-diphenyl-1H-imidazole-2-yl) (4-bromophenol) was discussed where it was prepared by cyclo condensation of 5-bromo-2-hydroxybenzaldehyde, benzil and butan-1-amine. Three new Cr(III), Fe(III) and Cu(II) coordination compounds of aryl imidazole ligand were synthesized. The multi-substituted aryl imidazole ligand (HL) and its coordination compounds were characterized via a wide range of spectroscopic and analytical tools such as 1H NMR and 13C NMR, infrared (IR) and UV–Vis spectrophotometry, conductivity and magnetic measurements. The crystal and molecular structure of aryl imidazole ligand HL were discussed by using maXus. The structure of the titled aryl imidazole ligand HL and its metal coordination compounds were discussed theoretically by using Gaussian 09 program at the B3LYP/LANL2DZ level of theory. The obtained data showed that the new compounds have 1:1 M ratio (metal: ligand) and non-electrolytes in nature. The newly prepared [Cr(L)Cl2(H2O)2], [Fe(L)(NO3)2(H2O)2] and [Cu(L)Cl(H2O)3] coordination compounds have a distorted-octahedral geometry. Density Functional Theory (DFT) calculations have been carried out to investigate the equilibrium geometry of the ligands and its coordination compound using Gaussian 09 program at the B3LYP/LANL2DZ level. Moreover, the new compounds were tested against the selected species of microorganism namely Staphylococcus aureus (+ve), Pseudomonas aeruginosa (-ve), Escherichia coli (-ve) and also against Candida albicans, Aspergillus flavus and Trichophyton Rubrumin. The result revealed that new compounds showed high efficacy towards the growth inhibition of the selected pathogenic microorganism. Moreover, the interaction of the new coordination compounds with CT-DNA was studied by absorption spectra, gel electrophoresis and viscosity techniques. The result showed that the interaction of the new coordination compounds with CT-DNA is an intercalative binding mode. Furthermore, the growth inhibitory effects of the new compounds were tested against Hep-G2, MCF-7 and HCT-116 cell lines. Moreover, all complexes exhibited stronger cytotoxicity effect on the outgrowth of different types of carcinoma cells, than their corresponding imidazole ligand and follow the order: CuL > CrL > FeL > HL.**

Title	**On the representation of monogenic functions by the product bases of polynomials**
Authors	**Abul-Ez, M., Abdalla, M., Al-Ahmadi, A.**
Journal	**Filomat** **34(4), pp. 1209-1222**
Abstract	**The main purpose of this paper is to study questions concerning representations of Clifford valued functions by the product bases of Clifford polynomials. By the way we generalize several results from complex analysis to the setting of Clifford analysis.**

Title	**Fractional residual power series method for the analytical and approximate studies of fractional physical phenomena**
Authors	**Ismail, G.M., Abdl-Rahim, H.R., Ahmad, H., Chu, Y.-M**
Journal	**Open Physics** **18(1), pp. 799-805**
Abstract	**In this article, analytical exact and approximate solutions for fractional physical equations are obtained successfully via efficient analytical method called fractional residual power series method (FRPSM). The fractional derivatives are described in the Caputo sense. Three applications are discussed, showing the validity, accuracy and efficiency of the present method. The solution via FRPSM shows excellent agreement in comparison with the solutions obtained from other established methods. Also, the FRPSM can be used to solve other nonlinear fractional partial differential equation problems. The final results are presented in graphs and tables, which show the effectiveness, quality and strength of the presented method.**

Title	**Entanglement and sudden death for a two-mode radiation field two atoms** *Open Access*
Authors	**Hilal, E.M.A., Khalil, E.M., Abdel-Khalek, S.**
Journal	**Computers, Materials and Continua 66(2), pp. 1227-1236**
Abstract	**The effect of the field-field interaction on a cavity containing two qubit (TQ) interacting with a two mode of electromagnetic field as parametric amplifier type is investigated. After performing an appropriate transformation, the constants of motion are calculated. Using the Schrödinger differential equation a system of differential equations was obtained, and the general solution was obtained in the case of exact resonance. Some statistical quantities were calculated and discussed in detail to describe the features of this system. The collapses and revivals phenomena have been discussed in details. The Shannon information entropy has been applied for measuring the degree of entanglement (DE) between the qubits and the electromagnetic field. The normal squeezing for some values of the parameter of the field-field interaction is studied. The results showed that the collapses disappeared after the field-field terms were added and the maximum values of normal squeezing decrease when increasing of the field-field interaction parameter. While the revivals and amplitudes of the oscillations increase when the parameter of the field-field interaction increases. Degree of entanglement is partially more entangled with increasing of the field-field interaction parameter. The relationship between revivals, collapses and the degree of entanglement (Shannon information entropy) was monitored and discussed in the presence and absence of the field-field interaction.**

Title	**Fuzzy roughness via ideals**
Authors	**Alsulami, S.H., Ibedou, I., Abbas, S.E.**
Journal	**Journal of Intelligent and Fuzzy Systems** **39(5), pp. 6869-6880**
Abstract	**In this paper, we join the notion of fuzzy ideal to the notion of fuzzy approximation space to define the notion of fuzzy ideal approximation spaces. We introduce the fuzzy ideal approximation interior operator int Φ λ and the fuzzy ideal approximation closure operator cl Φ λ , and moreover, we define the fuzzy ideal approximation preinterior operator p int Φ λ and the fuzzy ideal approximation preclosure operator p cl Φ λ with respect to that fuzzy ideal defined on the fuzzy approximation space (X, R) associated with some fuzzy set λ ∈ IX. Also, we define fuzzy separation axioms, fuzzy connectedness and fuzzy compactness in fuzzy approximation spaces and in fuzzy ideal approximation spaces as well, and prove the implications in between.**

Title	**Hash-enhanced elliptic curve bit-string generator for medical image encryption**
Authors	**Reyad, O., Hamed, K., Karar, M.E.**
Journal	**Journal of Intelligent and Fuzzy Systems 39(5), pp. 7795-7806**
Abstract	**Bit-string generator (BSG) is based on the hardness of known number theoretical problems, such as the discrete logarithm problem with the elliptic curve (ECDLP). Such type of generators will have good randomness and unpredictability properties as it is challenged to find a solution regarding this mathematical dilemma. Hash functions in turn play a remarkable role in many cryptographic tasks to accomplish different security levels. Hash-enhanced elliptic curve bit-string generator (HEECBSG) mechanism is proposed in this study based on the ECDLP and secure hash function. The cryptographic hash function is used to achieve integrity and security of the obtained bit-strings for highly sensitive plain data. The main contribution of the proposed HEECBSG is transforming the x-coordinate of the elliptic curve points using a hash function H to generate bit-strings of any desirable length. The obtained pseudo-random bits are tested by the NIST test suite to analyze and verify its statistical and randomness properties. The resulted bit-string is utilized here for encrypting various medical images of the vital organs, i.e. the brain, bone, fetuses, and lungs. Then, extensive evaluation metrics have been applied to analyze the successful performance of the cipherimage, including key-space analysis, histogram analysis, correlation analysis, entropy analysis and sensitivity analysis. The results demonstrated that our proposed HEECBSG mechanism is feasible for achieving security and privacy purposes of the medical image transmission over unsecure communication networks.**

Title	**A numerical study on fractional differential equation with population growth model**
Authors	**Kumar, S., Shaw, P.K., Abdel-Aty, A.-H., Mahmoud, E.E.**
Journal	**Numerical Methods for Partial Differential Equations**
Abstract	**In this work, we developed two efficient and fast numerical technique to solve an initial value problem (IVP) of the linear and nonlinear fractional differential equations (FDEs) of order α, $0 < \alpha < 1$. Here we have used the arbitrary order derivatives in Riemann style. The proposed algorithm are very accurate and provides the solutions directly without perturbations, linearization, or any other assumptions. Illustrating examples with numerical comparisons between the proposed algorithm and the exact and/or Euler method and the improved Euler method (IEM) are given to reveal the efficiency and the accuracy of our algorithm. These scheme has quadratic and cubic convergence rate which is faster than the Euler method and IEM for solving the IVP of FDEs. Moreover, we have discussed the behaviors through graphical representation of the obtained solutions. Furthermore, both methods will be useful for the treatment of disease models for further study.**

Title	**Shrinking Projection Methods for Accelerating Relaxed Inertial Tseng-Type Algorithm with Applications**
Authors	**Hammad, H.A., Rehman, H.U., De La Sen, M.**
Journal	**Mathematical Problems in Engineering 2020,7487383**
Abstract	**Our main goal in this manuscript is to accelerate the relaxed inertial Tseng-type (RITT) algorithm by adding a shrinking projection (SP) term to the algorithm. Hence, strong convergence results were obtained in a real Hilbert space (RHS). A novel structure was used to solve an inclusion and a minimization problem under proper hypotheses. Finally, numerical experiments to elucidate the applications, performance, quickness, and effectiveness of our procedure are discussed.**

Title	**Criteria in Nuclear Fréchet Spaces and Silva Spaces with Refinement of the Cannon-Whittaker Theory**
Authors	**Abul-Ez, M., Zayed, M.**
Journal	**Journal of Function Spaces 2020,8817877**
Abstract	**Along with the theory of bases in function spaces, the existence of a basis is not always guaranteed. The class of power series spaces contains many classical function spaces, and it is of interest to look for a criterion for this class to ensure the existence of bases which can be expressed in an easier form than in the classical case given by Cannon or even by Newns. In this article, a functional analytical method is provided to determine a criterion for basis transforms in nuclear Fréchet spaces ((NF)-spaces), which is indeed a refinement and a generalization of those given in this concern through the theory of Whittaker on polynomial bases. The provided results are supported by illustrative examples. Then, we give the necessary and sufficient conditions for the existence of bases in Silva spaces. Moreover, a nuclearity criterion is given for Silva spaces with bases. Subsequently, we show that the presented results refine and generalize the fundamental theory of Cannon-Whittaker on the effectiveness property in the sense of infinite matrices.**

Title	**Chemical, physical, and biological properties of Pd(II), V(IV)O, and Ag(I) complexes of N_3 tridentate pyridine-based Schiff base ligand**
Authors	**Abdel-Rahman, L.H., Abu-Dief, A.M., Atlam, F.M., (...), Alsalme, A.M., Nafady, A.**
Journal	**Journal of Coordination Chemistry 73(23), pp. 3150-3173**
Abstract	**A new N3-tridentate imine ligand, 2,6-diacetylpyridinediphenylhydrazone (DAPH) (L), and its Pd(II), V(IV)O, and Ag(I) complexes were synthesized and characterized via elemental analysis, FT-IR, NMR, molar conductance, and magnetic susceptibility measurements. The obtained data confirmed geometrical structures of Pd(II), Ag(I), and V(IV)O complexes as square planar, tetrahedral, and distorted square pyramidal, respectively. Minimum inhibitory concentrations (MIC) were used to probe in vitro antimicrobial activity of DAPH ligand and metal complexes using three different bacteria. Results revealed that PdDAPH complex exhibited the highest toxicity and lowest MIC (1.25 µg/mL) toward Escherichia coli. Moreover, cytotoxic activity of the prepared complexes was evaluated via three human cancer cell lines, hepatic carcinoma (HepG2), breast carcinoma (MCF-7), and colon carcinoma (HCT-116). Among all tested complexes, PdDAPH caused a significant loss of cell viability in less time and lower dose than the reference drug vinblastine. Antioxidant activity was also measured for all complexes and compared to vitamin C. Probing the interaction of the prepared metal-DAPH chelates with calf-thymus DNA showed the Pd(II) complex displayed the strongest interaction, with a binding constant of 6.02 kcal mol−1. Molecular docking was also investigated on all complexes, with PdDAPH being the most promising compound due to its facile hydrophobic interactions with the active pocket of glucose transporter (GLUT1) enzyme. Overall, the combined findings of this work clearly demonstrate that these new compounds hold promise as efficient antibiotic and anticancer agents.**

Title	**On r-fuzzy ℓ-open sets and continuity of fuzzy multifunctions via fuzzy ideals**
Authors	**Taha, I.M.**
Journal	**Journal of Mathematical and Computational Science 10(6), pp. 2613-2633**
Abstract	**In this paper, the concepts of r-fuzzy ℓ-open, r-fuzzy semi-ℓ-open, r-fuzzy pre-ℓ-open, r-fuzzy α-ℓ-open and r-fuzzy β-ℓ-open sets are introduced in a fuzzy ideal topological space (X,τ,ℓ) based on the sense of Šostak. Also, the relations of these sets with each other are investigated with the help of examples. Moreover, the concepts of fuzzy upper (resp. lower) ℓ-continuous, almost ℓ-continuous and weakly ℓ-continuous multifunctions are introduced and some properties of these multifunctions along with their mutual relationships are specified.**

Title	**Macro and micromorphological studies and numerical analysis on the nutlet of some cyperoideae-cyperaceae taxa from Egypt and their taxonomic significances**
Authors	**Elkordy, A., Abd El-Ghani, M., Faried, A.**
Journal	**Turkish Journal of Botany**
Abstract	**Nutlets of 13 taxa of subfamily Cyperoideae (Cyperaceae) from Egypt were investigated using light and scanning electron microscopes to ascertain the taxonomic utility of the nutlet in corroborating and elaborating on distinctions between closely related genera and species. The studied taxa included representatives of tribes Fuireneae, Cypereae, Cariceae, Abildgaardieae and Schoeneae. Nutlet shape, size, color, surface, epidermal cell shape, anticlinal boundaries, outer periclinal cell wall and relief of outer cell walls were provided. It was found that the epidermis has useful microscopic characters to help in the taxonomic assessment of Cyperoideae. Seven different types of anticlinal cell wall boundaries were described, four types of outer periclinal cell walls, and five different forms of the secondary cell walls were recognized. A diagnostic key for the studied taxa based on nutlet characters was presented. The results showed congruence between the UPGMA dendrogram and principal component analysis in suggesting two major groups and six subgroups. The most important characters with the highest factor loadings along the first two PCA axes included nutlet shape, nutlet apex, surface topography and the presence of silica bodies. The results of this study confirmed the heterogeneity of the Cyperoideae and indicated that Fuireneae is the most heterogeneous tribe.**

Title	**Effect of several fields on a generalized thermoelastic medium with voids in the context of Lord-Shulman or dual-phase-lag models**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Kilany, A.A.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**The aim of the present study is concerned with an electromagnetic field, gravity field, rotation and initial stress on generalized thermoelastic medium with voids in the dual-phase-lag model (DPL) and Lord-Shulman (L-S). The problem deals with more applications in geophysics, engineering, acoustics, astronomy, industry, and petroleum extraction. A normal mode method is proposed to analyze the problem and obtain numerical solutions for the displacement components, stresses, temperature distribution and change in the volume fraction field. The results of the physical quantities have been illustrated graphically by comparison between (DPL) and Lord-Schulman (L–S) theory in the presence and absence of the considered variables. The results indicate that the effect of the voids, rotation, initial stress and gravity field is very pronounced. If the external previous parameters neglect, the results obtained considering diffusion are deduced to the results obtained by Abo-Dahab and Abd-Alla.**

Title	**Dual-phase-lag model on magneto-thermoelastic rotating medium with voids and diffusion under the effect of initial stress and gravity**
Authors	**Abo-dahab, S.M., Abd-alla, A.M.**
Journal	**Heat Transfer** **49(4), pp. 2131-2166**
Abstract	**In this paper, the propagation of harmonic plane waves is considered in a generalized thermoelastic medium with diffusion and voids in the presence of initial stress, magnetic field, rotation, and gravity in the context of thermoelastic models; classical, Lord Shulman, Green Lindsay as well as dual-phase-lag models. We applied the boundary conditions in the physical domain using the normal mode method technique on the surface to obtain the displacements, stresses, temperature, diffusion concentration, and the volume fraction field. Influence of initial stress, magnetic field, rotation, and gravity on temperature, stresses, concentration of diffusion, and the volume fraction is observed through a numerical example. The results obtained will be compared in the presence and absence of the new considered variables, also with the previous results obtained by the others and displayed graphically.**

Title	**The laminar boundary layer over a rotating paraboloid**
Authors	**Shah, R., Hammad, H.A.**
Journal	**Information Sciences Letters** **9(3), pp. 199-204**
Abstract	**This work is concerned with the derivation of the steady boundary layer equations that gives the laminar flow profile over the outer surface of a paraboloid rotating in an otherwise still fluid. Also, the series solution formulation for the laminar flow equations for a rotating paraboloid is given. The series solution were numerically calculated and the laminar flow profiles are visualized in detail. Further, we showed that the formulation of the laminar flow equations for paraboloid has a mathematical flaw and this mistake led to the work of P. D. Verma [1].**

Title	**Eco-physiological response of solanum nigrum to Cd and Ni stress under hydroponic conditions**
Authors	**Aboelkassem, A., El-Khatib, A., Hassanein, S., Allam, O., El-Sheikh, O.**
Journal	**Egyptian Journal of Botany** **60(2), pp. 563-574**
Abstract	**SOLANUM nigrum L. was transplanted from soil to hydroponic culture system with Hoagland's solution to study its eco-physiological response to Cd and Ni toxicity. The plants were exposed to 10 or 25mg/L Cd or Ni over 7 days before harvesting for analysis. The findings of this study provided better understanding of stress adaptation in S. nigrum under Cd and Ni stress. The photosynthetic pigments and activities of antioxidant enzymes were estimated in the plant leaves. Chlorophyll content and carotenoids decreased progressively with increasing concentrations of both metals. Activities of the antioxidant enzymes POD, APX, CAT, and SOD in the leaves increased significantly by exposure to the high levels for both metals. The plant responses was varied with both metal and tested concentrations, reflecting the potentiality of using S. nigrum as phytoremediator of Cd and Ni polluted water in hydroponic culture system.**

Title	**The effects of thermal relaxation time in a two-dimension porous medium due to thermal loading**
Authors	**Saeed, T., Abbas, I.**
Journal	**Waves in Random and Complex Media**
Abstract	**In this article, the generalized model for thermoelastic waves with one relaxation time is utilized to compute the increment of temperature, the components of displacement, the changes in volume fraction field and the stress components in a two-dimension porous medium. By using Fourier–Laplace transforms with the eigenvalue approach, the physical quantities are analytically obtained. The derived method is evaluated with numerical results which are applied to the porous medium in simplified geometry. Numerical outcomes for all the physical quantities considered are implemented and represented graphically. The effects of thermal relaxation time in the temperature, the changes in volume fraction field, the displacement components and the stress components have been depicted graphically.**

Title	**Pomegranate peel extract protects against carbon tetrachloride-induced nephrotoxicity in mice through increasing antioxidants status**
Authors	**Emam, N.M., Anjum, S., Okail, H.A., Ibrahim, M.A.R., Ahmad, T.**
Journal	**Biomedical Reports 13(3),13, pp. 1-9**
Abstract	**Carbon tetrachloride (CCl4) is a notorious environ-mental pollutant known for its toxicity. The aim of the present study was to evaluate the possible protective effects of aqueous pomegranate peel extract (PPE) against CCl4 induced nephrotoxicity in mice. Adult male mice were divided into four groups: Group one was used as the control; Group two was treated with a daily oral dose of PPE (400 mg/kg) for 15 days; the third group was intraperitoneally injected with a dose (1 ml/kg) of CCl4 twice a week for two weeks; and the final group was injected with the same dose of CCl4 twice a week concomitantly with a daily oral dose of PPE (400 mg/kg). Biochemical and histopathological data were analyzed along with the gene expression levels of the antioxidant enzymes and immunohistochemistry of the kidney tissue. CCl4 resulted in a significant increase in the serum urea and creatinine levels with detectable degenerative changes in the Bowman's capsule and glomerulus, with cells exhibiting vacuolization and evidence of necrosis. Co-administration of animals with CCl4 and PPE resulted in improved biochemical and histopathological conditions. Similarly, increased production of the Caspase-3 and collagen fibers were reduced in mice treated with PPE. Quantitative analysis of superoxide dismutase, catalase and glutathione peroxidase further accentuated the effects of PPE treatment significantly improving the conditions of the CCl4-administered group. The results of the present study demonstrate that the phenolic derivative rich PPE is a potent nephroprotective agent and suppresses CCl4-induced nephrotoxicity in mice.**

Title	**Effects of anti-ethylene compounds on vitrification and genome fidelity of stevia rebaudiana bertoni**
Authors	**Salem, J.M.**
Journal	**Egyptian Journal of Botany** **60(2), pp. 519-535**
Abstract	**SUBCULTURE repeats was essential prerequisite for mass micropropagation in stevia but it accompanied by vitrification of the cultured shoots. Increase the number of shoots/ explant without vitrification was detected when nodal segments of in vitro obtained shoots were subcultured twice, three weeks each, on Murashige and Skoog (MS) medium with 0.25mg/L BAP. From the third subculture, shoot multiplication decreased and vitrification increased as the number of subcultures increased; where 40% of the formed shoots of 10th subculture were vitrified. Decrease of water potential by polyethylene glycol (PEG) increased the incidence of shoot vitrification but shortened the period of subculture from three to two weeks delayed its appearance up to sixth subcultures. Also, application of anti-ethylene agents [AgNO3, CoCl2 or salicylic acid (SA)] decreased vitrification problems up to six subcultures. The best results were obtained by 1.7mg/L AgNO3 where verification was reduced without significant reduction in the number of shoots/explant and shoot growth. The equivalent concentration of AgNO3 in nano-particles form (AgNPs) showed a drastic increase in shoot vitrification (20%).When shoots of the 1st, 4th, 7th and 10th subcultures were subjected to genome amplification using RAPD or ISSR primers, the registered polymorphism under the influence of 1.7mg/L AgNO3 was lower than that of 1.7mg/L AgNPs; both of them were lower than that of shoots cultured on anti-ethylene free medium (control).**

Title	**A technique of tripled coincidence points for solving a system of nonlinear integral equations in POCML spaces**
Authors	**Hammad, H.A., La Sen, M.D.**
Journal	**Journal of Inequalities and Applications 2020(1),211**
Abstract	**This manuscript aims to initiate some recent theoretical consequences related to tripled coincidence points for non-self mappings via the notion of C-type functions in partially ordered complete metric-like space (for short, POCML space). Our contributions unify and expand some previous studies in this line. Moreover, some corollaries and suitable examples are presented to demonstrate the novelty of the results established. Ultimately, two applications are given here to boost our theoretical consequences, the first one about the contributions of the integral type to obtain a triple coincidence points and the other application is about solving a system of nonlinear integral equations**

Title	**Sources and health risk assessments of nitrate in groundwater, West of Tahta area, Sohag, Egypt**
Authors	**Redwan, M., Abdel Moneim, A.A., Mohammed, N.E., Masoud, A.M.**
Journal	**Episodes** **43(2), pp. 751-760**
Abstract	**Due to natural and anthropogenic human activities in arid and semi-arid regions, groundwater will continuously suffer from severe contaminations such as increases in nitrate levels. Groundwater contamination poses serious threats to the environment and human health. In the current study, 23 groundwater samples were collected from the desert zone around the wastewater treatment plant west of Tahta area, Sohag, Egypt. The samples were chemically and bacteriologically analyzed to quantify the sources and potential risk of nitrate in groundwater to the health of adults, children and infants. The nitrate showed wide spatial variability in the studied area, with values going from 0.38 up to 59 mg/L. Based on the bacteriological, principal component, NO3- and NO3-/Cl- analyses, nitrate in the south-western parts around the wastewater treatment plant developed from the sewage contamination while the northeastern and southern parts are mainly due to contamination from the agricultural activities and organic wastes. The non-carcinogenic hazard quotients (HQ) values of 78% of infants, 70% children and 4% of adults were higher than the safety level (i.e., HQs>1), suggesting severe health effects on human health. Proper management of wastewater disposal activities and application of fertilizers are required to reduce groundwater contamination in Egypt and globally.**

Title	**Plane Waves Transmission and Reflection at the Interface Between Thermoelastic Continua in Absence of Dissipation: The Influence of Magnetic Field and Rotation**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Abd-alla, A.-E.-N.N., Elsagheer, M**
Journal	**Advanced Structured Materials** **132, pp. 235-266**
Abstract	**In the present contribution, it is addressed the problem of plane wave reflection and transmission at the imperfect interface between thermoelastic halfspaces having different properties when the effect of magnetic and rotation fields is relevant. Using Green and Naghdi theory, we formulate the needed governing equations for thermoelastic bodies occupying both an half space under the assumption that each of them is homogeneous and isotropic. We could solve in a closed form the problem of planar waves whose propagation is determined by postulated balance equations. The amplitude of transmitted and reflected waves are obtained so that we can prove that one can observe three kinds of waves, namely, P–waves, T–waves and SV–waves. Our closed form solution allows us to determine the amplitude ratios between reflected and refracted waves also in the case of imperfect boundary. In particular, we obtain that these amplitude ratios depend on the elastic stiffness, the magnetic field and on the thermal properties of the considered bodies. Also the case of stress-free boundary has been considered. The effect of the magnetic and rotation fields is investigated via suitable numerical computations. We observe that rotation and magnetic fields may induce relevant phenomenology.**

Title	**On the new explicit solutions of the fractional nonlinear space-time nuclear model**
Authors	**Abdel-Aty, A.-H., Khater, M.M.A., Attia, R.A.M., Abdel-Aty, M., Eleuch, H.**
Journal	**Fractals**
Abstract	**In this research, the analytical and numerical solutions of the fractional nonlinear space-time Phi-four model are investigated by employing two systematic schemes and the B-spline schemes. A new fractional operator definition is applied to this model to convert the model from its fractional formula to an integer-order nonlinear ordinary differential equation. The considered model is of major interest for studying the nuclear interaction, elementary particles in a condensed medium, and propagation of dislocations in crystals. Explicit wave solutions are obtained.**

Title	**On generalized waves reflection in a micropolar thermodiffusion elastic half-space under initial stress and electromagnetic field**
Authors	**Abo-Dahab, S.M., Abd-Alla, A.M., Alsharif, A., Alotaibi, H.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**We discuss the reflection waves phenomenon in a generalized thermoelastic micropolar half-space under initial stress, electromagnetic field, and diffusion based on two models: Lord-Shulman (LS) and Dual-Phase-Lag (DPL). The governing equations are formulated by considering new parameters as a constitutive equation, equation of motion, diffusion equation, and micropolar equation in the context of two thermoelastic models. Lame potentials are used to separate the equations to dilatational and shear components. So, the characteristic equation indicates to five reflected waves due to the motion, diffusion, micropolar, and thermoelastic effects. The boundary conditions have been applied concerning the mechanical and maxwell stresses, temperature, diffusion, and micropolar. The reflection coefficients ratios are calculated for the general case in the presence of thermodiffusion and microplarity, and the absence of microplarity of the medium. The effect of the initial stress, relaxation times, electromagnetic field, and angle of incidence on the reflection coefficients for thermal wave incidents are displayed graphically to show the physical meaning of the phenomenon. We compare our results which we obtain by using the external parameters effect with other results. The specific loss of energy has been also computed analytically and presented by graph.**

Title	**Photothermal and void effect of a semiconductor rotational medium based on Lord–Shulman theory**
Authors	**Kilany, A.A., Abo-Dahab, S.M., Abd-Alla, A.M., Abd-alla, A.N.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**In this article the photothermal and void parameters of a semiconductor rotational medium are investigated when there is a fixed thermal relaxation time. We obtain the displacement, temperature, stress components, and carrier density concentration in a thermoelastic solid. Considering the normal mode technique under the effectiveness of the rotation, photothermal, and voids on the obtained components were graphically drawn. A comparison was made between the results obtained, taking into account the presence or ignorance of rotation, photothermal, and voids. The outcomes point out a strong impact of the voids, rotation, photothermal, and the thermal relaxation on the phenomenon and agree with the physical results. The results agree with the previous results obtained by the others when the rotation and voids vanish.**

Title	**Ellipsometric evaluation and morphology of mixed zinc sulfide/zinc oxide and zinc oxide nanostructures synthesized at various temperatures**
Authors	**Alqahtani, M.S., Mohamed, S.H., Alrowaili, Z.A., Hadia, N.M.A**
Journal	**Canadian Journal of Physics 98(7), pp. 689-694**
Abstract	**The aim of this work was to carry out systematic studies of how synthesis temperatures affect the morphology and properties of mixed zinc sulfide/zinc oxide (ZnSxOy and ZnO) nanostructures, and to get reliable data on optical constants of ZnSxOy and ZnO nanowires/nanobelts (NW/NB) for the use in device applications. ZnSxOy and ZnO NWs/NBs were fabricated using vapor transport in an open-end tube. Mixed ZnS0.47O0.62NWs was obtained at the synthesis temperature of 850 °C. The sulfur content disappeared as the temperature increased to 950 °C and 1050 °C and the morphology changed to a mixture of NW/NB. The NW prepared at 850 °C were indexed as mixed phases of hexagonal ZnS and hexagonal ZnO structures. The NW/NB prepared at 950 °C and 1050 °C were indexed as pure hexagonal ZnO structures. The thickness, surface roughness, and optical constants of the synthesized nanostructured samples were extracted from measurements of spectroscopic ellipsometry. A two-layers model was proposed to fit the calculated data to the measured ellipsometric spectra. The estimated band gap values of the prepared nanostructures lay 0.66–0.79 eV below the bulk ZnO value due to the lower oxygen content present in the samples and the stresses built in the samples during preparation.**

Title	**The impact of hydrogen peroxide against cucumber green mottle mosaic virus infection in watermelon plants**
Authors	**Radwan, D.E.M., Ismail, K.S.**
Journal	**Polish Journal of Environmental Studies 29(5), pp. 3771-3782**
Abstract	**The aim of this work was to study the effects of hydrogen peroxide (H2 O2) application against cucumber green mottle mosaic virus (CGMMV) infection in watermelon (Citrullus lanatus) plants. From the obtained results, the induced resistance using H2 O2 treatments caused a delay in the appearance of CGMMV symptoms in watermelon plants. The viral infection showed abnormal morphological symptoms such as mosaics, yellow blisters and reduction in size. Pretreatment with H2 O2 before infection was beneficial in increasing the contents of pigments, total proteins, total free amino acids and proline. Consequently, plants appeared morphologically similar to healthy controls. Signaling the effect of the H2 O2 treatment could induce partial resistance or delay the appearance of symptoms and decreased virus concentration. The induced mechanism of resistance was suggested to be through alterations of plant antioxidant status – both enzymatic and non-enzymatic. All analyzed antioxidant enzymes were induced in response to H2 O2 ±CGMMV. Due to the H2 O2 application prior to infection, malondialdehyde (MDA) content was reduced, indicating a lowering in lipid peroxidation caused by virus infection. On the other hand, internal H2 O2 and phenolics contents were induced in H2 O2 + CGMMV-treated leaves. To confirm: total antioxidant activity was increased to be double the value (80.67%) of that recorded in healthy plants (47.18%), indicating changes in antioxidant status as a response to H2 O2 and/or CGMMV infection. This work provided evidence of the signaling role of exogenous H2 O2, which led to systemic acquired resistance (SAR) induction acting against CGMMV infection in watermelon plants. From the present findings, a suggestion of spraying of H2 O2 might be helpful in avoiding the appearance of CGMMV severe symptoms throughout the plants' life.**

Title	**FRACTIONAL CALCULUS of THERMOELASTIC p -WAVES REFLECTION under INFLUENCE of GRAVITY and ELECTROMAGNETIC FIELDS**
Authors	**Alotaibi, H., Abo-Dahab, S.M., Abo-Dahab, S.M., Abdlrahim, H.R., Kilany, A.A.**
Journal	**Fractals** **2040037**
Abstract	**In this paper, we discussed the longitudinal harmonic waves reflection from a solid elastic half-space with electromagnetic and gravity fields influence, considering a fractional order via fractional exponential function method. The clarifications are required for the reflection amplitudes ratios (i.e. the ratios between the reflected waves amplitude and the incident waves amplitude). The results obtained were calculated analytically and displayed by graphs to show the physical meaning of the phenomenon. A comparison has been made between the fractional and integer derivatives. The results of this paper demonstrate the rigor and effectiveness of the considered fractional technique.**

Title	**Analytical solution for rotating surface waves remodeling in long bones under magnetic field**
Authors	**Abo-Dahab, S.M., Abd-Alla, A.M., Alqosami, S., Gafel, H.S.**
Journal	**JP Journal of Heat and Mass Transfer 20(1), pp. 1-30**
Abstract	**We investigate the analytical solution for an internal bone remodeling under magnetic field, rotation, porosity and a medullary pin. The model with prescribed boundary conditions has been solved using Lame's potential method. A new theoretical approach for surface remodeling is thus developed. The components of stresses, stress of the fluid, displacement and rate of internal remodeling are theoretically analyzed and calculated numerically. A movement of the periosteal surfaces and endosteal with remodeling time is displayed considering various values of magnetic field, rotation and bone porosity. The results obtained indicate to the pronounced effect of magnetic field, rotation and porosity on the rate of internal remodeling in bone and agreement with the results obtained previous by others if the rotation and magnetic field have been neglected.**

Title	**Structural and optical properties of $CuIn_{1-x}Ga_xSe_2$ thin films**
Authors	**Hadia, N.M.A., Wakkad, M.M., Shokr, E.K.H., Taya, Y.**
Journal	**Journal of Optoelectronics and Advanced Materials 22(1-2), pp. 42-54**
Abstract	**Bulk alloys of CuIn1-xGaxSe2 with Ga - incorporation ratio x= Ga / (Ga + In) equal to 0.1, 0.2, 0.3, 0.4 and 0.6 have been prepared by the melt quench technique. The CuIn1-xGaxSe2 (CIGS) thin films have been deposited on clean microscope glass substrates with different thickness (50, 100, 150, 200 and 250 nm) using the thermally evaporated technique in a vacuum of 3x10-4 mbar from the prepared bulk material. XRD, SEM and EDAX were utilized in order to examine the structure, surface morphology and composition stoichiometry of CIGS samples. Effects of Ga - ratio, film thickness and annealing at 573 K for different periods of time (5 - 60 min.) on structural and optical properties have been depicted and explained. Some important structural and optical parameters were calculated and discussed.**

Title	**Iot and neural network-based water pumping control system for smart irrigation**
Authors	**Karar, M.E., Al-Rasheed, M.F., Al-Rasheed, A.F., Reyad, O.**
Journal	**Information Sciences Letters** **9(2), pp. 107-112**
Abstract	**This article aims at saving the wasted water in the process of irrigation using the Internet of Things (IoT) based on a set of sensors and Multi-Layer Perceptron (MLP) neural network. The developed system handles the sensor data using the Arduino board to control the water pump automatically. The sensors measure the environmental factors; namely temperature, humidity, and soil moisture to estimate the required time for the operation of water irrigation. The water pump control system consists of software and hardware tools such as Arduino Remote XY interface and electronic sensors in the framework of IoT technology. The machine learning algorithm such as the MLP neural network plays an important role to support the decision of automatic control of IoT-based irrigation system, managing the water consumption effectively.**

Title	**Mathematical prospective of coronavirus infections in bahrain, saudi arabia and egypt**
Authors	**Alnaser, W.E., Abdel-Aty, M., Al-Ubaydli, O.**
Journal	**Information Sciences Letters** **9(2), pp. 51-64**
Abstract	**In this paper, a mathematical prospective of Coronavirus Infections in Bahrain, Suaidi Arabia and Egypt is considered taking into account the development of the propagation of COVID 19 in Wuhan city, China. The model revealed that the number of actual cases of COVID - 19 in the Kingdom of Bahrain is less than expected by about 21.3 times that of the reported cases in the city of Wuhan, while in the Kingdom of Saudi Arabia it is 141.9 less and in Egypt is less than 808 times. This is may be attributed to several factors including ambient temperature, population density, absolute humidity, lifestyle, physical immunity type of nutrition, accuracy of measurements and number of tests made and other reasons. Finally, we present the expected behavior of the Coronavirus during the forthcoming period.**

Title	**Constructing a new frame of spacelike curves on timelike surfaces in Minkowski 3-space**
Authors	**Shonoda, E.N., Khalifa Saad, M.**
Journal	**WSEAS Transactions on Mathematics** **19, pp. 247-252**
Abstract	**In this paper, we define a relative Minkowski normal plane ζ and relative tangent vector TM. We construct a new relative S-frame (Shnoda-Saad frame) of regular spacelike curves on timelike surfaces. It depends only on the curve lies on the surface, Euclidean and Minkowski unit normal vectors. Also, we define S-curve according to this frame with some related theorems.**

Title	**Gasduino-wireless air quality monitoring system using internet of things**
Authors	**Karar, M.E., Al-Masaad, A.M., Reyad, O.**
Journal	**Information Sciences Letters** **9(2), pp. 113-117**
Abstract	**The Health Effects Institute (HEI) reported recently that the deaths from the negative health effects of the air pollution in the Middle East Region is about 500,000 people. Therefore, this paper presents a new design and development of portable system; called GASDUINO that allows the user to measure the quality of air using the Internet of Things (IoT). The main components of developed GASDUINO system are the Arduino microcontroller board, Gas sensor (MQ-135), Android user interface (UI) connected with all things via Remote XY Arduino cloud. The developed system can alarm the users about the dangerous levels of the air quality index (AQI) or the particle per million (PPM) levels in the range of 0 to above 200 PPM. The developed GASDUINO system is considered as an essential environmental module in the development and sustainability of future smart cities.**

Title	**Reflection of plane waves on generalized thermoelastic medium under effect of temperature dependent properties and initial stress with three-phase-lag model**
Authors	**Abo-Dahab, S.M., Abd-Alla, A.M., Othman, M.I.A.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**The present paper investigates the reflection coefficient of thermoelastic plane waves at the free surface of an elastic half-space influenced by initial stress and temperature-dependent properties in the presence of thermal loading bounded by the three-phase-lag (3PHL) thermoelastic model. It revealed three plane waves, i.e. (thermal wave (T-wave), P-wave, and SV-wave). It provided the numerical solution and presented the effect of initial stress and temperature-dependent properties of the reflection coefficient graphically. Moreover, the paper utilized the altered reflected elastic waves because of initial stress and temperature-dependence to identify the more accurate nature of waves reflection, especially seismic waves.**

Title	**Characterizations of some special curves in lorentz-minkowski space**
Authors	**Saad, M.K., Abdel-Baky, R.A., Alharbi, F., Aloufi, A.**
Journal	**Mathematics and Statistics** **8(3), pp. 299-305**
Abstract	**In a theory of space curves, especially, a helix is the most elementary and interesting topic. A helix, moreover, pays attention to natural scientists as well as mathematicians because of its various applications, for example, DNA, carbon nanotube, screws, springs and so on. Also there are many applications of helix curve or helical structures in Science such as fractal geometry, in the fields of computer aided design and computer graphics. Helices can be used for the tool path de-scription, the simulation of kinematic motion or the design of highways, etc. The problem of the determination of parametric representation of the position vector of an arbitrary space curve according to the intrinsic equations is still open in the Euclidean space E3 and in the Minkowski space E1.3 In this paper, we introduce some characterizations of a non-null slant helix which has a spacelike or timelike axis in E1.3 We use vector differential equations established by means of Frenet equations in Minkowski space E1.3 Also, we investigate some differential geometric properties of these curves according to these vector differential equations. Besides, we illustrate some examples to confirm our findings.**

Title	**Magneto-thermoelastic problem in the context of four theories under influence of laser pulse and gravity field**
Authors	**Abo-Dahab, S., Abd-Alla, A., Alqarni, A.**
Journal	**Archives of Thermodynamics** **41(1), pp. 31-66**
Abstract	**The paper is devoted to study the effect of gravity, magnetic field and laser pulse on the general model of the equations of generalized thermoelasticity for a homogeneous isotropic elastic half-space. The formulation is applied under four theories of generalized thermoelasticity: the coupled theory, Lord-Schulman theory, Green-Lindsay theory as well as Green-Naghdi theory. By employing normal mode analysis, the analytical expressions for the displacement components, temperature and the (mechanical and Maxwell's) stresses distribution are obtained in the physical domain. These expressions are also calculated numerically and corresponding graphs are plotted to illustrate and compare the theoretical results. The effect of gravity, magnetic field and laser pulse are also studied and displayed graphically to show the physical meaning of the phenomena. A comparison has been made between the present results and the results obtained by the others. The results indicate that the effects of magnetic field, laser pulse and gravity field are very pronounced.**

Title	**Finite element analyses of nonlinear DPL bioheat model in spherical tissues using experimental data**
Authors	**Saeed, T., Abbas, I.**
Journal	**Mechanics Based Design of Structures and Machines**
Abstract	**Based on the non-linear dual phase lag model, the present investigation treats with mathematical models of bioheat transfer to study the transient phenomena in a spherical tissue due to the effect of laser heat source. Caused by the nonlinear basic equations, the finite element method is adopted to get the solutions of this problem. To verify the accuracy of the numerical solutions, the numerical results obtained by the finite element method are compared with the experimental data. Also, the comparison between the experimental results and the numerical results display that the existing mathematical model is efficacious tool to estimate the bio-heat model in the spherical biological tissues.**

Title	**Structure and optical properties of polycrystalline ZnSe thin films: Validity of Swanepol's approach for calculating the optical parameters**
Authors	**Hasaneen, M.F., Alrowaili, Z.A., Mohamed, W.S.**
Journal	**Materials Research Express 7(1),016422**
Abstract	**Ultrasonically cleaned glass slides are used as substrates for receiving the different thickness of Zinc selenide (ZnSe) films. The deposition processes of our investigated films were done at room temperature using physical thermal evaporation mechanism under vacuum ≈2 × 105 mbar. We investigated the optical and structural parameters of ZnSe thin films in correlation with film thickness (200-650 nm). Various techniques such as UV-vis-NIR spectrophotometer, X-ray diffraction lines and field emission scanning electron microscope were used to investigate aforementioned parameters. Structural analysis indicate that the films exhibited cubic preferred orientation along the plane (111) and the crystallinity and crystallite size of films increases linearly with film thickness. The optical band gap ranges from 2.69 to 2.81 eV and it is founded that it increases with film thickness. According to the applied Swanepoel's approach, it is possible to estimate the optical parameters and average thickness of the ZnSe thin films of different thicknesses with higher accuracy.**

Title	**Classes of weighted tent function spaces and mixed norms with some applications**
Authors	**El-Sayed Ahmed, A., Youssif, M.Y.**
Journal	**Italian Journal of Pure and Applied Mathematics 43, pp. 402-415**
Abstract	**In this paper, some new definitions for weighted classes of analytic functions are introduced. Moreover, certain properties are presented for functions belonging to the defined classes in the unit disk. Besides, a class of weighted tent functions is also considered. Furthermore, some properties for identity operator are studied for the new tent function spaces.**

Title	**Two-level atom and quantum system entanglement and squeezing with and without classical field and damping effects**
Authors	**Khalil, E.M., Abdel-Khalek, S., Al-Awfi, S., Rasulova, M.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2823-2832**
Abstract	**In this article, we study the entropy squeezing and the nonlocal correlation between a nonlinear quantum system initially in the BGS (Barut-Girardello state) and 2LA (two-level atom). The numerical solution is used for solving the differential equations to obtain the density matrix. The relation between the atomic inversion, nonlocal correlation measured by the negativity and entropy are discussed. The effective of classical field and damping on the dynamical properties of the entanglement and entropy squeezing is examined. The results are shown that a high amount of classical field due to the entanglement reached to minimum values. Finally the proposed quantum system being more resistant to the damping effect in the absence of classical field than the presence of classical field.**

Title	**Secure communication and synchronizations in light of the stability theory of the hyperchaotic complex nonlinear systems**
Authors	**Mahmoud, E.E., Eshmawi, A.A.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2591-2601**
Abstract	**This paper's main objective is to reflect on hyperchaotic complex nonlinear systems' phase synchronization (PS) and anti-phase synchronization (APS). In these complex systems, the number of state variables can be expanded by isolating the real and imaginative parts. In PS, while their amplitudes stay uncorrelated, the position between two coupled chaotic (or hyperchaotic) systems remains in step with each other. The absence of the sum of relevant variables can characterize APS. To study PS and APS with complex variables of hyperchaotic nonlinear systems, the active control technique on the basis of stability analysis is proposed. PS and APS investigations for high dimensional systems are demonstrated by studying a 6-dimensional Lü system. Phase synchronization concerns were also used to construct a straightforward and simple secure communication application. Numerical influences outlined for clarifying the phase synchronization of the hyperchaotic Lü model and for examining the gravity of scientific articulations' control powers.**

Title	**On the stable computational, semi-analytical, and numerical solutions of the Langmuir waves in an ionized plasma**
Authors	**Khater, M.M.A., Attia, R.A.M., Qin, H., (...), Kharabsheh, R., Lu, D.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2847-2858**
Abstract	**This research paper investigates the stable computational, semi-analytical, and numerical solutions of the nonlinear complex fractional generalized-Zakharov system. This system describes the nonlinear interactions between the low-frequency, acoustic waves and high-frequency, electromagnetic waves. The modified Khater method is applied to find the analytical solutions then the stability property of these solutions is discussed by using the Hamiltonian system properties. Moreover, stable computational solutions are used as the initial condition in the semi-analytical and numerical schemes. The Adomian decomposition and septic B-spline schemes are used to find the semi-analytical and numerical. For more explanation of the obtained analytical solutions, some sketched are plotted in different types. Also, the comparison between the distinct types of obtained solutions is shown by calculating the absolute value of error. The performance of the used method explains the powerful, effective, and the ability for applying to different forms of nonlinear evolution equation.**

Title	**A quantum classification algorithm for classification incomplete patterns based on entanglement measure**
Authors	**Abdel-Aty, A.-H., Kadry, H., Zidan, M., (...), Zanaty, E.A., Abdel-Aty, M.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2817-2822**
Abstract	**In this paper, a novel quantum classification algorithm that is based on competitive learning is presented to classify an input pattern that results from the failures of some sensors. As long as an incomplete pattern is presented to our model, the proposed algorithm performs the competitions between the neurons by applying some unitary transformations then measures the degree of entanglement using concurrence measure to find the winner class based on the winner-take-all technique. The proposed algorithm finds the most likely winning class label in between two binary competitive classes for an incomplete pattern presented to the proposed model. Because larger scale quantum computers are still in the lab, we studied the proposed algorithm on a case study.**

Title	**Genetic algorithm and numerical methods for solving linear and nonlinear system of equations: A comparative study**
Authors	**Hassan, O.F., Jamal, A., Abdel-Khalek, S.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2873-2883**
Abstract	**The problem of solving linear and nonlinear system of equations is a largely useful issue of significant importance such as that it is presented on real-time applications. Different numerical methods such as fixed-point, Newton Raphson, bisection and secant methods, and or others, namely; evolutionary and computational methods are used to solve nonlinear system under optimizing the space and time complexity. Genetic Algorithm (GA) proved to be an efficient soft computing approach to solve many linear/non-linear system of equations. In this article, a comparison between different GAs and numerical methods for solving a system of equations are introduced. From the results, a novel approach is introduced which is inspired by using a modified GA to get the optimistic solution for the system which has no numerical solution and verified with the highest performance measures in solving complicated problems.**

Title	**On the computational and numerical solutions of the transmission of nerve impulses of an excitable system (the neuron system)**
Authors	**Khater, M.M.A., Attia, R.A.M., Abdel-Aty, A.-H., (...), Al-Hadeethi, Y., Lu, D.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2603-2610**
Abstract	**This research paper studies the computational and numerical solutions of the transmission of nerve impulses of a nervous system (the neuron) by applying the modified Khater (mK) method and B-spline scheme to the FitzHugh-Nagumo (FN) equation where it is usually used as a model of the transmission of nerve impulses. This study focuses on finding the different types of soliton wave solutions, studying the stability property of them, and then use them to obtain the numerical solutions of the model. The obtained solutions are compared with each other to show the absolute value of error between them that will explain the accuracy of both types of solutions. Moreover, in the text of more explanation of the physical properties of the suggested model, some sketches are plotted. Also, the performance of both techniques is investigated to show its ability for applying to other nonlinear evolutions equation.**

Title	**Entanglement and atomic Fisher information of a two qubits and optical field in squeezed thermal state**
Authors	**Algarni, M., Al-Ghamdi, H., Abdel-Khalek, S.**
Journal	**Journal of Intelligent and Fuzzy Systems 38(3), pp. 2457-2467**
Abstract	**Quantum information technology depends on an invaluable and tenuous resource, named quantum correlation, that shows strong significant manifestation of the coherent overlap of states of a combined quantum systems. So the quantifier of this resource under factual conditions that is, whereas corrupted via generalized optical radiation field states is still limited, and common statements on entanglement dynamics. In this article, we describe quantitatively the nonlocal correlation between a two-qubit and squeezed thermal field. Especially, considering the effect thermal photons and number of photons transition between the two qubits and squeezed thermal field. Also, the Mandel parameter, entanglement and atomic Fisher information over the time evolution as a function of implicated parameters in the system are investigated. We have shown that the squeeze parameter and thermal photons have a potential effect of the dynamical properties of the atomic Fisher information, Mandel parameter and entanglement. Also, the AFI is very sensitive to the field parameters rather than the number of photons transition. Furthermore, the results interpreted in the case of thermal environment considering the effect of thermal photons and squeeze parameter on the evolution of the system under consideration.**

Title	**Medical image encryption via lifting method**
Authors	**Abd-Elhafiez, W.M., Heshmat, M.**
Journal	**Journal of Intelligent and Fuzzy Systems** **38(3), pp. 2833-2845**
Abstract	**A new method to enhance image encryption is proposed. It is based on lifting transform and edge detection technique, the edge detection is selected as a way that it increases the capacity of hidden data, which smooth (non-edge) area hide small amount of information as compared to edge area. Initially, the lifting transform will apply on entering image. For approximate part, the simplest edge detection technique is applied, then, the image into N×N blocks is divided, the selection of key for edge will be different about non-edge block. To make the proposed method better enough, different techniques are used, one for the edge block and another for non-edge block. The proposed method is proved resists in most of security attacks. Further different testes analysis as entropy, correlation and histogram analysis is used to verify the performance of proposed method.**

Title	**Saturnispora mangrovi f.A., sp. nov. from Syhat mangrove, Saudi Arabia**
Authors	**El-Samawaty, A.E.-R.M.A., Boekhout, T., Yassin, M.A., Abdel-Wahab, M.A.**
Journal	**International Journal of Systematic and Evolutionary Microbiology 70(2),003859, pp. 977-981**
Abstract	**Strain SY-07 was isolated from decaying leaves of Avicennia marina collected from Syhat mangroves, Dammam city, Arabian Gulf, Saudi Arabia. Phylogenetic analyses of three genes [D1/D2 region of the LSU and SSU rRNA genes and internal transcribed spacer (ITS) region] showed that strain SY-07 represents a novel species of the genus Saturnispora distinct from closely related species. Saturnispora mendoncae was the most closely related species with an LSU gene sequence similarity of 89.3% (58 nucleotide substitutions and four indels out of 578 nt), 97% similarity for the SSU gene (42 nucleotide substitutions and 10 indels out of 1614 nt) and 88% similarity for the ITS region (15 nucleotide substitutions and eight indels out of 430 nt). In addition, strain SY-07 differed from S. mendoncae by its ability to assimilate d-galactose (weak), d-xylose (weak), meso-erythritol (delayed), glucono-δ-lactone, citrate (delayed) and ethylamine. S. mendoncae produced persistent asci that contain two to four spherical ascospores and lacked pseudohyphae, while sexual reproduction was not observed in strain SY-07 and extensive and pseudohyphae were present. Strain SY-07 was able to grow at between 25 and 40 °C, while S. mendoncae did not grow at 37 °C. The name Saturnispora mangrovi f.a., sp. nov. is proposed for strain SY-07. The holotype is CBS 15874, with the ex-type culture AUMC 12005. The MycoBank number for Saturnispora mangrovi f.a., sp. nov. is MB 827036.**

Title	**On the Growth Order and Growth Type of Entire Functions of Several Complex Matrices**
Authors	**Abul-Ez, M., Abd-Elmageed, H., Hidan, M., Abdalla, M.**
Journal	**Journal of Function Spaces 2020,4027529**
Abstract	**In this paper, we establish an explicit relation between the growth of the maximum modulus and the Taylor coefficients of entire functions in several complex matrix variables (FSCMVs) in hyperspherical regions. The obtained formulas enable us to compute the growth order and the growth type of some higher dimensional generalizations of the exponential, trigonometric, and some special FSCMVs which are analytic in some extended hyperspherical domains. Furthermore, a result concerning linear substitution of the mode of increase of FSCMVs is given.**

Title	**Effect of a Magnetic Field on the Propagation of Waves in a Homogeneous Isotropic Thermoelastic Half-Space**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Ahmed, S.M., Rashid, M.M.**
Journal	**Physical Mesomechanics** **23(1), pp. 54-65**
Abstract	**The prime objective of the present paper is to analyze the propagation of thermoelastic waves in a homogeneous isotropic elastic semi-infinite space that is exposed to a magnetic field at initial temperature T0 and whose boundary surface is subjected to the moving heat source and load moving with finite velocity. Temperature and stress distribution occurring due to heating or cooling have been determined using certain boundary conditions. Numerical results indicate that the effect of the magnetic field is very pronounced. Comparison is made with the results predicted by the theory of thermoelasticity in the absence of a magnetic field. Apart from geophysical applications, the consequences of the present study offer a better platform to design a surface wave sensor by means of its established results. The obtained results may be also used for acquiring a better performance in surface acoustic wave devices and waveguides.**

Title	**Entangled Pair of the su(1) Quantum Systems Interacting with Two Two-Level Atoms**
Authors	**Abdel-Khalek, S., Khalil, E.M., Alsubei, B., Bogolubov, N.N., Rasulova, M.Y.**
Journal	**Journal of Russian Laser Research** **41(1), pp. 30-39**
Abstract	**In this communication, we consider a pair of entangled quantum systems, each described by the su(1) Lie algebra, interacting with two two-level atoms. We discuss in detail the influence of the detuning terms on the system and derive from the Heisenberg equations of motion the expressions of various operators corresponding to the dynamics. Solving the associated Schrödinger equation, we obtain the general solution. Then we calculate and discuss in detail the expression of the von Neumann entropy for the two qubits and the radiation field. We examine the negativity index to gauge the degree of quantum entanglement between the su(1) quantum system and the atoms. Finally, we compare the results of the negativity and von Neumann entropy for some values of the initial state and the detuning parameter.**

Title	**Fixed-point results for a generalized almost (s, q)-Jaggi F-contraction-type on b-metric-like spaces**
Authors	**Hammad, H.A., De la Sen, M.**
Journal	**Mathematics 8(1),63**
Abstract	**The purpose of this article is to present a new generalized almost (s, q)-Jaggi F-contraction-type and a generalized almost (s, q)-Jaggi F-Suzuki contraction-type and some results in related fixed point on it in the context of b-metric-like spaces are discussed. Also, we support our theoretical results with non-trivial examples. Finally, applications to find a solution for the electric circuit equation and second-order differential equations are presented and an strong example is given here to support the first application.**

Title	**Bivariate gompertz generator of distributions: Statistical properties and estimation with application to model football data**
Authors	**Eliwa, M.S., Alhussain, Z.A., Ahmed, E.A., (...), Ahmed, H.H., El-Morshedy, M.**
Journal	**Journal of the National Science Foundation of Sri Lanka 48(2), pp. 149-162**
Abstract	**In this paper, the bivariate extension of the so called Gompertz-G family was introduced and studied in detail. Marshall and Olkin shock model was used to build the proposed bivariate family. The new family was constructed from three independent Gompertz-H families using a minimisation process. Some of its statistical properties such as joint probability density function, coefficient of median correlation, moments, product moment, covariance, conditional probability density function, joint reliability function, stress-strength reliability and joint reversed (hazard) rate function were derived. After introducing the general class, three special models of the new family were discussed. Maximum likelihood method was used to estimate the family parameters. A simulation study was carried out to examine the bias and mean square error of the maximum likelihood estimators. Finally, the importance of the proposed bivariate family was illustrated by means of real dataset, and it was found that the proposed model provides better fit than other well-known models in the statistical literature such as bivariate Gompertz, bivariate generalized Gompertz, bivariate Gumbel Gompertz, bivariate Burr X Gompertz and bivariate exponentiated Weibull-Gomperz.**

Title	**Emission Spectrum and Nonclassical Properties of an Atom–Field System Under an Intensity-Dependent Field**
Authors	**Altowyan, A.S., Aldaghfag, S.A., Berrada, K., Abdel-Khalek, S.**
Journal	**Journal of Russian Laser Research 41(1), pp. 23-29**
Abstract	**In this paper, we investigate the emission spectrum of a two-level atomic system interacting with an optical radiation field based on photon-added coherent states of a pseudo-harmonic oscillator (PACSPHO). Also, the purity of the optical field initially prepared in the PACS-PHO is studied through the evolution of the field entropy. We examine the influence of the intensity-dependent field and the photon-transition number on the dynamic behavior of the emission spectrum and field purity. We explore the link between the field purity and the emission spectrum during the time evolution. Finally, we show how the emission spectrum is affected and changed according to the main physical parameters. We find that there is some kind of correlation between the emission spectrum and the field purity, which will be useful in different applications of quantum physics and spectroscopy.**

Title	**Mimosa pudica and Carica papaya extracts on Ascaridia galli - Experimentally infected Kabir chicks in Cameroon: Efficacy, lipid and hematological profile**
Authors	**Nghonjuyi, N.W., Keambou, C.T., Sofeu-Feugaing, D.D., (...), Juliano, R.S., Kimbi, H.K.**
Journal	**Veterinary parasitology, regional studies and reports 19, pp. 100354**
Abstract	

Title	**Structural and frequency-dependent dielectric properties of $(SnO_2)_{1-x}(Fe_2O_3)_x$**
Authors	**Saleh, S.A., Abdel-Latif, I.A., Hakeem, A.M.A., Ibrahim, E.M.M.**
Journal	**Journal of Nanoparticle Research 22(2),44**
Abstract	**A series of iron-substituted tin dioxide ceramics with composition Snx−1FexO2 was synthesized using a conventional solid-state method in order to investigate its detailed structural and dielectric properties. Samples formed in the tetragonal structure with grain sizes of around 88–48 nm. Reduction in grain size was found because of the suppression in the grain growth with Fe addition. From FTIR analysis, a broad peak was centered on 650 cm−1 due to Sn–O vibration. Many Raman-active phonon modes observed for as prepared samples. The Fe substitution in SnO2 essentially changes the position of modes, where all the modes shifted to a lower wave number. For all the samples, frequency-dependent dielectric and AC conductivity measurements collected at room temperature and in the frequency range from 75 kHz to 10 MHz. In this frequency range, large dielectric dispersion was noted. According to our analysis of electrical properties of the samples under study, it is found that the conduction mechanism in these materials is based only on a small polaron.**

Title	**Propagation of a thermoelastic wave in a half-space of a homogeneous isotropic material subjected to the effect of rotation and initial stress**
Authors	**Bayones, F., Abd-Alla, A., Alfatta, R., Al-Nefaie, H.**
Journal	**Computers, Materials and Continua** **62(2), pp. 551-567**
Abstract	**The propagation of thermoelastic waves in a homogeneous, isotropic elastic semi-infinite space is subjected to rotation and initial stress, which is at temperature T 0 - initially, and whose boundary surface is subjected to heat source and load moving with finite velocity. Temperature and stress distribution occurring due to heating or cooling and have been determined using certain boundary conditions. Numerical results have been given and illustrated graphically in each case considered. Comparison is made with the results predicted by the theory of thermoelasticity in the absence of rotation and initial stress. The results indicate that the effect of the rotation and initial stress is very pronounced.**

Title	**Lime addition chemical stabilization of expansive soil at al-kawamil city, sohag region, Egypt**
Authors	**Farghaly, A.A., El-Shater, A., Naiem, M.A.A., Hamdy, F.**
Journal	**Advances in Computational Design** **5(1), pp. 1-11**
Abstract	**Soil is the fundamental element in the construction process. Soil problems affect the safety of the structures, even so the high quality of the structures and so, bad soil found the structures will affect the lifetime or even destroy the structures built on it. Therefore, the study of soil is an important step in the construction process and the investigation of the most effective characteristics of a special kind of soil (shale soil), i.e. Atterberg limits, swelling pressure, swelling potential and unconfined compression strength, are the most effective soil properties. A big projects will be constructed in new urban extension areas with expansive shale soils, like at Al-Kawamil and new Akhmim shale soils which associated with soil problems, treatment system should be used to ensure the stability of the soil under the structures foundations one of the most effective methods is by adding lime solution to the soil by specific quantities, which affect on the properties of the shale soil by decreasing the swelling and increasing the compressive strength of the treatment soils. Experimenting with the soil added to the lime, it was found that the addition of lime solution 6% improve c j the properties of the soil. The results of the tests showed the high effectiveness of using lime in the treatment of Al-Kawamil soil.**

Title	**Crystallization kinetics of $Pb_{12}Ge_{12}Se_{76}$ chalcogenide glass**
Authors	**Diab, A.K., Abd El-Raheem, M.M., Shaaban, E.R., (...), Taya, Y.A., Yousef, E.S.**
Journal	**Phase Transitions**
Abstract	**The differential thermal analysis technique is used in testing the crystallization kinetics of Pb12Ge12Se76 glass at different heating rates (2.5, 5, 10, 15, and 20 K/min). The glass is thermally stable. The activation energy for glass transitions Eg using the Kissinger, Augis–Bennett, and Moynihan models is 89.4, 92.1, and 94.7 kJ/mol, respectively. The activation energy of crystallization Ec using the models, Kissinger, Augis–Bennett, Moynihan, Gao et al., Matusita, Friedmann, Flynn–Wall–Ozawa, and Kissinger–Akahira–Sunose is 266.7, 271.4, 276.1, 257.4, 270.9, 306.8, 288.7, and 279.3 kJ/mol, respectively. In studying normalized z(α) and y(α) as functions of conversion for processes of the crystallization peak at different heating rates, the values of αmax,z are 0.657, 0.634, 0.617, 0.612, and 0.639 for rates (2.5–20 K/min) of the average value 0.632, so the JMA model was applied. Also, the values of αmax,y found to be smaller than those of αmax,z.**

Title	**A novel Lyapunov theorem on finite/fixed-time stability of discontinuous impulsive systems**
Authors	**Wang, Z., Cao, J., Cai, Z., Abdel-Aty, M.**
Journal	**Chaos** **30(1),013139**
Abstract	**This paper deals with the Finite/Fixed-Time Stability (FTS) problem of the discontinuous impulsive differential equation. Under the framework on differential inclusion, this problem can be transformed into the FTS problem of impulsive differential inclusion. A uniform criterion on FTS of nonlinear discontinuous impulsive differential systems with pre-given finite impulse instances is established, which is effective for both stabilizing impulses and destabilizing impulses. During this process, we propose an improved Lyapunov method, where the derivative of the Lyapunov Function (LF) may not exist in some instances. Moreover, the upper-bound estimation for the derivative of LF is allowed to be a time-varying function and takes both positive and negative values. Finally, the proposed criterion is supported by two numerical examples.**

Title	**A polyphasic approach to compare the genomic profiles of aflatoxigenic and non-aflatoxigenic isolates of Aspergillus section Flavi**
Authors	**Abbas, A., Hussien, T., Yli-Mattila, T.**
Journal	**Toxins** **12(1),56**
Abstract	**Aflatoxins (AF) are highly toxic compounds produced by Aspergillus section Flavi. They spoil food crops and present a serious global health hazard to humans and livestock. The aim of this study was to examine the phylogenetic relationships among aflatoxigenic and non-aflatoxigenic Aspergillus isolates. A polyphasic approach combining phylogenetic, sequence, and toxin analyses was applied to 40 Aspergillus section Flavi isolates collected from eight countries around the world (USA, Philippines, Egypt, India, Australia, Indonesia, China, and Uganda). This allows one to pinpoint the key genomic features that distinguish AF producing and non-producing isolates. Based on molecular identification, 32 (80%) were identified as A. flavus, three (7.5%) as A. parasiticus, three (7.5%) as A. nomius and one (2.5%) as A. tamarii. Toxin analysis showed that 22 (55%) Aspergillus isolates were aflatoxigenic. The majority of the toxic isolates (62.5%) originated from Egypt. The highest aflatoxin production potential was observed in an A. nomius isolate which is originally isolated from the Philippines. DNA-based molecular markers such as random amplified polymorphic DNA (RAPD) and inter-simple sequence repeats (ISSR) were used to evaluate the genetic diversity and phylogenetic relationships among these 40 Aspergillus isolates, which were originally selected from 80 isolates. The percentage of polymorphic bands in three RAPD and three ISSR primers was 81.9% and 79.37%, respectively. Analysis of molecular variance showed significant diversity within the populations, 92% for RAPD and 85% for ISSR primers. The average of Polymorphism Information Content (PIC), Marker Index (MI), Nei's gene diversity (H) and Shannon's diversity index (I) in ISSR markers are higher than those in RAPD markers. Based on banding patterns and gene diversities values, we observed that the ISSR-PCR provides clearer data and is more successful in genetic diversity analyses than RAPD-PCR. Dendrograms generated from UPGMA (Unweighted Pair Group Method with Arithmetic Mean) cluster analyses for RAPD and ISSR markers were related to the geographic origin.**

Title	**Synergistic inhibition effect of poly(ethylene glycol) and cetyltrimethylammonium bromide on corrosion of Zn and Zn—Ni alloys for alkaline batteries**
Authors	**ABD EL-LATEEF, H.M., ELROUBY, M.**
Journal	**Transactions of Nonferrous Metals Society of China (English Edition) 30(1), pp. 259-274**
Abstract	**The synergistic inhibition effect of poly(ethylene glycol)-400 (PEG-400) and cetyltrimethylammonium bromide (CTMAB) on the corrosion of Zn and Zn—Ni alloys in 8 mol/L KOH solution saturated with ZnO was observed by potentiodynamic anodic/cathodic polarization (PDP), and electrochemical impedance spectroscopy (EIS) measurements. The electrochemical studies confirmed that there was a synergism between PEG-400 and CTMAB on corrosion inhibition of Zn and its alloys. Corrosion inhibition efficiency of the mixed inhibitors, 250 mg/L CTMAB + 250 mg/L PEG-400, was found to be much higher than that of the single inhibitor, 500 mg/L PEG-400 or 500 mg/L CTMAB. Scanning electron microscopic (SEM) investigations before and after the corrosion inhibition process emphasize the synergistic effect of the mixed inhibitors. Accordingly, it was found that the addition of the investigated inhibitors to the alkaline solution enhanced the discharge and capacity of the alkaline battery anodes. The obtained electrochemical data exhibited a good correlation with the computational one.**

Title	**Dynamics of distributed-order hyperchaotic complex van der Pol oscillators and their synchronization and control**
Authors	**Mahmoud, G.M., Farghaly, A.A., Abed-Elhameed, T.M., Aly, S.A., Arafa, A.A.**
Journal	**European Physical Journal Plus 135(1),32**
Abstract	**The distributed-order hyperchaotic unforced and forced complex van der Pol oscillators with complex parameter are introduced and investigated in this paper. The basic dynamical properties including equilibrium point and its stability and chaotic behavior of the unforced oscillator are studied. The intervals of the parameters values at which this oscillator has periodic, chaotic, and hyperchaotic behaviors are calculated using Lyapunov exponents. These intervals of chaotic and hyperchaotic behaviors can be used in many applications such as secure communication and electronic circuits. Using the linear feedback control, the control of solutions of our oscillator(unforced) converge to a fixed point are studied. We state a scheme to achieve the complete synchronization between two distributed-order hyperchaotic unforced complex van der Pol oscillators. The analytical formula of the controller is derived and used to achieve synchronization. Secure communications via hyperchaotic masking for a text which contains alphabets, numbers, space, and symbols are investigated using the proposed scheme of this work. The dynamics of the distributed-order hyperchaotic forced complex van der Pol oscillator with complex parameter is investigated. Synchronization and secure communications can be similarly studied for the forced oscillator.**

Title	**Antibacterial and photocatalytic activities of controllable (anatase/rutile) mixed phase TiO_2 nanophotocatalysts synthesized: Via a microwave-assisted sol-gel method**
Authors	**Almashhori, K., Ali, T.T., Saeed, A., (...), Aly, M., Al-Hazmi, F.E.**
Journal	**New Journal of Chemistry** **44(2), pp. 562-570**
Abstract	**TiO2 samples with different ratios of anatase/rutile phases were synthesized via a microwave assisted sol-gel method and by applying particular concentrations of titanium(iv) isopropoxide as a single source precursor (SSP) with a constant concentration of nitric acid, which was used as the structure directing agent. The effect of the TiO2 composition ratio of anatase to rutile on the physicochemical and photocatalytic properties was studied. The structural, morphological, and optical properties of the as-prepared samples were studied via X-ray diffraction (XRD), high-resolution transmission electron microscopy (HRTEM), and UV-Vis diffuse reflectance spectroscopy (DRS), respectively. In addition, the functional groups were determined via Fourier transform infrared (FTIR) spectroscopy. The characterization results showed that the crystallite sizes were in the range of 30-70 nm and also revealed the different crystalline phase ratios of anatase and rutile depending on the concentrations of the Ti precursor. The photocatalytic degradation of the as-synthesized samples was evaluated with crystal violet (CV) and methylene blue (MB) solutions under UV light irradiation. The results confirmed that the TiO2 sample containing 81.65 wt% anatase exhibited a high photoactivity of organic dye degradation. The inhibitory effects of the as-synthesized samples of TiO2 nanoparticles were determined against different multidrug resistant Gram-positive and negative bacterial pathogens. The most active sample was the one with the highest ratio of anatase to rutile.**

Title	**Sonochemically synthesized Ni-doped ZnS nanoparticles: structural, optical, and photocatalytic properties**
Authors	**Othman, A.A., Osman, M.A., Ali, M.A., Mohamed, W.S., Ibrahim, E.M.M.**
Journal	**Journal of Materials Science: Materials in Electronics 31(2), pp. 1752-1767**
Abstract	**In the present work, we investigate the effect of Ni doping on the crystallite size (Dhkl), optical band gap (Egopt), Photoluminescence emission (PL) behavior, as well as the photocatalytic degradation efficiency of methylene blue (MB) by ZnS nanoparticles (NPs) catalyst. Undoped and Ni-doped ZnS NPs at Ni concentrations of 2, 4, 6, 8, and 10% are successfully synthesized with average Dhkl from 2.75 to 3.76 nm by the sonochemical technique. X-ray diffraction (XRD) patterns and high-resolution transmission electron microscope (HRTEM) images of all samples exhibit pure zinc-blende type of ZnS cubic structure. The increase in Ni content up to 4% results in an increase in the Dhkl and unit cell volume (V) accompanied by a decrease in Egopt. Meanwhile, a further increase in Ni content above 4% leads to a decrease in Dhkl and V and an increase in Egopt. The deconvoluted PL emission spectrum of the undoped sample at the excitation wavelength (λex) of 325 nm reveals emission bands centered at 3.41, 3.16, 2.89, and 2.26 eV, which are red-shifted with increasing λex to 370 nm. It is observed that the PL emission intensity is quenched with increasing Ni content without any noticeable change in the PL peak position. Ni-doped ZnS catalyst with 2% Ni exhibits maximum photo-degradation efficiency of 52.23% with a rate constant of 0.00396 min−1. The obtained results demonstrate that Ni doping can tune the optical band gap and photocatalytic efficiency of ZnS NPs that make it applicable for many optoelectronic applications.**

Title	**Remarkable facets for selective monitoring of biomolecules by morphologically tailored CuO nanostructures**
Authors	**Khairy, M., Ismael, M.**
Journal	**Journal of Solid State Electrochemistry 24(1), pp. 237-243**
Abstract	**Remarkable selective analysis of biomolecules i.e., glucose and ascorbic acid on copper oxide facets was reported for the first time. The copper oxide nanostructures were synthesized using different Cu-ions sources i.e., CuCl2 and CuSO4 by utilizing the hydrothermal method, which congregates in flower and hollow sphere morphologies, respectively. Interestingly, the results showed a comparable sensitivity and selectivity of CuO nanostructures toward glucose and ascorbic acid. To provide a deep understanding of the key factors that predominate the efficiency and selectivity of nanostructured CuO toward these biomolecules, density functional theory (DFT) calculations were accomplished. Five different crystal facets including (002), (200), (202), (111), and (110) were considered and their binding energies with the biomolecules were investigated. It was found that the facets with rich Cu or O atoms might control the selectivity toward glucose and ascorbic acid. This approach will be helpful for designing sensitive and selective targeted nanomaterial-based sensors.**

Title	**High Efficient Haar Wavelets for Medical Image Compression**
Authors	**Zanaty, E.A., Ibrahim, S.M.**
Journal	**Advances in Intelligent Systems and Computing 1058, pp. 547-557**
Abstract	**n this paper, we proposed an improved high efficient Haar wavelets (HEHW) algorithm to improve the quality of image compression ratio (CR) rate and peak signal to noise ratio for medical imaging. The proposed algorithm starts by partitioning the original image into 2 * 2 submatrices. Then the wavelets transform coefficients obtained by working on the submatrices instead of the rows and on the columns in the original image. We re-compute the resulting coefficients for sub-matrices to obtain the approximation and the sub details of the original image. Then, we calculate statistical thresholds on the details subbands to complete the compression process. The proposed algorithm is applied to five different medical image structures to prove its efficiency using the evaluation factors like CR, peak signal to noise ratio, mean square error and transform time. The comparison between the proposed and the well-known modified Haar method also compared to the results of existing wavelets techniques: like Coiflet, Daubechies, Biorthogonal, Dmeyer, and Symlets to prove the proposed algorithm efficiency.**

Title	**Physicochemical and electrochemical investigations of an electrodeposited $CeNi_2$@NiO nanomaterial as a novel anode electrocatalyst material for urea oxidation in alkaline media**
Authors	**Abd El-Lateef, H.M., Almulhim, N.F., Mohamed, I.M.A.**
Journal	**Journal of Molecular Liquids 297,111737**
Abstract	**Energy and water treatment can be considered to be major challenges in socioeconomic growth. The urea fuel cell (UFC) is a system that uses urea-containing waste water to generate power; this system satisfies two aims: treating water that contains urea and providing electricity from waste water. In this work, an electrodeposited material, CeNi2@NiO, was introduced to enhance the anodic behavior of UFC. The as-fabricated CeNi2@NiO nanoparticles (NPs) were studied using field emission-scanning electron microscope (FE-SEM), Energy-dispersive X-ray spectroscopy (EDX) and X-ray diffraction (XRD) techniques. These analyses indicated that the presented NPs possessed CeNi2@NiO NPs that have a low CeNi2 content and have NiO as their primary form. Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) measurements were conducted in a 3-electrode system to investigate the performance of CeNi2@NiO for urea electrooxidation and/or as an anode material for UFC. The synthesized NPs showed an improved electrocatalytic behavior at high pH (KOH media) in different urea concentrations, up to 1.0 mol/l. The superior electroactivity can be attributed to the assembly of Ce with Ni during the electrodeposition step, which enhances roughness, charge transfer and structural defects of Ni sites.**

Title	**Homo-dinuclear VO^{2+} and Ni^{2+} dihydrazone complexes: Synthesis, characterization, catalytic activity and CO_2-corrosion inhibition under sustainable conditions**
Authors	**Adam, M.S.S., Soliman, K.A., Abd El-Lateef, H.M.**
Journal	**Inorganica Chimica Acta 499,119212**
Abstract	**VO2+ and Ni2+ complexes (VOPHL and NiPHL) were prepared by complexation of terephthaloyl salicylidene dihydrazone (H2PHL) with VO2+ or Ni2+ ions. The chemical structures were estimated by various spectroscopic methods. Their sustainable corrosion inhibition on mild steel in NaCl solutions saturated with CO2 was investigated using potentiodynamic polarization (PDP), open circuit potential and electrochemical impedance spectroscopy (EIS) methods. H2PHL, NiPHL and VOPHL showed maximum capacity within 89.57, 97.25 and 98.22%, respectively. The PDP study refers to that they could act as mixed-type inhibitors i.e. retarded both cathodic and anodic reactions. Metal complexes displayed better inhibition than their coordinated ligand. H2PHL and its M-complexes adsorbed on C-steel surface via chemical adsorption with obeying the Langmuir model. The post-exposure investigation, for the inhibited and uninhibited C-steel surface, was elucidated using SEM /EDS. The homogeneous catalytic behavior of NiPHL and VOPHL was studied in the (ep)oxidation of unsaturated cycloalkene (1,2-cyclohexene) and Suzuki-Miyaura cross-coupling. VOPHL shows better catalytic potential in (ep)oxidation processes. NiPHL has higher catalytic efficiency towards cross-couplings. The aqueous hydrolysis of epoxy selective product could be reduced in low temperature of the (ep)oxidation processes. DFT studies were performed on H2PHL, NiPHL and VOPHL. Electronic representatives ELUMO, EHOMO energy gap (ΔE), hardness, softness and electronegativity were computed. Theoretical values are in good accordance with corrosive and catalytic experimental results.**

Title	**A hyperchaotic detuned laser model with an infinite number of equilibria existing on a plane and its modified complex phase synchronization with time lag**
Authors	**Mahmoud, E.E., AL-Harthi, B.H.**
Journal	**Chaos, Solitons and Fractals 130,109442**
Abstract	**The objective of this research is to implement a contemporary hyperchaotic complex detuned laser system. Here, the hyperchaotic complex system is developed by combining a straight controller to the chaotic complex detuned laser system. The new system is a seven-dimensional real continuous autonomous hyperchaotic system. This system's characteristics, including the Hamiltonian, dissipative, fixed points and its stability, Lyapunov dimension, Lyapunov exponents, and bifurcation diagrams are examined, as is the achievement of hyperchaos. Different forms of hyperchaotic complex detuned laser systems are constructed. Additionally, we present another type of synchronization for complex nonlinear systems only, termed modified complex phase synchronization with a time lag (MCPSTL). Given Lyapunov stability, the aim is to achieve MCPSTL of two indistinguishable hyperchaotic trajectories of these systems. A simulation is performed to demonstrate the viability of this approach. Numerical methods are used to calculate the variable and error states of these hyperchaotic trajectories after synchronization. The results provide a theoretical foundation for applications of the proposed approach in secure communication.**

Title	**Optical, water splitting and wettability of titanium nitride/titanium oxynitride bilayer films for hydrogen generation and solar cells applications**
Authors	**Mohamed, S.H., Zhao, H., Romanus, H., (...), Rabia, M., Lei, Y.**
Journal	**Materials Science in Semiconductor Processing 105,104704**
Abstract	**TiN/TiOxNy bilayer films with various TiN thicknesses were prepared using direct current (d.c.) reactive magnetron sputtering. The ratio of N/O in the bilayer films increased with increasing TiN top layer thickness. The observed crystalline peaks for the bilayer films, for different TiN layer thicknesses, were indexed to anatase TiO2 with tetragonal structure. Only 0.31° peak shift, to lower 2θ angles was detected. FESEM indicated that the morphology of TiOxNy single layer is consisted of elongated nanocrystals with diameters in the range of 27.9–46.8 nm and the diameters of the nanocrystallites changed slightly with increasing the thickness of TiN layer. The transmittance, absorbance, reflectance spectra and the optical constants of the bilayer films were presented. The photoelectrochemical performance for water splitting of TiN/TiOxNy bilayer films was studied by examination both the continuous and chopped photocurrent density under light illumination. The photocurrent density increases with increasing TiN top layer up to a thickness of 9 nm, after which a reduction in photocurrent is observed. The wettability of TiN/TiOxNy bilayer films could be transformed by UV illumination from hydrophobic to hydrophilic.**

Title	**An analytical solution for fractional oscillator in a resisting medium**
Authors	**Ismail, G.M., Abdl-Rahim, H.R., Abdel-Aty, A., (...), Alharbi, W., Abdel-Aty, M.**
Journal	**Chaos, Solitons and Fractals** **130,109395**
Abstract	**In this paper, an analytical exact solution for the fractional differential equation of the oscillator in a resisting medium was obtained successfully via the natural transform method. The fractional derivatives were described in the Caputo sense. The results illustrated the power, efficiency, simplicity, and reliability of the proposed method.**

Title	**Geochemical and geochronological characteristics of the Um Rus granite intrusion and associated gold deposit, Eastern Desert, Egypt**
Authors	**Zoheir, B., Goldfarb, R., Holzheid, A., Helmy, H., El Sheikh, A.**
Journal	**Geoscience Frontiers** **11(1), pp. 325-345**
Abstract	**the mineralized quartz veins. Ore minerals in the auriferous quartz veins include ubiquitous pyrite and arsenopyrite, with less abundant pyrrhotite, chalcopyrite, sphalerite, and galena. Uncommon pentlandite, gersdorffite, and cobaltite inclusions hosted in quartz veins with meladiorite slivers are interpreted as pre-ore sulfide phases. The gold-sulfide paragenesis encompasses an early pyrite-arsenopyrite ± loellingite assemblage, a transitional pyrite-arsenopyrite assemblage, and a late pyrrhotite-chalcopyrite-sphalerite ± galena assemblage. Free-milling gold/electrum grains (10s μm-long) are scattered in extensively deformed vein quartz and in and adjacent to sulfide grains. Marcasite, malachite, and nodular goethite are authigenic alteration phases after pyrrhotite, chalcopyrite, and pyrite and arsenopyrite, respectively. A combined ore petrography, EPMA, and LA-ICP-MS study distinguishes morphological and compositional differences in the early and transitional pyrites (Py I, Py II) and arsenopyrite (Apy I, Apy II). Py I forms uncommon small euhedral inclusions in later Py II and Apy II. Py II forms large subhedral crystals with porous inner zones and massive outer zones, separated by narrow As-rich irregular mantles. The Fe and As contents in Py II are variable, and the LA-ICP-MS analysis shows erratic concentrations of Au (<1 to 177 ppm) and other trace elements (e.g., Ag, Te, and Sb) in the porous inner zones, most likely related to discrete sub-microscopic sulfide inclusions. The outer massive zones have a rather homogenous composition, with consistently lower abundances of base metals and Au (mean 1.28 ppm). The early arsenopyrite (Apy I) forms fine-grained euhedral crystals enriched in Au (mean 17.7 ppm) and many other trace elements (i.e., Ni, Co, Se, Ag, Sb, Te, Hg, and Bi). On the other hand, Apy II occurs as coarse-grained subhedral crystals with lower and less variable concentrations of Au (mean 4 ppm). Elevated concentrations of Au (max. 327 ppm) and other trace elements are measured in fragmented and aggregated pyrite and arsenopyrite grains, whereas the undeformed intact zones of the same grains are poor in all trace elements. The occurrence of gold/electrum as secondary inclusions in deformed pyrite and arsenopyrite crystals indicates that gold introduction was relatively late in the paragenesis. The LA-ICP-MS results are consistent with gold redistribution by the N–S though-going faults/dikes overprinted the earlier NNW-SSE quartz veins in the southeastern part of the intrusion, where the underground mining is concentrated. Formation of the Um Rus intrusion and gold-bearing quartz veins can be related to the evolution of the Wadi Mubarak shear belt, where the granitic intrusion formed during or just subsequent to D2 and provided dilatation spaces for gold-quartz vein deposition when deformed by D3 structures.**

Title	**An Efficient Deep Convolutional Neural Network for Visual Image Classification**
Authors	**El-Rahiem, B.A., Ahmed, M.A.O., Reyad, O., (...), Amin, M., El-Samie, F.A.**
Journal	**Advances in Intelligent Systems and Computing 921, pp. 23-31**
Abstract	**Such a hot open issue in the area of computer vision is the classification of visual images especially in Internet of Things (IoT) and remote mid-band and high-band based connections. In this paper, we propose a robust and efficient taxonomy framework. The proposed model utilizes the well-known convolutional neural network composites to construct a robust Visual Image Classification Network (VICNet). The VICNet consists of three convolutional layers, four Relu/Leaky Relu activation layers, three max-pooling layers and only two fully connected layers for extracting expected input image features. To make the training process faster, we used non-saturating neurons with a very efficient Graphics Processing Unit (GPU) implementation for the convolution operation. To minimize over-fitting issue in the fully-connected layers, we utilized a recently-developed regularization approach "dropout" with a dropping probability of 50%. The proposed VICNet framework has a high potential capability in the recognition of test images. The experimental and simulations results proven the efficacy of the proposed model.**

Title	**Image Encryption Algorithm Methodology Based on Multi-mapping Image Pixel**
Authors	**Abd-Elhafiez, W.M., Reyad, O., Mofaddel, M.A., Fathy, M.**
Journal	**Advances in Intelligent Systems and Computing 921, pp. 645-655**
Abstract	**Image encryption and decryption using a key sequence based on the multi-mapping method of an image pixel is proposed in this paper. The generated key sequences are based on the logistic map, elliptic curves (EC) and Henon map. In the beginning, the one-dimensional sequence is generated using logistic map for the bifurcation parameter and initial value. The generated sequences are XORed with image pixels as a first mapping step. Then the resulted pixels are XORed with key sequence based on elliptic curve random number generator (ECRNG) as a second mapping step. Finally, the resulted pixels XORed with key sequence generated by Henon map. The obtained cipher image introduces good cryptographic properties in the case of multi-mapping. The performance of the proposed scheme is analyzed by computing Histogram, Entropy, and Correlation between the original and encrypted images. The proposed method provides an immense improvement in the encrypted image.**

Title	**Stability of a modified within-host HIV dynamics model with antibodies**
Authors	**Al-Qahtani, A., Aly, S., Elaiw, A., Elnahary, E.K.**
Journal	**Journal of Computational Analysis and Applications** **28(1), pp. 110-120**
Abstract	**We investigate a modified HIV infection model with antibodies and latency. The model consider saturated HIV-CD4 + T cells and HIV-macrophages incidence rates. We show that the solutions of the proposed model are nonnegative and bounded. We established that the global stability of the three steady states of the model depend on threshold parameters R 0 and R 1 . Using Lyapunov function, we established the global stability of the steady states of the model. The theoretical results are confirmed by numerical simulations. The results show that antibodies can reduce the HIV infection.**

Title	**Design and nonlinear optical properties (NLO) using DFT approach of new Cr(III), VO(II), and Ni(II) chelates incorporating tri-dentate imine ligand for DNA interaction, antimicrobial, anticancer activities and molecular docking studies**
Authors	**Abdel-Rahman, L.H., Abu-Dief, A.M., Moustafa, H., Abdel-Mawgoud, A.A.H.**
Journal	**Arabian Journal of Chemistry 13(1), pp. 649-670**
Abstract	**In recent years, metals based antitumor complexes have played a vital role in chemotherapy. Therefore, in this study, some new imine Cr(III), VO(II) and Ni(II) complexes incorporating ESAP imine ligand (2-Ethoxy-6-((2-hydroxy-phenylimino)-methyl)-phenol were designed and synthesized. The investigated complexes were fully characterized by micro analysis, infrared, electronic spectra, thermal analysis (TGA), conductivity as well as magnetic susceptibility measurements. Moreover, the stability constants of the prepared complexes were determined spectrophotometrically. The results suggest that the titled ESAP imine ligand serves as tri-dentate moiety through deprotonated two phenolic oxygen and azomethene nitrogen atoms for coordination to Cr(III) in octahedral geometry, tetrahedral to Ni(II) and distorted square pyramidal to VO(II). The electronic structure and nonlinear optical parameters NLO of the newly synthesized complexes are investigated theoretically at the B3LYP/GEN level of theory. The studied complexes show promising optical properties. Indeed, the prepared compounds were evaluated for antimicrobial effect against some types of bacteria and fungi. The investigated complexes exhibit a stronger antimicrobial efficiency compared to its ligand. Moreover, the interaction of the complexes with CT-DNA was monitored using spectral studies, viscosity and gel electrophoreses measurements. Furthermore, the cytotoxic activity of the prepared imine complexes on human colon carcinoma cells, hepatic cellular carcinoma cells and breast carcinoma cells have shown promising results and enhancement of the anti-proliferative activity compared to its ligand. The molecular docking into TRK (PDB: 1t46) was done for the optimization of the investigated compounds as potential TRK inhibitors.**