ابحاث كلية العلوم

2021

Scopus

Title	A GN model of thermoelastic interaction in a 2D orthotropic material due to pulse heat flux
Authors	Hobiny, A., Abbas, I.A.
Journal	Structural Engineering and Mechanics, 80(6), pp. 669-675
Abstract	A GN model with and without energy dissipations is used to discuss the waves propagation in a two-dimension orthotropic half space by the eigenvalues approach. Using the Laplace-Fourier integral transforms to get the solutions of the problem analytically, the basic formulations of the two-dimension problem are given by matrices-vectors differential forms, which are then solved by the eigenvalues scheme. Numerical techniques are used for the inversion processes of the Laplace-Fourier transform. The results for physical quantities are represented graphically. The numerical outcomes show that the characteristic time of pulse heat flux have great impacts on the studied fields values.

Title	Alterations in lipids and minerals in relation to larval trematode infections of Nerita polita marine snails
Authors	Hassan, A.H., Alhazmi, N.S., Filimban, A.A.R., Alsulami, M.N.
Journal	Helminthologia (Poland), 58(4), pp. 346-355
Abstract	Summary: Marine snails provide an important source of vitamins, proteins, minerals, and essential fatty acids, and their mucus has a therapeutic significance. Parasitic infection of larval trematodes in these snails affects their nutritional value. The present study aimed to screen Nerita polita marine snails for the prevalence of cercarial infections and to evaluate the changes in lipids and some minerals in the infected as well as non-infected ones. Snails were collected randomly from February 2018 to January 2019 from the Red Sea Obhor bay, Jeddah city, Saudi Arabia. The amount of triglycerides, cholesterol, and phospholipids in the Digestive Gland Gonad Complex (DGG), hemolymph, and Snail Conditioned Water (SCW) of non-infected and infected Nerita polita snail was estimated using a spectrophotometer. Minerals content such as Ca, Zn, Pb, Na, Mn, Mg, K, Fe, Cu, and Cd, in the DGG and shell in the infected and non-infected snails were analyzed using an Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES). Two types of cercariae were detected, ocellate furcocercus cercaria (Trichobilharzia regent) and xiphidiocercaria (Litorina saxatilis VII). The study showed that there is a fl uctuation in the concentration of lipids and minerals between increase and decrease in DGG, hemolymph, shell, and SCW in infected snails. The nutritive value of the snails is affected with infection through the decrease of some lipids and minerals in infected snails. Further qualitative studies are needed.

Title	Mechanical and thermoelectric properties of FeVSb-based half-Heusler alloys
Authors	El-Khouly, A., Adam, A.M., Ibrahim, E.M.M., (...), Khovaylo, V., Elsehly, E.M.
Journal	Journal of Alloys and Compounds, 886,161308
Abstract	Half Heusler FeVSb-based compounds are recently identified as promising thermoelectric materials for medium to high temperature range. In this research article, thermoelectric properties of half Heusler FeV1−x-y-zHfxTiyNbzSb and FeVSb samples were studied over a temperature range from 300 to 800 K. Transition heavy elements such as Hf, Ti and Nb were used as dopants to enhance the phonon scattering aiming at reducing the material's thermal conductivity. The FeV0.24Nb0.4Hf0.16Ti0.2Sb compound showed the lowest lattice thermal conductivity (κl) with a value of (1.81 ± 0.1 Wm−1 K−1) at room temperature with a reduction of ~82% compared with that of FeVSb compound. A maximum power factor value of (9.8 ± 0.9) μW cm−1 K−2 at 800 K and figure of merit (zT) value of 0.44 were recorded at 725 K for FeV0.24Nb0.4Hf0.16Ti0.2Sb. Vickers hardness method was used to estimate the hardness of the concerned alloys by micro-hardness technique, subjected to various applied loads. All the concerned samples showed significant mechanical stability. A maximum hardness value of 19.15 ± 0.77 GPa at load of 0.98 N was obtained for the FeV0.24Nb0.4Hf0.16Ti0.2Sb compound.

Title	Structural inspection for novel Pd(II), VO(II), Zn(II) and Cr(III)- azomethine metal chelates: DNA interaction, biological screening and theoretical treatments
Authors	Aljohani, F.S., Abu-Dief, A.M., El-Khatib, R.M., (...), Khalifa, M.E., El-Metwaly, N.M.
Journal	Journal of Molecular Structure, 1246,131139
Abstract	An alternative sequence of bioactive series, using novel Schiff base derivative (1-Quinolin-8-yliminomethyl-naphthalen-2-ol), was produced (HNQ). Elements analysis, molar conductivity, magnetic moment, IR, 1H NMR, UV-Vis, and TGA were used to define the chemical forms. As a result, an appropriate geometry has been proposed for each complex. The HNQ ligand functions as a tri-dentate via NNO donors to the metal ions within octahedral geometry with Cr3+, square pyramidal with VO2+, tetrahedral with Zn2+, and square planner with Pd2+ ion. The Coats-Redfern approach was used to determine the kinetic and thermodynamic characteristics of complexes, and their values revealed the ordered state of active complexes. The binding effectiveness of the examined compounds with calf thymus DNA (ct-DNA) was analyzed using various methods, and the binding function was assumed to be electrostatic, intercalation, or replacement mode. Furthermore, the compounds' antibacterial and anticancer efficacy was tested in vitro. In a concentration-dependent way, the chemicals had a considerable influence on lowering cell viability of breast cancer cells (MCF-7). The antioxidant activity of the compounds was examined in vitro, and the results revealed that the ligand's activity was similar to that of the reference drug. This study was reinforced by different theoretical implementations. The geometry optimization process supported the manner of ligand-metal ion interaction. The stability of complexes was shined and the reduced polarity was recorded with HNQ, HNQPd and HNQVO, which is promising in biological applications. Biological simulation was performed using Pharmit link to search on drug-like compounds and to discover the extent of interaction with DNA-protein (1bna). In addition, MOE-docking was implemented to put a clear view about the interaction features between the compounds and 1bna protein. The simulation study reveals the priority of HNQ ligand towards the DNA and the negligible role of complexes, was expected. While, comparing in-vitro with in-silico results, this difference was noticed, which may suggest a presence of any unknown mechanism improves the behavior of complexes inside living-cells.

Title	Synthesis of TiO_2@ZnO heterojunction for dye photodegradation and wastewater treatment
Authors	Mousa, H.M., Alenezi, J.F., Mohamed, I.M.A., (...), Hashem, A.-F.M., Abdal-hay, A.
Journal	Journal of Alloys and Compounds,886,161169
Abstract	The presented work aims to synthesis and engineering a semiconductor-semiconductor (S–S) heterojunction with low bandgap energy. The synthesized material composed mainly from titanium dioxide (TiO2) and zinc oxide (ZnO) as a photocatalytic nanoparticle (NPs). This strategy could highly enhance photo-degradation properties and antibacterial properties for wastewater treatment. A composite cellulose acetate CA@TiO2 NPs (CTO) was fabricated via electrospinning technique to generate a core TiO2 NPs within a polymeric matrix followed by immersion in ZnO NPs suspension solution to deposit ZnO NPs on the nanofiber surface (CTZO). Subsequently, the composite mat was subjected to a calcination/annealing process at 700 °C for 4 h to obtain composite S–S heterojunction nanostructure material (TZO). The morphological characteristics, thermal degradation, chemical composition, and phase structure of the synthesis material were investigated. In addition, antibacterial properties were evaluated using E-coli bacteria, whereas the photocatalytic degradation efficiency was performed using both methylene blue (MB) and methylene red (MR) dyes under direct sunlight. The morphological properties showed that TiO2 NPs was well decorated with ZnO NPs and form heterojunction structure. The resulted (TZO) has high antibacterial effect and showed a 15±0.8 mm of inhibition zone in gram (-ve) Bactria comparing to that of ZnO NPs (12±0.2) mm. Furthermore, photocatalytic degradation of the composite NPs showed high photodegradation properties close to 25% and 13% for MB and MR dyes in direct sunlight, respectively. The increased dye photodegradation is attributed to the formation of S–S heterojunction structure with low bandgap energy (1.17 eV) comparing to that of wide band gap energy (3.52 eV) of TiO2 that play role in enhancement of electron transfer and thus photodegradation process. These results suggest that the resulted S–S heterojunction nanomaterial have a high potential in wastewater application.

Title	A promising star-like PtNi and coral reefs-like PtCo nano-structured materials for direct methanol fuel cell application
Authors	Sadek, M., Abd El-Lateef, H.M., Mohran, H.S., Elrouby, M.
Journal	Electrochimica Acta, 399,139370
Abstract	Novel composite catalysts of nanostructured PtCo and PtNi alloys onto a coated glassy carbon electrode (GCE) with a nanostructured alloy of NiCo as a substrate material were fabricated by an electrodeposition method from their salt solutions at ambient temperature. The PtCo/NiCo/GCE and the PtNi/NiCo/GCE catalysts display an improved electrocatalytic behavior for the electrochemical oxidation reaction of methanol (MOR). The morphology, chemical composition, and phase structure for the electrodeposited catalysts were checked utilizing a scanning electron microscope (SEM), energy-dispersive X-ray spectroscopy (EDAX), and X-ray diffraction (XRD) technique, respectively. PtCo/NiCo/GCE catalyst shows coral particles of reef-shaped morphology, whilst the PtNi/NiCo/GCE catalyst star-shaped particles. The electrocatalytic performance of the electrodeposited catalysts was verified using chronoamperometry and cyclic voltammetry (CV). The effects of the type of electrodeposition method, pH of the solution, temperature, and precursors concentration on the characteristics of the PtCo and PtNi alloys electrodeposits and accordingly on the electrocatalytic peculiarities of the catalysts were well assessed. Furthermore, the impact of methanol concentration and temperature on MOR was discussed. The stability and the corrosion resistance tests of the PtNi/Ni-Co/GCE and PtCo/Ni-Co/GCE systems were evaluated via the electrochemical impedance spectroscopy (EIS), Tafel polarization, and potentiostatic methods.

Title	Synthesis, crystal structural determination and in silco biological studies of 3,3′-ethane-1,2-diylbis(2-benzylidene-1,3-thiazolidin-4-one
Authors	Abdel-Rahman, L.H., Mohamed, S.K., El Bakri, Y., (...), Mague, J.T., Abdalla, E.M.
Journal	Journal of Molecular Structure, 1245,130997
Abstract	A new thiazolidine derivative, 3,3′-ethane-1,2-diylbis(2-benzylidene-1,3-thiazolidin-4-one (4) was synthesized and the product obtained was characterized by NMR, IR and mass spectral studies, and the structure was confirmed by single crystal X-ray diffraction studies. The title compound crystallizes in the monoclinic space group P21/n, the unit cell parameters are a = 15.9505(8) Å, b = 6.6818(3) Å, c = 18.1799(9) Å, β = 94.249(2)° and Z = 4 at 150 K. In the title molecule, C20H18N4O2S2, the thiazolidine rings adopt a "pincer" conformation with the phenylimino substituents extending outwards on both sides. A layer structure is formed in the crystal by C—H···N and C—H···O hydrogen bonds. A Hirshfeld surface analysis was used to explore the nature of the intermolecular interactions in the crystal structure employing molecular surface contours and 2D fingerprint plots have been used to examine molecular shapes. The frontier orbital analysis shows that 4 should be more sensitive to a nucleophilic attack than an electrophilic attack. Molecular docking, followed by molecular dynamics simulation and MM-GBSA binding free energy was carried out to predict the binding affinity of 4 for α-amylase enzyme. These analyses revealed good intermolecular stability of the complex with stable high affinity intermolecular complex formation of high equilibrium nature.

Title	Prognostic value of immunoglobulin G (IgG) patterns by western blotting immunodetection in treated dogs previously infected with Leishmania infantum
Authors	Elmahallawy, E.K., Zanet, S., Poggi, M., (...), Trisciuoglio, A., Ferroglio, E.
Journal	Veterinary Sciences, 8(12),293
Abstract	Leishmaniasis is a heterogeneous group of neglected tropical diseases with various clinical syndromes, which is caused by obligate intracellular protozoa of the genus Leishmania and transmitted by the bite of a female phlebotomine sandfly. Humans and several animal species are considered as reservoirs of the disease. Among other animal species, dogs are the most important reservoirs in a domestic environment, maintaining the endemic focus of the parasite. The behavior of the disease progression and the clinical symptoms of the disease in the infected dog is mainly associated with depressed cellular immunity and strong humoral response. This study aimed to assess the role of Western blotting in the analysis of the idiotype expression of the two main immunoglobulins (IgG1 and IgG2) in dogs that are naturally infected with Leishmania infantum (L. infantum) and treated with N-methyl meglumine antimoniate. Interestingly, for the first time, our study identified several L. infantum antigen polypeptides (14, 31, 33, 49, 64, 66, 99, and 169 kDa) that more frequently stimulate an immune reaction in recovered dogs after treatment, whereas in the non-recovered group of dogs, four antigen polypeptides of L. infantum with molecular weights of 31, 49, 66, and 115 kDa with unfavorable prognosis were identified. Clearly, these interesting findings confirm the strong association between the detected immunodominant bands and the successful recovery in treated dogs that can be used for differentiating the treated dogs from the untreated dogs, as well as the markers of a favorable or unfavorable prognosis and, as a consequence, the prediction of the clinical outcome of the disease. Likewise, these data could be helpful in the implementation of novel vaccines from the detected antigens.

Title	Entropic uncertainty for two coupled dipole spins using quantum memory under the dzyaloshinskii–moriya interaction
Authors	Khedr, A.N., Mohamed, A.-B.A., Abdel-Aty, A.-H., (...), Abdel-Aty, M., Eleuch, H.
Journal	Entropy, 23(12),1595
Abstract	In the thermodynamic equilibrium of dipolar-coupled spin systems under the influence of a Dzyaloshinskii–Moriya (D–M) interaction along the z-axis, the current study explores the quantum-memory-assisted entropic uncertainty relation (QMA-EUR), entropy mixedness and the concurrence two-spin entanglement. Quantum entanglement is reduced at increased temperature values, but inflation uncertainty and mixedness are enhanced. The considered quantum effects are stabilized to their stationary values at high temperatures. The two-spin entanglement is entirely repressed if the D–M interaction is disregarded, and the entropic uncertainty and entropy mixedness reach their maximum values for equal coupling rates. Rather than the concurrence, the entropy mixedness can be a proper indicator of the nature of the entropic uncertainty. The effect of model parameters (D–M coupling and dipole–dipole spin) on the quantum dynamic effects in thermal environment temperature is explored. The results reveal that the model parameters cause significant variations in the predicted QMA-EUR.

Title	Pathogenesis of velogenic genotype VII.1.1 newcastle disease virus isolated from chicken in Egypt via different inoculation routes: Molecular, histopathological, and immunohistochemical study
Authors	El-Morshidy, Y., Abdo, W., Elmahallawy, E.K., (...), Albrakati, A., Asa, S.A.
Journal	Animals, 11(12),3567
Abstract	Newcastle disease virus (NDV) remains a constant threat to the poultry industry. There is scarce information concerning the pathogenicity and genetic characteristics of the circulating velogenic Newcastle disease virus (NDV) in Egypt. In the present work, NDV was screened from tracheal swabs collected from several broiler chicken farms (N = 12) in Dakahlia Governorate, Egypt. Real-time reverse transcriptase polymerase chain reaction (RRT-PCR) was used for screening of velogenic and mesogenic NDV strains through targeting F gene fragment amplification, followed by sequencing of the resulting PCR products. The identified strain, namely, NDV-CH-EGYPT-F42DAKAHLIA-2019, was isolated and titrated in the allantoic cavity of 10 day old specific pathogen-free (SPF) embryonated chicken eggs (ECEs), and then their virulence was determined by mean death time (MDT) and intracerebral pathogenicity index (ICPI). The pathogenicity of the identified velogenic NDV strain was also assessed in 28 day old chickens using different inoculation routes as follows: intraocular, choanal slit, intranasal routes, and a combination of both intranasal and intraocular routes. In addition, sera were collected 5 and 10 days post inoculation (pi) for the detection of NDV antibodies by hemagglutination inhibition test (HI), and tissue samples from different organs were collected for histopathological and immunohistochemical examination. A series of different clinical signs and postmortem lesions were recorded with the various routes. Interestingly, histopathology and immunohistochemistry for NDV nucleoprotein displayed widespread systemic distribution. The intensity of viral nucleoprotein immunolabeling was detected within different cells including the epithelial and endothelium lining, as well as macrophages. The onset, distribution, and severity of the observed lesions were remarkably different between various inoculation routes. Collectively, a time-course comparative pathogenesis study of NDV infection demonstrated the role of different routes in the pathogenicity of NDV. The intranasal challenge was associated with a prominent increase in NDV lesions, whereas the choanal slit route was the route least accompanied by severe NDV pathological findings. Clearly, the present findings might be helpful for implementation of proper vaccination strategies against NDV.

Title	Quantum computational speed of a nanowires system with Rashba interaction in the presence of a magnetic field
Authors	Mohamed, R.I., Eldin, M.G., Farouk, A., Ramadan, A.A., Abdel-Aty, M.
Journal	Scientific Reports, 11(1),22726
Abstract	The present research is designed to examine the dynamic of the quantum computational speed in a nanowire system through the orthogonality speed when three distinct types of magnetic fields are applied: the strong magnetic field, the weak magnetic field, and no magnetic field. Moreover, we investigate the action of the magnetic fields, the spin-orbit coupling, and the system's initial states on the orthogonality speed. The observed results reveal that a substantial correlation between the intensity of the spin-orbit coupling and the dynamics of the orthogonality speed, where the orthogonality speed decreasing as the spin-orbit coupling increases. Furthermore, the initial states of the nanowire system are critical for regulating the speed of transmuting the information and computations.

Title	Insights into Chufa milk frozen yoghurt as cheap functional frozen yoghurt with high nutritional value
Authors	Swelam, S., Zommara, M.A., Abd El-Aziz, A.E.-A.M., (...), Baty, R.S., Elmahallawy, E.K.
Journal	Fermentation, 7(4),255
Abstract	Milk and dairy products are fundamental items in all social groups' diets. The production of functional milk and dairy products supplemented with plant extracts is a potential direction of research in the dairy sector. In the present study, chufa (tiger nut) milk was mixed with buffalo milk for manufacturing functional frozen yoghurt. Flavoring materials (orange (O), strawberry (St), cocoa (Co), instant coffee "soluble coffee" classic (N) and cinnamon (Ci)) were used, aiming to improve the sensory attributes of the final products. The resultant frozen yoghurt was analyzed for chemical, physical and sensory properties. Interestingly, our study revealed that buffalo–chufa milk (50%:50%, w/w) frozen yoghurt (F) had higher total solid (TS), fat and protein contents compared to the control buffalo milk frozen yoghurt (CT). These parameters reached their highest values in cocoa frozen yoghurt (CoF). Lactose, acetaldehyde and pH were lower in F compared to CT, while the highest acetaldehyde value was observed in strawberry chufa frozen yoghurt (StF). Plain or flavored F recorded higher petaldehyde values, observed in strawberry chufa frozen yoghurt (StF). Plain or flavored materials improved the melting resistance, and the highest value was recorded in cinnamon chufa frozen yoghurt (CiF). Na, K, Mg, and Fe contents were significantly higher in F; however, Ca was lower compared to CT. In general, the used flavoring materials markedly increased the mineral content in the final products. A significant decrease was observed in the sensory properties in F compared to CT, whereas frozen yoghurt manufactured with coca was preferred over all other types, followed by the soluble coffee-flavored product (NF). Collectively, functional frozen yoghurt can be produced by mixing buffalo yoghurt and chufa milk (50:50 v/v). Buffalo—chufa frozen yoghurt (F) had higher nutritional value but lower physical and sensory properties compared to buffalo frozen yoghurt (control). A clear improvement in the properties of the final product can be achieved using different flavoring materials. Cleary, our present study provides novel interesting information about the potential beneficial use of chufa buffalo milk for manufacturing functional frozen yoghurt. Further similar research is recommended to explore the potential benefits of the supplementation of other dairy products with chufa.

Title	Thraustochytrids from the Red Sea mangroves in Saudi Arabia and their abilities to produce docosahexaenoic acid
Authors	Abdel-Wahab, M.A., El-Samawaty, A.E.-R.M.A., Elgorban, A.M., Bahkali, A.H.
Journal	Botanica Marina, 64(6), pp. 489-501
Abstract	This is the first study of thraustochytrids from the Red Sea coast in Saudi Arabia. One hundred and thirty-four isolates of thraustochytids were cultured from Al-Leith, Jeddah and Yanbu mangroves from this area, and were categorized into 38 morphotypes. Among the isolated thraustochytrids, Aurantiochytrium was the most speciose genus, represented by 36 morphological types. Seventeen strains formed a distinct clade within the genus Aurantiochytrium based on phylogenetic analyses of 18S rDNA sequences. The Aurantiochytrium clade from the Middle East is characterized by the production of high levels of oleic and linoleic acids and may represent undescribed taxa. Four Aurantiochytrium strains were grown on large scale to study their ability to produce docosahexaenoic acid (DHA). These strains produced biomass ranging from 37.7 to 66 g L-1 and the percentages of oil ranged from 40 to 57.2% of the dry weight. Twenty-one fatty acids were recorded from the four strains which included: eight saturated four monounsaturated and nine polyunsaturated. Dominant fatty acids included C16:0 palmitic acid (24.14-37.02% total fatty acid (TFA)), C18:1ω9 oleic acid (3.01-25.07% TFA), C18:2ω6 linoleic acid (1.85-20.85% TFA) and C22:6ω3 DHA (4.87-16.5% TFA). DHA was the predominant polyunsaturated fatty acid in three strains, while linoleic acid was the predominant PUFAs in one strain.

Title	Concave (L, M)-fuzzy interior operators and (L, M)-fuzzy hull operators
Authors	Zhao, H., Hu, X., Sayed, O.R., El-Sanousy, E., Sayed, Y.H.R.
Journal	Computational and Applied Mathematics و40(8),301
Abstract	In this paper, the notions of (concave) (L, M)-fuzzy interior operators are introduced. It is proved that the category of (L, M)-fuzzy concave spaces and the category of concave (L, M)-fuzzy interior spaces is isomorphic, and there is a Galois correspondence between the category of (L, M)-fuzzy concave spaces and the category of (L, M)-fuzzy interior spaces. In addition, (L, M)-fuzzy hull operators proposed by Sayed et al. (Filomat 33(13):4151–4163, 2019) are further studied. Particularly, some results in Sayed et al. (2019) are corrected.

Title	Biomass derived P-containing activated carbon as a novel green catalyst/support for methanol conversion to dimethyl ether alternative fuel
Authors	Khalil, K.M.S., Elhamdy, W.A., Goda, M.N., Said, A.E.-A.A.
Journal	Journal of Environmental Chemical Engineering و9(6),106572
Abstract	The current environmental situation has urged researchers to look for alternative green fuels with lower emissions from biomass feedstock. This work aims a greener approach for the heterogeneous catalytic conversion of methanol to dimethyl ether, DME, as an alternative fuel. Thus, a series of phosphorous−containing activated carbon (ACP) derived from orange peel (OP) at different H3PO4: OP (w/w) rations, as well as a series of tungsten (W)-loaded on ACP, WO3/ACP supported catalysts were formed and thermally treated at different temperatures. The formed materials were characterized by XRD, ATR−FTIR, N2 adsorption/desorption, HRTEM, electron diffraction, EDX, elemental mapping and surface acidity. Effects of H3PO4 ratio and treatment temperature on the bulk and surface properties of the produced catalyst/support materials were investigated. Catalytic activities of the ACP support and W-loaded catalysts towards methanol dehydration in the range of 150–400 °C were measured at WHSV of 2.01 h−1 in an inert atmosphere. Improved catalytic performance was observed for ACP support, which further improved for the W-loaded catalysts. This involved increase of methanol conversion (from 67% to 84%), DME formation rate (from 14.6 to 18.3 mmol.h−1), time-on-stream (from < 40 to >120 h) and Ea (from 48.98 to 42.23 kJ mol−1) on moving from ACP support to the most active supported catalyst, respectively. The improvement was attributed to the enhanced textural and thermal stability of the supported catalyst, which places it among the high efficiency catalysts for DME formation.

Title	Health benefits and phenolic compounds of Moringa oleifera leaves: A comprehensive review
Authors	Hassan, M.A., Xu, T., Tian, Y., (...), Yang, X., Lu, B.
Journal	Phytomedicine, 93,153771
Abstract	Background: Moringa oleifera Lam (MO) is native to India and is a cash crop widely cultivated in tropical and sub-tropical areas. The health improving properties of MO has been studied from a long time ago for the numerous phenolic compounds, including vitamins, flavonoids, phenolic acids, isothiocyanates, tannins and saponins, which are present in considerable amounts in the plant. A growing spectrum of therapeutic characteristics of MO leaves has been found and used in the remission or treatment of oxidative stress, liver disease, neurological disease, hyperglycemia and cancer. Hypothesis: This review focused on researches applying MO or MO leaf extract as a functional food or cure against various disease and cellular injuries. We believed it would help the discovery of therapeutic application of MO and understanding of MO phytochemistry. Methods: The data collected in this review were extracted from researches indexed in Web of Science, google scholar, PubMed, Science Direct and Scopus to find out health benefits and biological activities of MO leaves polyphenols. The studies reporting mechanistic route of phenolic compounds of MO leaves were also considered in the present study. Results: It has been reported that polyphenols of MO leaf have protective characteristics against neurodegenerative disorders through reducing DNA damage, activation of AchE activity and inhibition of caspase-3 activity. It has been reported that, they protected the kidney from damage caused by melamine through suppressed the pro-inflammatory cytokine, metallopeptidase inhibitor 1 (TIMP-1), and kidney injury molecule 1 (KIM-1). Similarly, methanol extract of MO leaves has low hypoglycemic attributes and attenuate the risk of diabetes caused by alloxan by enhancing lipid metabolism and stimulating insulin release, glucose uptake, and glycogen synthesis. In addition, MO leaves are becoming the best phytomedicine to reduce hypertension, which are naturally known as angiotensin-1converting enzyme (ACE), acetylcholinesterase, arginase and phosphodiesterase 5 (PDE5) inhibitors. Conclusion: MO leaves extract as a health promoting food additives for human and animals due to its great protective effect against many diseases and the widely persistent environmental toxins which disrupted cellular metabolic function. More studies are required to use the phenolic compounds of MO leaves to develop and produce drugs for controlling and treatment of various diseases.

Title	Solving a fractional-order differential equation using rational symmetric contraction mappings
Authors	Hammad, H.A., Agarwal, P., Momani, S., Alsharari, F.
Journal	Fractal and Fractional, 5(4),159
Abstract	The intent of this manuscript is to present new rational symmetric $\varpi - \xi$-contractions and infer some fixed-points for such contractions in the setting of Θ-metric spaces. Furthermore, some related results such as Suzuki-type rational symmetric contractions, orbitally Y-complete, and orbitally continuous mappings in Θ-metric spaces are introduced. Ultimately, the theoretical results are shared to study the existence of the solution to a fractional-order differential equation with one boundary stipulation.

Title	Plasmonic performance, electrical and optical properties of titanium nitride nanostructured thin films for optoelectronic applications
Authors	El-Rahman, A.M.A., Mohamed, S.H., Khan, M.T., Awad, M.A.
Journal	Journal of Materials Science: Materials in Electronics, 32(24), pp. 28204-28213
Abstract	TiN films with different thicknesses (17.9–102.8 nm) were prepared using rf magnetron sputtering to study the effect thickness on the plasmonic, electrical, and optical properties. X-ray diffraction revealed the amorphous-like structure for thinner films with thicknesses lower than 50.3 nm, whereas polycrystalline of face-centered cubic TiN structure was observed for thicker films. Scanning electron microscopy observations revealed rounded nano-crystallites morphology for TiN films. The EDAX depicted oxygen in the TiN films which attributed to the residual oxygen inside the sputtering chamber and to the partial surface oxidation resulted from the exposure to atmospheric air. As the thickness increased from 17.9 to 102.8 nm, the carrier concentration increases from 1.47 × 1022 to 3.51 × 1022 cm−3 and the carrier mobility increased from 0.091 to 0.489 cm2/V.s, which resulted in a resistivity decrease from 4.65 × 10–3 to 3.64 × 10–4 Ω cm. Two absorption bands around 250 and 1000 nm were observed. The band around 1000 nm was ascribed to the localized surface plasmon resonance (LSPR) and increased with increasing the film thickness. The optical band gap and refractive index values decreased monotonically with increasing the film thickness. It is also inferred that the thickness has a strong influence on the values of real and imaginary parts of the dielectric function. Applying various figures of merit indicated that the prepared TiN films are probably not practical for LSPR device fabrication however they are probably suitable for practical transformation optics and superlens device applications.

Title	Microplastic distribution, abundance, and composition in the sediments, water, and fishes of the Red and Mediterranean seas, Egypt
Authors	Sayed, A.E.-D.H., Hamed, M., Badrey, A.E.A., (...), Osman, A.G.M., Soliman, H.A.M.
Journal	Marine Pollution Bulletin, 173,112966
Abstract	This study records the extent of microplastics (MPs) in the surface water, sediments, and fishes of the Mediterranean and Red seas in Egypt. In sediment and water samples, the Ras Gharib station in the Red sea and Damietta and Port Said stations in the Mediterranean sea exhibited the highest microplastic abundance, while the lowest concentration was found in the Ain Sukhna station in the Red Sea and Marsa Matruh station in the Mediterranean sea. Rayon and polyethylene terephthalate were the most frequently found polymers in fishes. The results highlighted the abundant existence of microplastics in sediments, water, and fishes of the Mediterranean and Red seas, thereby improving our understanding of the environmental risks posed by microplastics to fisheries and marine ecosystems and the need for measures to diminish the flux of plastics to the marine settings.

Title	Lead-substituted barium hexaferrite for tunable terahertz optoelectronics
Authors	Alyabyeva, L.N., Prokhorov, A.S., Vinnik, D.A., (...), Lunkenheimer, P., Gorshunov, B.P.
Journal	NPG Asia Materials, 13(1),63
Abstract	Due to their outstanding dielectric and magnetic properties, hexaferrites are attracting ever-increasing attention for developing electronic components of next-generation communication systems. The complex crystal structure of hexaferrites and the critical dependences of their electric and magnetic properties on external factors, such as magnetic/electric fields, pressure, and doping, open ample opportunities for targeted tuning of these properties when designing specific devices. Here we explored the electromagnetic properties of lead-substituted barium hexaferrite, Ba1−xPbxFe12O19, a compound featuring an extremely rich set of physical phenomena that are inherent in the dielectric and magnetic subsystems and can have a significant effect on its electromagnetic response at terahertz frequencies. We performed the first detailed measurements of the temperature-dependent (5–300 K) dielectric response of single-crystalline Ba1−xPbxFe12O19 in an extremely broad spectral range of 1 Hz–240 THz. We fully analyzed numerous phenomena with a corresponding wide distribution of specific energies that can affect the terahertz properties of the material. The most important fundamental finding is the observation of a ferroelectric-like terahertz excitation with an unusual temperature behavior of its frequency and strength. We suggest microscopic models that explain the origin of the excitation and its nonstandard temperature evolution. Several narrower terahertz excitations are associated with electronic transitions between the fine-structure components of the Fe2+ ground state. The discovered radio-frequency relaxations are attributed to the response of magnetic domains. Gigahertz resonances are presumably of magnetoelectric origin. The obtained data on diverse electromagnetic properties of Ba1−xPbxFe12O19 compounds provide information that makes the entire class of hexaferrites attractive for manufacturing electronic devices for the terahertz range.

Title	Bioremediation of hemotoxic and oxidative stress induced by polyethylene microplastic in Clarias gariepinus using lycopene, citric acid, and chlorella
Authors	Sayed, A.E.-D.H., Hamed, M., Badrey, A.E.A., Soliman, H.A.M.
Journal	Comparative Biochemistry and Physiology Part - C: Toxicology and Pharmacology, 250,109189
Abstract	Despite extensive research on the toxic effects of microplastics (MPs), there is no obtainable data on the use of phytobioremediation against MPs toxicity in fish. This study aimed to investigate the protective role of lycopene, citric acid, and chlorella against the toxic effects of MPs in African catfish (Clarias gariepinus) using hematology, biochemical, antioxidants, erythron profiles (poikilocytosis and nuclear abnormalities) and the accumulation of MPs in tissues as biomarkers. Five groups of fish received: normal diet (control); MPs (500 mg/kg diet) (Group 2); MPs (500 mg/kg diet) + lycopene (500 mg/kg diet) (Group 3); MPs (500 mg/kg diet) + citric acid (30 g/kg diet) (Group 4); and MPs (500 mg/kg diet) + chlorella (50 g/kg diet) (Group 5) for 15 days. Group 2 had significantly higher amounts of MPs in the stomach, gills, and feces, electrolyte imbalances (HCO3, Fe, Na+, K+, Ca+2, Cl−, and anion gap, hematobiochemical alterations, and decreases in the activities of superoxide dismutase, catalase, total antioxidant capacity, and glutathione S-transferases compared to the control group. Additionally, Group 2 had significant increase in the percentage of poikilocytosis, and nuclear abnormalities in RBC's compared to the control group. The co-treatment of MPs-exposed fish with lycopene, citric acid, and chlorella-supplemented diets ameliorated the hematological, biochemical, and erythron profile alterations, but only slightly enhanced the antioxidant activity. Overall, lycopene, citric acid, and chlorella can be recommended as a feed supplement to improve hematobiochemical alterations and oxidative damage induced by MPs toxicity in the African catfish (C. gariepinus).

Title	Incorporation of polyaniline on graphene-related materials for wearable thermoelectric applications
Authors	Panbude, A., Sathiyamoorthy, S., Kumar, R., (...), Jayabal, K., Veluswamy, P.
Journal	Materials Letters, 304,130576
Abstract	Polyaniline (PANi)/graphene composite on the cotton fabric is blended via a fusion of in-situ polymerization and solution process. PANi is initially grafted to graphene oxide via solution process where an associated reduction of GO transpired due to the hydrothermal condition and acquaintance of GO to KOH. The structural, morphological, elemental, thermal and electrical characteristics of these fabrics are studied by various physio-chemical techniques. The study is aimed to comprehend the participation of PANi as well as improved composite thereof under investigation. UV shielding ability of Nanostructured PANi/ graphene composite fabric is found to be enhanced to the value of 447 along with the thermal stability till 280 °C. It is also detected that the electrical conductivity of the PANi/graphene composite fabrics has improved. The thermo power value of the PANi/graphene composite fabric reaches 0.045 μVK−1. Hence, these materials are expected to be prominent for wearable thermoelectric devices.

Title	Efficient quantum gates and algorithms in an engineered optical lattice
Authors	Homid, A.H., Abdel-Aty, M., Qasymeh, M., Eleuch, H.
Journal	Scientific Reports, 11(1),15402
Abstract	In this work, trapped ultracold atoms are proposed as a platform for efficient quantum gate circuits and algorithms. We also develop and evaluate quantum algorithms, including those for the Simon problem and the black-box string-finding problem. Our analytical model describes an open system with non-Hermitian Hamiltonian. It is shown that our proposed scheme offers better performance (in terms of the number of required gates and the processing time) for realizing the quantum gates and algorithms compared to previously reported approaches.

Title	Pre-Crystallization Criteria and Triple Crystallization Kinetic Parameters of Amorphous–Crystalline Phase Transition of $As_{40}S_{45}Se_{15}$ Alloy
Authors	Alzaid, M., Abd-el Salam, M.N., Qasem, A., Shaaban, E.R., Hadia, N.M.A.
Journal	Journal of Inorganic and Organometallic Polymers and Materials, 31(12), pp. 4563-4580
Abstract	This framework focuses mainly on a detailed study of the pre-crystallization criteria that characterize the As40S45Se15 glassy alloy in various heating rates ranging from 5 to 40 (K/min) by Differential Scanning Calorimetry (DSC). These criteria aim to clarify the relationship of the tendency of glass-forming by the heating rate for the investigated glassy alloy. The crystallization parameters were calculated using different methods.The activation energy of crystallization Ec(χ) as a function of conversion (χ) was obtained using the iso-conversional models of Flynn–Wall–Ozawa (FWO), Starink and Kissinger–Akahira–Sunose (KAS). The results show a slight increase of Ec(χ) with conversion (χ) which accounts for a single-step mechanism controlling the crystallization process. Moreever, the conversion dependence of the Avrami exponent n(χ) show an increase with conversion (χ), average values of n(χ) can be accounted for two and three-dimensional crystal growth with heterogeneous nucleation. On the other hand, the fitting of the experimental DSC data to the calculated DSC curves indicated that the crystallization process of the studied glasses cannot be satisfactorily described by the Johnson–Mehl–Avrami (JMA) model. On the contrary (SB) model is more suitable to describe the crystallization process for the studied of As40S45Se15 Alloy. Finally, the crystalline structure of the study sample was recognized by X-ray diffraction (XRD) and electron scanning microscope (SEM).

Title	New coincidence point results for generalized graph-preserving multivalued mappings with applications
Authors	Hammad, H.A., De la Sen, M., Agarwal, P.
Journal	Advances in Difference Equations, 2021(1),334
Abstract	This research aims to investigate a novel coincidence point (cp) of generalized multivalued contraction (gmc) mapping involved a directed graph in b-metric spaces (b-ms). An example and some corollaries are derived to strengthen our main theoretical results. We end the manuscript with two important applications, one of them is interested in finding a solution to the system of nonlinear integral equations (nie) and the other one relies on the existence of a solution to fractional integral equations (fie).

Title	Antibiofilm and antivirulence potential of silver nanoparticles against multidrug-resistant Acinetobacter baumannii
Authors	Hetta, H.F., Al-Kadmy, I.M.S., Khazaal, S.S., (...), Mohamed, N.A., Algammal, A.M.
Journal	Scientific Reports, 11(1),10751
Abstract	We aimed to isolate Acinetobacter baumannii (A. baumannii) from wound infections, determine their resistance and virulence profile, and assess the impact of Silver nanoparticles (AgNPs) on the bacterial growth, virulence and biofilm-related gene expression. AgNPs were synthesized and characterized using TEM, XRD and FTIR spectroscopy. A. baumannii (n = 200) were isolated and identified. Resistance pattern was determined and virulence genes (afa/draBC, cnf1, cnf2, csgA, cvaC, fimH, fyuA, ibeA, iutA, kpsMT II, PAI, papC, PapG II, III, sfa/focDE and traT) were screened using PCR. Biofilm formation was evaluated using Microtiter plate method. Then, the antimicrobial activity of AgNPs was evaluated by the well-diffusion method, growth kinetics and MIC determination. Inhibition of biofilm formation and the ability to disperse biofilms in exposure to AgNPs were evaluated. The effect of AgNPs on the expression of virulence and biofilm-related genes (bap, OmpA, abaI, csuA/B, A1S_2091, A1S_1510, A1S_0690, A1S_0114) were estimated using QRT-PCR. In vitro infection model for analyzing the antibacterial activity of AgNPs was done using a co-culture infection model of A. baumannii with human fibroblast skin cell line HFF-1 or Vero cell lines. A. baumannii had high level of resistance to antibiotics. Most of the isolates harbored the fimH, afa/draBC, cnf1, csgA and cnf2, and the majority of A. baumannii produced strong biofilms. AgNPs inhibited the growth of A. baumannii efficiently with MIC ranging from 4 to 25 µg/ml. A. baumannii showed a reduced growth rate in the presence of AgNPs. The inhibitory activity and the anti-biofilm activity of AgNPs were more pronounced against the weak biofilm producers. Moreover, AgNPs decreased the expression of kpsMII , afa/draBC,bap, OmpA, and csuA/B genes. The in vitro infection model revealed a significant antibacterial activity of AgNPs against extracellular and intracellular A. baumannii. AgNPs highly interrupted bacterial multiplication and biofilm formation. AgNPs downregulated the transcription level of important virulence and biofilm-related genes. Our findings provide an additional step towards understanding the mechanisms by which sliver nanoparticles interfere with the microbial spread and persistence.

Title	Existence theorem for a unique solution to a coupled system of impulsive fractional differential equations in complex-valued fuzzy metric spaces
Authors	Humaira, Hammad, H.A., Sarwar, M., De la Sen, M.
Journal	Advances in Difference Equations, 2021(1),242
Abstract	In this manuscript, the existence theorem for a unique solution to a coupled system of impulsive fractional differential equations in complex-valued fuzzy metric spaces is studied and the fuzzy version of some fixed point results by using the definition and properties of a complex-valued fuzzy metric space is presented. Ultimately, some appropriate examples are constructed to illustrate our theoretical results.

Title	Application of triple compound combination anti-synchronization among parallel fractional snap systems & electronic circuit implementation
Authors	Mahmoud, E.E., Trikha, P., Jahanzaib, L.S., Higazy, M., Alkinani, M.H.
Journal	Advances in Difference Equations, 2021(1),211
Abstract	In this article we examine the dynamical properties of the fractional version of the snap system by means of chaotic attractor, existence, and uniqueness of the solution, symmetry, dissipativity, stagnation point analysis, Lyapunov dynamics, K.Y. dimension, bifurcation diagram, etc. Also, parallel systems to this system are synchronized in presence of uncertainties and external disturbances using triple compound combination anti-synchronization by two ways. Synchronization time is compared with some other works. Also the utilization of achieved synchronization is illustrated in secure transmission. By constructing the snap system's signal flow graph and its real electronic circuit, some of its additional invariants are investigated.

Title	Influence of the dissipation on the N-level atom interacting with a two two-level atoms in presence of qubit–qubit interaction
Authors	Abdel-Khalek, S., Alshehri, H.M., Khalil, E.M., Obada, A.-S.F.
Journal	Scientific Reports, 11(1),7345
Abstract	The interacting of two qubits and an N-level atom based on su(2) Lie algebra in the presence of both qubit–qubit interaction and dissipation term is considered. The effects of the qubit–qubit interaction and the dissipation term on the dynamics of the proposed system are discussed in detail for certain values of the number of levels. The dynamical expressions of the observable operators are obtained using the Heisenberg equation of motion. The population inversion and linear entropy, as well as the concurrence formula as a measure of entanglement between the two qubits are calculated and discussed. The roles of the number of levels, the qubit–qubit coupling parameter and the dissipation rate on these quantities are also discussed. We explore the sudden birth and sudden death of the entanglement phenomena with and without the dissipation term.

Title	Analysis and control of the fractional chaotic Hopfield neural network
Authors	Mahmoud, E.E., Jahanzaib, L.S., Trikha, P., Almaghrabi, O.A.
Journal	Advances in Difference Equations, 2021(1),126
Abstract	The fractional Hopfield neural network (HNN) model is studied here analyzing its symmetry, uniqueness of the solution, dissipativity, fixed points etc. A Lyapunov and bifurcation analysis of the system is done for specific as well as variable fractional order. Since a very long time ago, HNN has been carefully studied and applied in various fields. Because of the exceptional non-linearity of the neuron activation function, the HNN system is stoutly non-linear. Chaos control using adaptive SMC considering disturbances and uncertainties is done about randomly chosen points by designing suitable controllers. Numerical simulations performed in MATLAB verify the efficacy of the designed controllers.

Title	Contributions of the fixed point technique to solve the 2D Volterra integral equations, Riemann–Liouville fractional integrals, and Atangana–Baleanu integral operators
Authors	Hammad, H.A., Aydi, H., Mlaiki, N.
Journal	Advances in Difference Equations, 2021(1),97
Abstract	In this manuscript, some fixed point results for generalized contractive type mappings under mild conditions in the setting of double controlled metric spaces (in short, ηגv-metric spaces) are obtained. Moreover, some related consequences dealing with a common fixed point concept and nontrivial examples to support our results are presented. Ultimately, we use the theoretical results to discuss the existence and uniqueness of solutions of 2D Volterra integral equations, Riemann–Liouville integrals and Atangana–Baleanu integral operators are given.

Title	Effect of shrinking projection and CQ-methods on two inertial forward–backward algorithms for solving variational inclusion problems
Authors	Tuyen, T.M., Hammad, H.A
Journal	Rendiconti del Circolo Matematico di Palermo, 70(3), pp. 1669-1683
Abstract	In this paper, we establish the convergence theorems for two projection algorithms for finding a null point of the sum of two monotone operators in Hilbert spaces. Our algorithms are the combination the inertial forward–backward with the shrinking of hybrid projection methods. To clarify the acceleration, effectiveness, and performance of proposed algorithms, numerical contributions have been incorporated.

Title	MHD Casson nanofluid flow over nonlinearly heated porous medium in presence of extending surface effect with suction/injection
Authors	Abo-Dahab, S.M., Abdelhafez, M.A., Mebarek-Oudina, F., Bilal, S.M.
Journal	Indian Journal of Physics 95(12), pp. 2703-2717
Abstract	An exertion is executed to explicate thermophysical aspects of viscoelastic fluid flow produced by a nonlinearized stretched surface. Here, viscoelasticity is characterized by Casson fluid model and expressed rheologically in momentum equation. Flow attributes of Casson fluid are thoroughly investigated under transversal magnetized field and along with provision of suction/injection to surface. Flow medium is also considered to be porous. Convective heating is supplied to the surface to depict heat transfer change within the flow domain. Nanosized particles are hanged into the Casson fluid to understand the effectiveness of Brownian motion and thermophoretic forces on the diffusion of particles. Generative chemical reactions are also considered to measure mass transport. Initially, flow narrating differential equations for concerning a problem are attained in differential equations and later on transforming into ordinary differential coupled system via similarity approach. Variations in flow associated distributions against involved parameters are divulged through graphical structures. Wall drag, thermal and mass fluxes are also calculated. Credibility of computing results is tested with the aid of comparison with previously published data in limiting sense.

Title	Soot removal from ancient Egyptian complex painted surfaces using a double network gel: empirical tests on the ceiling of the sanctuary of Osiris in the temple of Seti I—Abydos
Authors	Al-Emam, E., Motawea, A.G., Caen, J., Janssens, K.
Journal	Heritage Science, 9(1),1
Abstract	In this study, we evaluated the ease of removal of soot layers from ancient wall paintings by employing double network gels as a controllable and safe cleaning method. The ceiling of the temple of Seti I (Abydos, Egypt) is covered with thick layers of soot; this is especially the case in the sanctuary of Osiris. These layers may have been accumulated during the occupation of the temple by Christians, fleeing the Romans in the first centuries A.D. Soot particulates are one of the most common deposits to be removed during conservation-restoration activities of ancient Egyptian wall paintings. They usually mask the painted reliefs and reduce the permeability of the painted surface. A Polyvinyl alcohol-borax/agarose (PVA-B/AG) double network gel was selected for this task since its properties were expected to be compatible with the cleaning treatment requirements. The gel is characterized by its flexibility, permitting to take the shape of the reliefs, while also having self-healing properties, featuring shape stability and an appropriate capacity to retain liquid. The gel was loaded with several cleaning reagents that proved to be effective for soot removal. Soot removal tests were conducted with these gel composites. The cleaned surfaces were evaluated with the naked eye, a digital microscope, and color measurements in order to select the best gel composite. The gel composite, loaded with a solution of 5% ammonia, 0.3% ammonium carbonate, and 0.3% EDTA yielded the most satisfactory results and allowed to safely remove a crust of thick soot layers from the surface. Thus, during the final phase of the study, it was used successfully to clean a larger area of the ceiling. [Figure not available: see fulltext.]

Title	Novel nanocomposites of nickel and copper oxide nanoparticles embedded in a melamine framework containing cellulose nanocrystals: Material features and corrosion protection applications
Authors	El-Lateef, H.M.A., Gouda, M.
Journal	Journal of Molecular Liquids و342,116960
Abstract	In this work, novel metal oxide-organic frameworks (cellulose nanocrystals (CNCs)), copper oxide/melamine/cellulose nanocrystals (CuO@MEL@CNCs), and nickel oxide/melamine/cellulose nanocrystals (NiO@MEL@CNCs) were effectively fabricated using a hydrothermal method. The prepared nanocomposite CNCs, CuO@MEL@CNCs, and NiO@MEL@CNCs were described by Fourier transform infrared (FT-IR), field emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), Brunauer–Emmett–Teller (BET), and Raman spectroscopy. The outcomes show that the nanomaterials have high scattering and narrow size distribution. Moreover, vibrational investigations have been performed utilizing Raman spectroscopic procedures. Explicit Raman peaks were observed in the CNC, CuO@MEL@CNC, and NiO@MEL@CNC nanostructures, and the full width at half maximum (FWHM) of the peaks demonstrated the small particle size of the prepared nanocomposites. The capability of the CNC, CuO@MEL@CNC, and NiO@MEL@CNC nanocomposites to act as corrosion inhibitors of AISI360-steel in molar H2SO4 is described for the first time. The corrosion protection capabilities of the nanocomposites were evaluated using potentiodynamic polarization (PDP), impedance spectroscopy (EIS), and surface morphology (FE-SEM/ energy dispersive X-Ray analysis (EDX)) measurements. The protection effectiveness was found in the order NiO@MEL@CNCs (98.3%) > CuO@MEL@CNCs (96.8%) > CNCs (85.3%) at 300 mg L-1. The current report shows that CNCs and metal oxide-melamine frameworks at CNCs as inexpensive and eco-friendly inhibitors could be probable candidates to protect AISI360-steel corrosion in petroleum manufacturing.

Title	Tailoring, structural elucidation, DFT calculation, DNA interaction and pharmaceutical applications of some aryl hydrazone Mn(II), Cu(II) and Fe(III) complexes
Authors	Abu-Dief, A.M., El-khatib, R.M., Sayed, S.M.E., (...), El-Sarrag, G., Ismael, M.
Journal	Journal of Molecular Structure, 1244,131017
Abstract	The current research focuses on the treatment of Mn(II) Cu(II) and Fe(III) metal ions with 1-(Benzhydrylidene-hydrazonomethyl)-naphthalen-2-ol (aryl hydrazone DHPN) ligand, producing three new solid complexes with substantial yields. In all mononuclear crystalline metal chelates with high thermal stability, different characterization techniques including infrared, UV–visible and NMR spectroscopies, elemental analyses and TGA revealed a tetra-coordination in DPHNCu complex and six-coordination for DPHNMn and DPHNFe complexes. Calculations based on Density Functional Theory (DFT) were used and offered a satisfactory explanation to better understands the electronic and structural properties of these metal chelates. Moreover, electronic absorption spectroscopy, hydrodynamic and electrophoresis measurements have revealed significant interactions of these novel complexes with calf thymus DNA through different binding modes. Accordingly, the Kb and ΔGb≠ values of such interaction followed that order: DPHNFe > DPHNMn > DPHNCu complex. In addition to, antibathogenic studies of the new metal chelates revealed that the latter had considerably high efficacy than the corresponding hydrazone ligand. The anti-proliferative activity of the compounds studied was also tested against various cancer cell lines and showed substantial cytotoxic activity. Moreover, antioxidant activity findings showed that the compounds tested had anti-oxidative activity relative to regular ascorbic acid. Furthermore, docking study of the investigated DPHN ligand and its complexes was performed to get a first insight of the interaction in the active site of the protein enzyme of the bacteria and fungi receptors.

Title	TiO_2-carbon microspheres as photocatalysts for effective remediation of pharmaceuticals under simulated solar light
Authors	Peñas-Garzón, M., Abdelraheem, W.H.M., Belver, C., (...), Bedia, J., Dionysiou, D.D.
Journal	Separation and Purification Technology, 275,119169
Abstract	In this work, novel carbon microspheres supported TiO2 nanoparticles were prepared for the degradation of pharmaceuticals in water, selecting diclofenac, acetaminophen, and ibuprofen as target pollutants. Lignin, an important biomass byproduct from the paper industry and biorefineries, was transformed in carbon microspheres by a novel approach based on a Fe-activated hydrothermal carbonization followed by pyrolysis at 900 °C. These carbon microspheres were further covered with TiO2 by a solvothermal treatment. The effects of several parameters including hydrothermal carbonization time and mass ratio (TiO2:carbon) on the catalytic activity of TiO2-carbon microspheres were investigated. The results revealed that the combination of long carbonization time and high TiO2:carbon ratio achieved superior TiO2-carbon microspheres (Ti2-C20) catalytic performance. Ti2-C20 achieved complete degradation of ibuprofen (5 mg·L−1) and diclofenac (5 mg·L−1) within 3 h under solar light and mineralization percentages close to 50%. Moreover, the photocatalytic performance remained high after five reuse cycles and was barely affected by the presence of common inorganic ions in treated wastewater (such as Cl–, NO3– and HCO3–). The degradation pathway of diclofenac was proposed, involving C-N bond cleavage, and subsequent hydroxylation and cyclization reactions leading to the formation of aliphatic carboxylic acids. Overall, promising photocatalysts were obtained from a biomass byproduct for effective degradation of pharmaceuticals with the assistance of solar light.

Title	Engineering entanglement, geometric phase, and quantum Fisher information of a three-level system with energy dissipation
Authors	Abdel-Khalek, S., Abo-Dahab, S.M., Ragab, M., Rawa, M., Ahmad, H.
Journal	Mathematical Methods in the Applied Sciences, 44(16), pp. 12120-12128
Abstract	Quantum Fisher information (QFI) and geometric phase have recently performed different tasks in quantum information technology. We investigate the statistical quantities as the QFI and entanglement of a three-level atom in Λ configuration interacting with a quantized field mode by using linear entropy. We study the dynamical behavior of the geometric phase based on the engineering of a three-level atomic configuration. We analyze the effect of energy dissipation of the dynamical properties of the geometric phase and the QFI as an entanglement quantifier between the three-level atom and field. We explore the correlation between the engineering geometric phase and QFI in the absence and presence of energy dissipation effect. We have found that the QFI is very sensitive to the effect of the time-dependent coupling and energy dissipation.

Title	New Level-Set-Based Shape Recovery Method and its application to sparse-view shape tomography
Authors	Ali, H.A., Kudo, H.
Journal	ACM International Conference Proceeding Series, pp. 24-29
Abstract	The recovery of shapes from a few numbers of their projections is very important in Computed tomography. In this paper, we propose a novel scheme based on a collocation set of Gaussian functions to represent any object by using a limited number of projections. This approach provides a continuous representation of both the implicit function and its zero level set. We show that the appropriate choice of a basis function to represent the parametric level-set leads to an optimization problem with a modest number of parameters, which exceeds many difficulties with traditional level set methods, such as regularization, re-initialization, and use of signed distance function. For the purposes of this paper, we used a dictionary of Gaussian function to provide flexibility in the representation of shapes with few terms as a basis function located at lattice points to parameterize the level set function. We propose a convex program to recover the dictionary coefficients successfully so it works stably with only four projections by overcoming the issue of local-minimum of the cost function. Finally, the performance of the proposed approach in three examples of inverse problems shows that our method compares favorably to Sparse Shape Composition (SSC), Total Variation, and Dual Problem.

Title	Statistical Inference under Copula Approach of Accelerated Dependent Generalized Inverted Exponential Failure Time with Progressive Hybrid Censoring Scheme
Authors	Soliman, A.A., Farghal, A.W.A., Abd-Elmougod, G.A.
Journal	Applied Mathematics and Information Sciences, 15(6), pp. 687-699
Abstract	The problem of statistical inference in reliability theory for the competing risks model under accelerated life testing (ALT) have a great significance. In practice, independent variables are assumed for convenience, which do not agree with the nature of the problem at hand. In this paper, we consider the constant stress accelerated life testing (CS-ALT) of dependent competing risks model for generalized inverted exponential distribution (GIED). The dependence structure is described by the copula approach between variable. Under consideration that units is failing by only two dependent causes of failure under constant stress ALTs and type-I progressive hybrid censoring scheme (PHCS), the model parameters are estimated with maximum likelihood method by using the bivariate Pareto copula function. The asymptotic confidence intervals with approximate Bootstrap confidence intervals are constructed. Under consideration two stress levels the set of real data are analyzed for illustrative purposes. For different measures of Kendall's tau and censoring schemes Monto Carlo simulation study is constructed.

Title	Novel cellulose derivatives containing metal (Cu, Fe, Ni) oxide nanoparticles as eco-friendly corrosion inhibitors for c-steel in acidic chloride solutions
Authors	Gouda, M., Abd El-Lateef, H.M.
Journal	Molecules, 26(22),7006
Abstract	Novel environmentally-friendly corrosion inhibitors based on primary aminated modified cellulose (PAC) containing nano-oxide of some metals (MONPs), for instance iron oxide nanoparticles (Fe3 O4 NPs), copper oxide nanoparticles (CuONPs), and nickel oxide nanoparticles (NiONPs), were successfully synthesized. The as-prepared PAC/MONPs nanocomposites were categorized using Fourier transform infrared spectroscopy (FT-IR), transmission electron microscope (TEM), field-emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray spectroscopy (EDX), X-ray diffraction (XRD), and selected area diffraction pattern (SAED) techniques. The data from spectroscopy indicated that successful formation of PAC/MONPs nanocomposites, as well as the TEM images, declared the synthesized PAC/Fe3 O4 NPs, PAC/CuONPs, and PAC/NiONPs with regular distribution with particle size diameters of 10, 23 and 43 nm, respectively. The protection performance of the as-prepared PAC and PAC/MONPs nanocomposites on the corrosion of C-steel in molar HCl was studied by the electrochemical and weight-loss approaches. The outcomes confirmed that the protection power increased with a rise in the [inhibitor]. The protection efficiency reached 88.1, 93.2, 96.1 and 98.6% with 250 ppm of PAC/CuONP, PAC/Fe3 O4 NPs, and PAC/NiONPs, respectively. PAC and all PAC/MONPs nanocomposites worked as mixed-kind inhibitors and their adsorption on the C-steel interface followed the isotherm Langmuir model. The findings were reinforced by FT-IR, FE-SEM and EDX analyses.

Title	Investigation of the opto-magnetic properties of co doped zno nanoparticles and thin films for spintronics
Authors	Ibrahim, E.M.M., Mahmoud, A.Z., Galal, L., El Sayed, Y., Shaaban, E.R.
Journal	Journal of Ovonic Research, 17(6), pp. 519-532
Abstract	Zn1-xCoxO (0≤x≤0.10) nanocrystalline compounds with different compositions were prepared by ball milling, and thin films of these compounds were prepared by electron evaporation method. XRD patterns are used to study the structural properties of these films. All films showed a hexagonal wurtzite structure. Using XRD patterns, calculate crystallite. The optical constants n and k of the Zn1-xCoxO nanocrystalline film are calculated in the range of 300-2500 nm based on K-K method. As Co is more doped, the refractive index also shows an increase. According to the Tauc relationship, the optical energy gap of the Zn1-xCoxO film is calculated, which proves to be a direct transition.

Title	Development of ferromagnetic materials containing co_2p, fe_2p phases from organometallic dendrimers precursors
Authors	Abd-El-aziz, A.S., Benaaisha, M.R., Abdelbaky, M.S.M., (...), Abdel-Rahman, L.H., Bissessur, R.
Journal	Molecules, 26(21),6732
Abstract	The development of synthesis methods to access advanced materials, such as magnetic materials that combine multimetallic phosphide phases, remains a worthy research challenge. The most widely used strategies for the synthesis of magnetic transition metal phosphides (TMPs) are organometallic approaches. In this study, Fe-containing homometallic dendrimers and Fe/Co-containing heterometallic dendrimers were used to synthesize magnetic materials containing multi-metallic phosphide phases. The crystalline nature of the nearly aggregated particles was indicated for both designed magnetic samples. In contrast to heterometallic samples, homometallic samples showed dendritic effects on their magnetic properties. Specifically, saturation magnetization (Ms) and coercivity (Hc) decrease as dendritic generation increases. Incorporating cobalt into the homometallic dendrimers to prepare the heterometallic dendrimers markedly increases the magnetic properties of the magnetic materials from 60 to 75 emu/g. Ferromagnetism in homometallic and heterometallic particles shows different responses to temperature changes. For example, heterometallic samples were less sensitive to temperature changes due to the presence of Co2P in contrast to the homometallic ones, which show an abrupt change in their slopes at a temperature close to 209 K, which appears to be related to the Fe2P ratios. This study presents dendrimers as a new type of precursor for the assembly of magnetic materials containing a mixture of iron-and cobalt-phosphides phases with tunable magnetism, and provides an opportunity to understand magnetism in such materials.

Title	Synchronization analysis for complex dynamical networks with coupling delay via event-triggered delayed impulsive control
Authors	Lv, X., Cao, J., Li, X., Abdel-Aty, M., Al-Juboori, U.A.
Journal	IEEE Transactions on Cybernetics, 51(11), pp. 5269-5278
Abstract	This article deals with the exponential synchronization problem for complex dynamical networks (CDNs) with coupling delay by means of the event-triggered delayed impulsive control (ETDIC) strategy. This novel ETDIC strategy combining delayed impulsive control with the event-triggering mechanism is formulated based on the quadratic Lyapunov function. Among them, the event-triggering instants are generated whenever the ETDIC strategy is violated and delayed impulsive control is implemented only at event-triggering instants, which allows the existence of some network problems, such as packet loss, misordering, and retransmission. By employing the Lyapunov-Razumikhin (L-R) technique and impulsive control theory, some sufficient conditions with less conservatism are proposed in terms of linear matrix inequalities (LMIs), which indicates that the ETDIC strategy can guarantee the achievement of the exponential synchronization and eliminate the Zeno phenomenon. Finally, a numerical example and its simulations are presented to verify the effectiveness of the proposed ETDIC strategy.

Title	Statistical properties of the nonlinear time-dependent interaction between a three-level atom and optical fields
Authors	Korashy, S.T., Bayatti, H.A., El-Shahat, T.M.
Journal	Journal of Statistics Applications and Probability, 10(3), pp. 779-793
Abstract	Some properties through a three-level Λ-type atom interacting with a two-mode deformed bosonic field are investigated. We study this system in the presence of detuning parameter and Kerr nonlinearity. Also, the coupling parameter is modulated to be time-dependent. The exact solution of this model is given using the Schrődinger equation when the atom and the field are initially prepared in superposition state and coherent state, respectively. We employed the results to calculate some aspects such as atomic population inversion, purity and Mandel Q-parameter. The results show that the time-dependent coupling parameter and the detuning parameter are quantum control parameters.

Title	Optimizing photonic and phononic crystal parameters for sensing organic compounds
Authors	Ameen, A.A., Elsayed, H.A., Mahmoud, M.A., Aly, A.H.
Journal	Applied Nanoscience (Switzerland), 11(11), pp. 2703-2716
Abstract	In this paper, we have introduced a multilayer periodic structure with a defect layer as a sensor for a variety of organic compounds. Here, we have considered the interaction of both electromagnetic and acoustic radiations with the designed sensor, which could offer flexibility in the detection process. Si and MgO are the basic materials in the design of the proposed sensor. In this context, this sensor is configured as {Si (Si/MgO)N (liquid) (MgO/Si)N Si}. The optimization procedure is based on the change of the thickness of the defect layer and the structure's periodicity. The simulation results were carried through the transfer matrix method to calculate the photonic and phononic transmittance. The structure is analyzed of the photonic and acoustic transmittance as the defect layer is filled with water, benzene, DIPE, n-Heptane, n-Hexane, and n-Octane. The analysis includes determining their defect peak frequency, full width at half maximum, quality factor, sensitivity, and figure of merit. The calculated photonic sensitivity for n-Heptane is 43.8 (THz / RIU) with 154.8 (RIU) - 1 figure of merit, while its acoustic sensitivity equivalent 1.614 (MHz / ms - 1) with a figure of merit equals 1.06 (m / s) - 1. From the simulation results, the structure shows a promise response for sensing different organic compounds with high sensitivity.

Title	Impact of treating hatching eggs with curcumin after exposure to thermal stress on embryonic development, hatchability, physiological body reactions, and hormonal profiles of dokki-4 chickens
Authors	Abuoghaba, A.A.-K., Ragab, M.A., Shazly, S.A., Kokoszyński, D., Saleh, M.
Journal	Animals, 11(11),3220
Abstract	This study evaluated the impact of incubation temperature and spraying hatching eggs with curcumin during the early embryogenesis phase on chick embryo developments, hatchability, physiological body reactions, and hormonal profiles of Dokki 4 chickens. A total of 720 fertile eggs were equally distributed into two groups. In the first group, the eggs were incubated at normal incubation temperature/NIT (37.8◦C and 55–60% RH) for up to 19 days of incubation, whereas those in the second group were incubated in the same conditions except from 6 to 8 day, in which they were daily exposed to chronic incubation temperature/CIT (39.0◦C) for 3 h. Each group was classified into four curcumin treatment doses; the 1st treatment (control) was sprayed with distilled water, while the 2nd, 3rd, and 4th treatments were sprayed with 250, 500, and 1000 mg curcumin/liter distilled water. The results indicated that the lowest hatchability of fertile eggs (%) was obtained in the CIT group ($p = 0.02$), whereas the highest body surface temperature/BST compared in the NIT group ($p = 0.01$). Regarding curcumin treatments, the percentages of heart, gizzard, spleen, and T3 hormone levels in the treated group were significantly increased, while the H/L ratio was significantly reduced ($p = 0.001$) compared with the control. At 8 weeks of age, the testes and ovary percentages in treated groups were significantly ($p = 0.05$) increased compared with the control. In conclusion, exposure of hatching eggs to high thermal stress (39◦C) during the incubation phase had deleterious effects on chick performance and T3 hormone level. Moreover, spraying hatching eggs had beneficial impacts on growth, reproductive organs, T3 hormone level, and reducing H/L ratio.

Title	Finite element analysis of thermal-diffusions problem for unbounded elastic medium containing spherical cavity under dpl model
Authors	Hobiny, A.D., Abbas, I.A.
Journal	Mathematics, 9(21),2782
Abstract	In this work, the thermo-diffusions interaction in an unbounded material with spherical cavities in the context dual phase lag model is investigated. The finite element technique has been used to solve the problem. The bounding surface of the inner hole is loaded thermally by external heat flux and is traction-free. The delay times caused in the microstructural interactions, the requirement for thermal physics to take account of hyperbolic effects within the medium, and the phase lags of chemical potential and diffusing mass flux vector are interpreted. A comparison is made in the case of the presence and the absence of mass diffusions between coupled, Lord-Shulman and dual phase lag theories. The numerical results for the displacement, concentration, temperature, chemical potential and stress are presented numerically and graphically.

Title	Experimental adsorption water desalination system utilizing activated clay for low grade heat source applications
Authors	Ali, E.S., Askalany, A.A., Harby, K., (...), Hussein, B.R.M., Alsaman, A.S.
Journal	Journal of Energy Storage, 43,103219
Abstract	In the present study, benefits of utilizing acid activated montmorillonite as a proposed new adsorbent material in adsorption desalination-cooling systems- have been experimentally expressed. Montmorillonite is a natural clay mineral which is composed mainly of alumina-silicate. Effect of acid activation on montmorillonite has been illustrated using infra-red spectra analysis. Adsorption characteristics (isotherm and kinetic) of acid activated montmorillonite (with 2 mole of hydrochloric acid/water vapor pair have been expressed. Isotherms results have been fitted with Dubinin-Astakhov and Sun-Chakraborty models. An experimental adsorption desalination-cooling test rig has been erected to explore the adsorption desalination-cooling systems performance with montmorillonite /water pair and axial finned tube adsorption bed design. The experimental results indicates that the daily water production is about 4.4 m3/ton of montmorillonite, its specific cooling power is 110 W/kg and the coefficient of performance is 0.41 at a driving temperature less than 100 °C. Solar energy can drive adequately the investigated system. The experiment also illustrates that the ADCS is very significant in removing all forms of salts, as proven by the weighty drop of the total dissolved salt, TDS (measured by TDS analyzer), level from approximately 40,000 ppm in seawater intake to less than 30 ppm.

Title	Influence of La-impurities and plasma treatment on the structural and optical properties of some bismuth calcium borate glasses
Authors	Ebrahem, N.M., Gomaa, H.M., Saudi, H.A., (...), El-Meligy, W.M., El-Hossary, F.M.
Journal	Optical and Quantum Electronics, 53(11),651
Abstract	This research work aims to the estimation of the effect of the addition of La2O3, by different amounts in wt. %, to the matrix of the bismuth calcium borate glass. The fast cooling procedure was used to prepare the suggested compositions. XRD was used to inspecting the internal structural phases of the prepared samples, where XRD patterns confirmed the amorphous natures of all samples. It was found that the La-additives act to increase the glass density, micro hardness, and optical absorption. While the plasma treatment using N2 acted to reduce both the relative intensity of XRD and the optical absorption.

Title	Aspirin-based organoiron dendrimers as promising anti-inflammatory, anticancer, and antimicrobial drugs
Authors	Abd-El-aziz, A.S., Benaaisha, M.R., Abdelghani, A.A., (...), Fayez, A.M., El-Ezz, D.A.
Journal	Biomolecules, 11(11),1568
Abstract	Designing nanocarriers with actions directed at a specific organ or tissue is a very promising strategy since it can significantly reduce the toxicity of a bioactive drug. In this study, an or-ganometallic dendrimer was used to synthesize a biocompatible drug delivery system by attaching aspirin to the periphery of the dendrimer. Our goal is to enhance the bioavailability and anticancer activity of aspirin and reduce its toxicity through successive generations of organoiron dendrimers. The biological activity of aspirin-based dendrimer complexes was evaluated. The result of antimi-crobial activity of the synthesized dendrimers also demonstrated an increase in their antimicrobial activity with increased generation of the dendrimers for most types of microorganisms. This study reveals for the first time that organoiron dendrimers linked with aspirin exhibit an excellent Gram-negative activity comparable to the reference drug Gentamicin. All synthesized dendrimers were tested for their anticancer activity against breast cancer cell lines (MCF-7), hepatocellular cell lines (Hep-G2), and a non-cancer cell line, Human Embryonic Kidney (HEK293), using the MTT cell via-bility assay and compared against a standard anticancer drug, Doxorubicin. Compounds G3-D9-Asp and G4-D12-Asp exhibited noticeable activity against both cell lines, both of which were more effective than aspirin itself. In addition, the in vivo anti-inflammatory activity and histopathology of swollen paws showed that the designed aspirin-based dendrimers displayed significant anti-in-flammatory activity; however, G2-D6-Asp showed the best anti-inflammatory activity, which was more potent than the reference drug aspirin during the same period. Moreover, the coupling of aspirin to the periphery of organoiron dendrimers showed a significant reduction in the toxicity of aspirin on the stomach.

Title	Mn-doped molybdenum trioxide for photocatalysis and solar cell applications
Authors	Taya, Y.A., Ali, H.M., Shokr, E.K., (...), Hassan, A.M., Abdel Hakeem, A.M.
Journal	Optical Materials, 121,111614
Abstract	Mn-doped MoO3 with different compositions in powder and thin film form have been prepared. The Orthorhombic (α-MoO3) crystal structure of pure MoO3 was revealed for (Mn)x(MoO3)1-x powdered samples, while the as-deposited films manifested an amorphous structure. FTIR spectra ensured that bonds are belonging to the vibrations of Mo[dbnd]O bonds to Mo–O–Mo stretching vibrations at the optimum peaks, confirming the presence of a single phase of MoO3. For powdered samples, the intensity of reflection has reached the maximum value (up to ≈ 85%) for (Mn)x(MoO3)1-x sample with x = 0.02 at.%, whereas the minimum value of reflection was obtained for undoped and (Mn)x(MoO3)1-x sample with x = 0.10 at.%. For thin films, the intensity of reflectance varies from 10% to 25% for all the samples. The optical energy was found to vary from 3.20 eV to 3.33 eV for the powdered samples and from 3.11 to 3.66 for as-deposited thin films. The photocatalytic properties were studied for all powdered samples by determining the absorbance of Methylene blue, using UV source as a function of illumination time. The degradation efficiency had maximum value of 48.5% at x = 0.10 at.%. The electrical conductivity study exhibited that, the maximum electrical conductivity of 3.11 × 102 (Ω m)−1 was obtained for the sample x = 0.10 at.%. It was a good match with the high degradation efficiency, minimum value of absorption, and narrow bandgap that existed due to the formation of the intermediate state of Mn.

Title	Psychological problems among the university students in Saudi Arabia during the COVID-19 pandemic
Authors	Mohammed, Z., Arafa, A., Atlam, E.-S., (...), Al-Hazazi, O., Ewis, A.
Journal	International Journal of Clinical Practice, 75(11),e14853
Abstract	Background: The 2019 coronavirus disease (COVID-19) pandemic is a public health emergency that represents a challenge to psychological health. This study aimed to assess the psychological conditions among university students in Saudi Arabia during the COVID-19 pandemic. Methods: During the period between the 4th and 18th of June 2020, the students of Umm AlQura University in Saudi Arabia were invited to complete an online survey. The survey assessed their sociodemographic characteristics, educational disciplines, and manifestations of psychological health problems including depression, anxiety, and stress as determined by the Arabic version of the Depression Anxiety Stress Scale-21 (DASS-21). Results: The study included 936 university students (56.4% women and 43.6% men). Of them, 41.1% had depressive symptoms (31.7% mild to moderate and 9.4% severe to very severe), 26.9% had anxiety symptoms (15.8% mild to moderate and 11.1% severe to very severe), and 22.4% had stress symptoms (15.2% mild to moderate and 7.2% severe to very severe). Students who reported having a friend or relative infected with or died of COVID-19, watching or reading news about the pandemic ≥2 hours/day, and not getting emotional support from family, university, and society were more likely to show psychological problems. Conclusion: Symptoms of depression, anxiety, and stress were common among Saudi university students during the COVID-19 pandemic. Psychological counselling and support should be provided to university students in Saudi Arabia.

Title	Fungal diversity notes 1387–1511: taxonomic and phylogenetic contributions on genera and species of fungal taxa
Authors	Boonmee, S., Wanasinghe, D.N., Calabon, M.S., (...), Mapook, A., Hyde, K.D.
Journal	Fungal Diversity, 111(1)
Abstract	This article is the 13th contribution in the Fungal Diversity Notes series, wherein 125 taxa from four phyla, ten classes, 31 orders, 69 families, 92 genera and three genera incertae sedis are treated, demonstrating worldwide and geographic distribution. Fungal taxa described and illustrated in the present study include three new genera, 69 new species, one new combination, one reference specimen and 51 new records on new hosts and new geographical distributions. Three new genera, Cylindrotorula (Torulaceae), Scolecoleotia (Leotiales genus incertae sedis) and Xenovaginatispora (Lindomycetaceae) are introduced based on distinct phylogenetic lineages and unique morphologies. Newly described species are Aspergillus lannaensis, Cercophora dulciaquae, Cladophialophora aquatica, Coprinellus punjabensis, Cortinarius alutarius, C. mammillatus, C. quercoflocculosus, Coryneum fagi, Cruentomycena uttarakhandina, Cryptocoryneum rosae, Cyathus uniperidiolus, Cylindrotorula indica, Diaporthe chamaeropicola, Didymella azollae, Diplodia alanphillipsii, Dothiora coronicola, Efibula rodriguezarmasiae, Erysiphe salicicola, Fusarium queenslandicum, Geastrum gorgonicum, G. hansagiense, Helicosporium sexualis, Helminthosporium chiangraiensis, Hongkongmyces kokensis, Hydrophilomyces hydraenae, Hygrocybe boertmannii, Hyphoderma australosetigerum, Hyphodontia yunnanensis, Khaleijomyces umikazeana, Laboulbenia divisa, Laboulbenia triarthronis, Laccaria populina, Lactarius pallidozonarius, Lepidosphaeria strobelii, Longipedicellata megafusiformis, Lophiotrema lincangensis, Marasmius benghalensis, M. jinfoshanensis, M. subtropicus, Mariannaea camelliae, Melanographium smilaxii, Microbotryum polycnemoides, Mimeomyces digitatus, Minutisphaera thailandensis, Mortierella solitaria, Mucor harpali, Nigrograna jinghongensis, Odontia huanrenensis, O. parvispina, Paraconiothyrium ajrekarii, Parafuscosporella niloticus, Phaeocytostroma yomensis, Phaeoisaria synnematicus, Phanerochaete hainanensis, Pleopunctum thailandicum, Pleurotheciella dimorphospora, Pseudochaetosphaeronema chiangraiense, Pseudodactylaria albicolonia, Rhexoacrodictys nigrospora, Russula paravioleipes, Scolecoleotia eriocamporesi, Seriascoma honghense, Synandromyces makranczyi, Thyridaria aureobrunnea, Torula lancangjiangensis, Tubeufia longihelicospora, Wicklowia fusiformispora, Xenovaginatispora phichaiensis and Xylaria apiospora. One new combination, Pseudobactrodesmium stilboideus is proposed. A reference specimen of Comoclathris permunda is designated. New host or distribution records are provided for Acrocalymma fici, Aliquandostipite khaoyaiensis, Camarosporidiella laburni, Canalisporium caribense, Chaetoscutula juniperi, Chlorophyllum demangei, C. globosum, C. hortense, Cladophialophora abundans, Dendryphion hydei, Diaporthe foeniculina, D. pseudophoenicicola, D. pyracanthae, Dictyosporium pandanicola, Dyfrolomyces distoseptatus, Ernakulamia tanakae, Eutypa flavovirens, E. lata, Favolus septatus, Fusarium atrovinosum, F. clavum, Helicosporium luteosporum, Hermatomyces nabanheensis, Hermatomyces sphaericoides, Longipedicellata aquatica, Lophiostoma caudata, L. clematidis-vitalbae, Lophiotrema hydei, L. neoarundinaria, Marasmiellus palmivorus, Megacapitula villosa, Micropsalliota globocystis, M. gracilis, Montagnula thailandica, Neohelicosporium irregulare, N. parisporum, Paradictyoarthrinium diffractum, Phaeoisaria aquatica, Poaceascoma taiwanense, Saproamanita manicata, Spegazzinia camelliae, Submersispora variabilis, Thyronectria caudata, T. mackenziei, Tubeufia chiangmaiensis, T. roseohelicospora, Vaginatispora nypae, Wicklowia submersa, Xanthagaricus necopinatus and Xylaria haemorrhoidalis. The data presented herein are based on morphological examination of fresh specimens, coupled with analysis of phylogenetic sequence data to better integrate taxa into appropriate taxonomic ranks and infer their evolutionary relationships.

Title	Efficient and recoverable novel pyranothiazol Pd (II), Cu (II) and Fe(III) catalysts in simple synthesis of polyfunctionalized pyrroles: Under mild conditions using ultrasonic irradiation
Authors	El-Remaily, M.A.E.A.A.A., El-Metwaly, N.M., Bawazeer, T.M., (...), El-Dabea, T., Abu-Dief, A.M.
Journal	Applied Organometallic Chemistry, 35(11),e6370
Abstract	Three novel Pd (II), Cu (II), and Fe (III) complexes were prepared from thiazole ligand through bidentate chelating mode. Alternative spectral and analytical tools were applied to elucidate their structural and molecular formulae. This study was extended to investigate stability and stoichiometry of complexes in solution, using standard methods. In addition, the best atomic distribution within structural forms was obtained by Material Studio Package via the density functional theory (DFT) method. This computational study fed us with significant physical characteristics for differentiation. Also, crystal surface properties in the packing system were studied using the Crystal explorer program, to evaluate the extent of contact between surfaces. Computational data discriminate Pd (II)-thiazole (HYHPd) complex by some physical features, which may be promising in the catalytic field. This complex was selected to play a catalytic function to synthesize polyfunctionalized pyrrole derivatives using ultrasonic irradiation in a one-pot reaction. The catalyst was selected for this application based on the history of Pd (II) complexes and the properties expected theoretically. A condensation reaction for aromatic aldehyde, aromatic amine, acetylacetone, and nitromethane was carried out under mild reaction conditions by ultrasonic irradiation. All reaction conditions were optimized among that variable Lewis acid catalysts in comparison to our new complexes. HYHPd catalyst displayed superiority in overall trials with high yield, short time, and green conditions (solvent H2O/EtOH). Also, the recovery of hetero-catalyst was succeeded and reused by the same efficiency up to five times after that the efficiency was reduced. The mechanism of action was proposed based on the ability of Pd (II) for adding extra-bonds over z axis and supported by theoretical aspects.

Title	Tuning the electrochemical properties by anionic substitution of Li-rich antiperovskite $(Li_2Fe)S_{1-x}Se_xO$ cathodes for Li-ion batteries
Authors	Mohamed, M.A.A., Gorbunov, M.V., Valldor, M., (...), Gräßler, N., Mikhailova, D.
Journal	Journal of Materials Chemistry A, 9(40), pp. 23095-23105
Abstract	The development of electrode materials with multielectron redox functionality is imperative for next-generation Li-ion batteries with a high gravimetric capacity. Within this context, a Li-rich (Li2Fe)SO antiperovskite cathode is a promising candidate exhibiting such multielectron cationic and anionic redox features, resulting in a reversible extraction/insertion of about 1.2 Li+per formula unit. However, it suffers from poor structural and cycling stabilities which hinder its practical application. Herein, we systematically investigate the effect of anionic substitution of S with Se on the structural, thermal and electrochemical properties of the (Li2Fe)SO cathode. With increasing the Se content, higher thermal stability and lower sensitivity to moist air were obtained. Multi-stage cationic and anionic redox processes characterized the electrochemical activity of all the prepared (Li2Fe)S1−xSexO solid solutions. The cationic redox process was shifted to higher potentials while the anionic redox process was shifted to lower potentials upon the increase of the Se content. Among the various synthesized compositions, (Li2Fe)S0.7Se0.3O exhibited the best electrochemical performance with a high discharge capacity of ∼245 mA h g−1and an outstanding cycling stability at 0.1C current rate as well as nearly 100% capacity recovery after rate capability tests of 50 cycles. To deeply characterize (Li2Fe)S0.7Se0.3O, variousex situandin situtechniques were applied. In contrast to (Li2Fe)SO, the substituted (Li2Fe)S0.7Se0.3O material remains crystalline without the evolution of secondary phases or superstructures after the first charge/discharge cycle highlighting its enhanced structural stability. Similar to (Li2Fe)SO, both the cation (Fe) and anions (S/Se) from (Li2Fe)S0.7Se0.3O participate in the redox process.

Title	Epidemiological, Morphological, and Morphometric Study on Haemonchus spp. Recovered From Goats in Egypt
Authors	Gareh, A., Elhawary, N.M., Tahoun, A., (...), Arafa, M.I., Elmahallawy, E.K.
Journal	Frontiers in Veterinary Science, 8,705619
Abstract	Goats can be infected by multiple groups of external and internal parasites. Haemonchus spp. are among abomasal parasites that can result in higher mortality and several considerable economic losses in goats. Early detection of parasites and better understanding of the major risk factors associated with infection are among the main strategies for controlling the infection. Considering this, information on hemonchosis in goats from Egypt, and the contribution of goats in the maintenance of the epidemiological foci of the disease is limited. This study investigated the prevalence of Haemonchus species among 240 abomasum samples collected during postmortem examination of goat carcasses from Assiut Governorate, Egypt. Moreover, the association of the major risk factors to describe the epidemiological pattern of the disease was explored. This study demonstrated that 16.66% of abomasa samples harbored Haemonchus species. Additionally, age, sex, and sampling season were the most significant risk factors associated with infection. Following the variable factors under study, goats aged 1 year or older were at higher risk, with an infection rate of 22.14% (31 of 140), than those younger than 1 year (9%) [p = 0.008; odds ratio (OR) = 2.87; 95% confidence interval (CI), 1.30–6.35]. The infection rate was 25% (19 of 76) in males and 12.8% (21 of 164) in females [p = 0.024; odds ratio (OR) = 2.26; 95% confidence interval (CI), 1.13–4.53]. Moreover, the exposure to infection was higher in summer (22.22%) than in winter (8.33%) (p = 0.007; odds ratio (OR) = 0.318; 95% confidence interval (CI), 0.139–0.725). More importantly, three species of the parasite—Haemonchus contortus, Haemonchus placei, and Haemonchus longistipes—were identified for the first time, and the confirmation of the identification and morphological characterization of the worms was performed using light microscopy and SEM. Collectively, this study reveals interesting epidemiological, morphological, and morphometric findings associated with the occurrence of hemonchosis among goats in Egypt. This study suggests further research for exploring the major circulating species of the parasite in Egypt, which is mandatory for controlling the disease.

Title	Crystalline Gold nanoparticles adjusted by carboxymethyl cellulose and citrate salt: Fabrication, characterization, and in vitro anticancer activity
Authors	Khalaf, M.M., El-Senduny, F.F., Abd El-Lateef, H.M., (...), Tantawy, A.H., Shaaban, S.
Journal	Journal of Molecular Structure, 1242,130693
Abstract	A simple route was introduced for the preparation of crystalline Gold Nanoparticles (Au NPs) in the size range of 4 to 22 nm, using sodium salt of carboxymethyl cellulose (CMC) and citrate salt. These stabilizers act as reducing factors and size-adjuster to dominate nanogold particle assemblage. The fabricated Au NPs were entirely described applying diverse instrumental methods such as Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), UV–Visible spectroscopy, and Transmission electron microscopy (TEM), in addition to the particle size distribution analysis. The anti-proliferative activity of the nanogold Au/CMC was evaluated against ovarian cancer (SKOV-3) and triple-negative breast cancer (MDA-MB-231) cell lines using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay and cisplatin as standard drug. Interestingly, Au/CMC stabilized by citrate ions exhibited a superior anticancer activity than cisplatin and induced several morphological changes to the SKOV-3 and MDA-MB-231. Collectively, these results point to a promising anticancer activity of Au/CMC which in turn needs further investigation using a wider arsenal of cancer cell lines and animal models.

Title	Synthesis and intensive characterization for novel Zn(II), Pd(II), Cr(III) and VO(II)-Schiff base complexes; DNA-interaction, DFT, drug-likeness and molecular docking studies
Authors	Abu-Dief, A.M., El-khatib, R.M., Aljohani, F.S., (...), Khalifa, M.E., El-Metwaly, N.M.
Journal	Journal of Molecular Structure, 1242,130693
Abstract	A novel bioactive series was synthesized from Zn(II), Pd(II), Cr(III) and VO(II) ions with a new Schiff base derivative (HNP) [HNP = 1-(Pyrimidin-2-yliminomethyl)-naphthalen-2-ol]. The proposed structures were defined from elemental analysis, molar conductivity, magnetic moment, IR, 1H NMR, UV-Vis, and TGA. Based on analytical and spectroscopic data, suitable geometry has been suggested for all complexes. The HNP ligand acts as a tri-dentate via NNO donors towards the metal ions inside octahedral geometry with Cr(III), square pyramidal with VO(II), tetrahedral with Zn2+ and square planner with Pd2+ ion. The kinetic and thermodynamic parameters of complexes have been determined by using Coats-Redfern method and their values suggested that the activated complexes were more ordered. The binding efficiency of the investigated complexes with calf thymus DNA (ctDNA), was examined by using different methods and the binding feature was suggested to be electrostatic, intercalation, or replacement mode. Moreover, in-vitro antimicrobial and anticancer potency of the compounds were evaluated. The new complexes showed an effective impact on decreasing cell viability of breast carcinoma cells (MCF-7) in a concentration-dependent manner. In-vitro antioxidant activity of all compounds was investigated and the results showed appreciated free radical scavenging activity of Pd(II) complex. Furthermore, Molecular docking inspection has been carried out to explain the binding affinity of the tested compounds towards breast cancer cell-protein (PDB: 3hb5)

Title	Generalized magneto-thermo-microstretch elastic solid with finite element method under the effect of gravity via different theories
Authors	Othman, M.I.A., Abbas, I.A., Abo-Dahab, S.M.
Journal	Geomechanics and Engineering, 27(1), pp. 45-55
Abstract	The present paper is aimed at studying the effect of gravity on the general model of the equations of generalized magneto-thermo-micro-stretch for a homogeneous isotropic elastic half-space solid. The problem is in the context of the Green-Lindsay (G-L) theories, as well as the coupled theory (CT). Finite element method is used to obtain the expressions for the displacement components, the force stresses, the temperature, the couple stresses, and the micro-stress distribution. Comparisons are made with the results in the presence and absence of gravity and magnetic field of a particular case for the generalized micropolar thermo-elasticity elastic medium (without micro-stretch constants) between the three theories.

Title	Endocrine, Stemness, Proliferative, and Proteolytic Properties of Alarm Cells in Ruby-Red-Fin Shark (Rainbow Shark), Epalzeorhynchos frenatum (Teleostei: Cyprinidae)
Authors	Abd-Elhafeez, H.H., Soliman, S.A., Attaai, A.H., (...), El-Sayed, A.M., Abou-Elhamd, A.S.
Journal	Microscopy and Microanalysis, 27(5), pp. 251-1264
Abstract	The current study investigated the morphological, histochemical, and immunohistochemical characteristics of alarm cells and their precursors in ruby-red-fin shark (rainbow shark), Epalzeorhynchos frenatum (Teleostei: Cyprinidae). Precursor alarm cells were shown to be small, cuboidal, pyramidal, or round in shape, with eosinophilic cytoplasm, resting on the basement membrane of the epidermis. The cells later elongated to become columnar in shape. Subsequently, they enlarged and became large oval-shaped cells. They then underwent shrinkage and vacuolation. The superficial alarm cells were collapsed. Alarm cells were found to have an affinity for different histochemical stains, including bromophenol blue, iron hematoxylin, Sudan black, Mallory triple trichrome, Crossman's trichrome, Safranin O, and Weigert's stains, as well as lipase and alkaline phosphatase. Endocrine properties of the alarm cells were identified by silver staining and synaptophysin immunostaining. Alarm cells exhibited stemness activities and had a strong immunoaffinity for CD117. They had a proteolytic function, as identified by lysosome-specific staining with acridine orange and strong immunoaffinity for matrix metalloproteinase (MMP-9). They also exhibited proliferatively, reflected by immunological staining by proliferating cell nuclear antigen. In conclusion, alarm cells are unique epidermal cells with multiple functions. They play immunological, and endocrine, roles. They also retain stemness and proliferative properties.

Title	Constraints of Mantle and Crustal Sources Interaction during Orogenesis of Pre- and Post-collision Granitoids from the Northern Arabian-Nubian Shield: A Case Study from Wadi El-Akhder Granitoids, Southern Sinai, Egypt
Authors	Mogahed, M.M., Abdelfadil, K.M.
Journal	Acta Geologica Sinica, 95(5), pp. 1527-1550
Abstract	The Egyptian older and younger granitic rocks emplaced during pre- and post-collision stages of Neoproterozoic Pan-African orogeny, respectively, are widely distributed in the southern Sinai Peninsula, constituting 70% of the basement outcrops. The Wadi El-Akhder, southwestern Sinai, is a mountainous terrain exposing two granitoid suites, namely the Wadi El-Akhder Older Granites (AOG) and the Homra Younger Granites (HYG). The AOG (granodiorites with subordinate tonalite compositions) have geochemical characteristics of medium-K calc-alkaline, metaluminous to mildly peraluminous granitoids formed in an island-arc environment, which are conformable with well-known Egyptian older granitoids rocks, whereas the HYG display calc-alkaline to slightly alkaline nature, peraluminous syeno-, monzogranites and alkali feldspar granites matching well those of the Egyptian younger granites. With respect to the AOG granitoids, the HYG granites contain lower Al2O3, FeO∗, MgO, MnO, CaO, TiO2, Sr, Ba, and V, but higher Na2O, K2O, Nb, Zr, Th, and Rb. The AOG are generally characterized by enrichment in LILE and LREE and depletion in HFSE relative to N-MORB values (e.g., negative Nb and Ta anomalies). The geochemical features of the AOG follow assimilation-fractional crystallization (AFC) trends indicative of extensive crustal contamination of magma derived from a mantle source. The chemical characteristics of the AOG are remarkably similar to those of subduction-related granitoids from the Arabian-Nubian Shield (ANS). The compositional variations from monzogranites through syenogranites to alkali feldspar granite within HYG could not be explained by fractional crystallization solely. Correlating the whole-rock composition of the HYG to melts generated by experimental dehydration melting of meta-sedimentary and magmatic rocks reveals that they appear to be derived by extended melting of psammitic and pelitic metasediments, which is similar to the most of younger granitic suites in the ANS.

Title	An intelligent metaheuristic binary pigeon optimization-based feature selection and big data classification in a mapreduce environment
Authors	Abukhodair, F., Alsaggaf, W., Jamal, A.T., Abdel-khalek, S., Mansour, R.F.
Journal	Mathematics, 9(20),2627
Abstract	Big Data are highly effective for systematically extracting and analyzing massive data. It can be useful to manage data proficiently over the conventional data handling approaches. Recently, several schemes have been developed for handling big datasets with several features. At the same time, feature selection (FS) methodologies intend to eliminate repetitive, noisy, and unwanted features that degrade the classifier results. Since conventional methods have failed to attain scalability under massive data, the design of new Big Data classification models is essential. In this aspect, this study focuses on the design of metaheuristic optimization based on big data classification in a MapReduce (MOBDC-MR) environment. The MOBDC-MR technique aims to choose optimal features and effectively classify big data. In addition, the MOBDC-MR technique involves the design of a binary pigeon optimization algorithm (BPOA)-based FS technique to reduce the complexity and increase the accuracy. Beetle antenna search (BAS) with long short-term memory (LSTM) model is employed for big data classification. The presented MOBDC-MR technique has been realized on Hadoop with the MapReduce programming model. The effective performance of the MOBDC-MR technique was validated using a benchmark dataset and the results were investigated under several measures. The MOBDC-MR technique demonstrated promising performance over the other exist-ing techniques under different dimensions.

Title	Photonic crystal enhanced by metamaterial for measuring electric permittivity in ghz range
Authors	Aly, A.H., Ameen, A.A., Mahmoud, M.A., (...), Al-Dossari, M., Elsayed, H.A.
Journal	Photonics, 8(10),416
Abstract	The rise of broadband cellular networks and 5G networks enable new rates of data transfer. This paper introduces a new design to measure the permittivity in the GHz range of non-magnetic materials. We tested the proposed design with a wide range of materials such as wood, glass, dry concrete, and limestone. The newly proposed design structure has a maximum sensitivity of 0.496 GHz/RIU. Moreover, it can measure permittivities in the range from 1 up to 9. The main component of the designed structure is a defective one-dimensional photonic crystal with a unit cell consisting of metamaterial and silicon. In addition, we demonstrate the role of the metamaterial in enhancing the proposed design and examine the impact of the defect layer thickness on the proposed structure.

Title	High-throughput amplicon sequencing of fungi and microbial eukaryotes associated with the seagrass Halophila stipulacea (Forssk.) Asch. from Al-Leith mangroves, Saudi Arabia
Authors	Abdel-Wahab, M.A., Bahkali, A.H., Elgorban, A.M., Jones, E.B.G.
Journal	Mycological Progress, 20(10), pp. 1365-1381
Abstract	This is the first high-throughput amplicon sequencing study of mycobiome associated with leaves of the seagrass Halophila stipulacea. Five leaf samples were collected from the Al-Leith mangroves along the Red Sea coast of Saudi Arabia. Total DNA was extracted from 250 mg of each sample, and the first 300 bp (contains D1-D2 variable regions) of the LSU rDNA amplicon was sequenced with the Illumina MiSeq (bTEFAP). A total of 928,626 reads were obtained from the five samples. The sequence reads belonged to Metazoa (48.1% of the total reads), Viridiplantae (41.1%), Eukaryota (8.8%), Fungi (1.96%), Bacteria (0.09%), and Archaea (0.0001%). Fungi represented between 1.1% and 5.8% of the total reads in the five samples. A total of 18,279 reads (representing 1.96% of the total reads) were recorded from the 5 samples representing 296 molecular species (OTUs) that belong to 13 fungal phyla. At the phylum level, Basidiomycota dominated the community (37.2–51.6%) in three samples, while Neocallimastigomycota (37.5%) and Mucoromycota (42.1%) dominated the community in the fourth and the fifth samples, respectively. High diversity of OTUs (28 molecular species) were recorded from the monokaryotic subkingdom with five unknown basal lineages that are not aligning with any known taxa. Total number of sequence reads of microbial eukaryote organisms (Stramenopiles) from the five samples ranged between 0.16 of total reads in the fifth sample (AL-Hs05) to 2.9% in the first one (AL-Hs01). Majority of the microbial eukaryote reads (93.6%) belong to the phylum Oomycota, followed by Opisthokonts (Fungi/Metazoa group) representing 6.4% of microbial eukaryote reads. Monokaryon phyla (i.e., Chytridiomycota, Mucoromycota, and Neocallimastigomycota) and microbial eukaryotes occupied a major portion of the sequence reads followed by Basidiomycota and Ascomycota. Our results support the findings that the majority of fungi and microbial eukaryotes communities are so far unknown with seven deep branching lineages remain to be cultivated. Graphical abstract: [Figure not available: see fulltext.].

Title	Pmepa1/tmepai is a unique tumorigenic activator of akt promoting proteasomal degradation of phlpp1 in triple-negative breast cancer cells
Authors	Haque, M.A., Abdelaziz, M., Puteri, M.U., (...), Watanabe, Y., Kato, M.
Journal	Cancers, 13(19),4934
Abstract	Transmembrane prostate androgen-induced protein (TMEPAI), also known as PMEPA1, is highly expressed in many types of cancer and promotes oncogenic abilities. However, the mechanisms whereby TMEPAI facilitates tumorigenesis are not fully understood. We previously established TMEPAI-knockout (KO) cells from human triple-negative breast cancer (TNBC) cell lines and found that TMEPAI-KO cells showed reduced tumorigenic abilities. Here, we report that TMEPAI-KO cells upregulated the expression of pleckstrin homology (PH) domain and leucinerich repeat protein phosphatase 1 (PHLPP1) and suppressed AKT Ser473 phosphorylation, which was consistent with TCGA dataset analysis. Additionally, the knockdown (KD) of PHLPP1 in TMEPAI-KO cells partially but significantly rescued AKT Ser473 phosphorylation, as well as in vitro and in vivo tumorigenic activities, thus showing that TMEPAI functions as an oncogenic protein through the regulation of PHLPP1 subsequent to AKT activation. Furthermore, we demonstrated that TMEPAI PPxY (PY) motifs are essential for binding to NEDD4-2, an E3 ubiquitin ligase, and PHLPP1-downregulatory ability. Moreover, TMEPAI enhanced the complex formation of PHLPP1 with NEDD4-2 and PHLPP1 polyubiquitination, which leads to its proteasomal degradation. These findings indicate that the PY motifs of TMEPAI suppress the amount of PHLPP1 and maintain AKT Ser473 phosphorylation at high levels to enhance the tumorigenic potentiality of TNBC.

Title	Erratum: A minimal timescale for the continuum in 4U 1608-52 and Aql X-1 (Monthly Notices of the Royal Astronomical Society: Letters (2021) 502 (L72-L78) DOI: 10.1093/mnrasl/slab004)
Authors	Mohamed, K., Sonbas, E., Dhuga, K.S., (...), Abd Allah, N.N., Ibrahim, A.
Journal	Monthly Notices of the Royal Astronomical Society: Letters 507(1), pp. L29
Abstract	This is an erratum to the original paper, 'A minimal timescale for the continuum in 4U 1608–52 and Aql X-1' (2021, MNRAS, 502, L72–L78). Upon the original publication of this article, there were errors in the affiliations of K. Mohamed, E. Sonbas and K. S. Dhuga. First author K. Mohamed's second affiliation should read: 'Department of Physics, The George Washington University, Washington, DC 20052, USA' instead of 'Department of Physics, Adiyaman University, Washington, DC 20052, USA'.

Title	Reaction of arylglyoxal hydrate derivatives with cyanoguanidine under benzilic rearrangement effect
Authors	Moustafa, A.H., Hussein, B.R.M.
Journal	Monatshefte fur Chemie, 152(10), pp. 1285-1290
Abstract	A novel series of (5-aryl-4-oxoimidazolidin-2-ylidene)cyanamides was successfully synthesized via the reaction of arylglyoxal hydrates with cyanoguanidine through benzilic rearrangement mechanism. The reaction was also optimized by changing various reaction factors for endeavor to increase the yield of the target product and reduce the by-product 1-cyano-3-(2-oxo-2-arylethylidene)guanidine formation. Graphic abstract: [Figure not available: see fulltext.]

Title	Mesoporous TiO_2@g-C_3N_4 composite: construction, characterization, and boosting indigo carmine dye destruction
Authors	Toghan, A., Abd El-Lateef, H.M., Taha, K.K., Modwi, A.
Journal	Diamond and Related Materials, 118,108491
Abstract	This study articulates the fabricating of TiO2@g-C3N4 nanocomposite employing ultrasonic power starting with TiO2 and g-C3N4 as precursors. The fabricated nanostructures were characterized employing many techniques such as the X-ray diffraction (XRD), which revealed the mutual existence of g-C3N4 and anatase TiO2 phase peaks, and the scanning electron microscopy (SEM) and transmission electron microscopy (TEM) that exposed the anchoring of TiO2 nanoparticles to the g-C3N4 layers. The coexistence of the composite constituent elements C, N, O, and Ti was verified by the energy dispersive X-ray analysis (EDX) and X-ray photoelectron spectroscopy (XPS). The composite visible-light-driven photocatalytic performance was assessed using the indigo carmine (IC) dye, and the photocatalyst demonstrated outstanding performance. The photocatalytic process fitted the pseud-first-order kinetics with a rate that is seven times faster than bare TiO2. The photocatalysis improvement could be credited to the improved porosity, the low bandgap energy and efficient recombination inhibition of the photogenerated charge carriers at the heterojunction interfaces, and prevailing photo-prompted holes electrons. The mechanistic investigation revealed that the vital species considerably contributing to the dye photodegradation were peroxide radicals and holes as interpreted from scavenger trapping experiments. The study discloses the substantiation of a Z-scheme that facilitates the electron-hole pair separation for enhanced optical characteristics.

Title	Effects of plasma powers on the corrosion, mechanical, wear, and tribological surface features of the $Fe_{52}Ni_{28}Co_{17}Ti_3$ shape memory alloy
Authors	Ata, M.H., El-Lateef, H.M.A., Elrouby, M.
Journal	Surfaces and Interfaces, 26,101384
Abstract	In this work, Fe-Ni-Co-Ti shape memory alloy (Fe-SMA) substrates were pickled at various plasma-treating powers of 300, 400, and 450 W at a fixed handling time of 15 min. The carbonitriding procedure was achieved by employing a gas blend contains 10% acetylene and 90% nitrogen. The phase composition, structure, and mechanical and tribological surface characteristics were examined using X-ray diffraction (XRD), oscillating ball-on-disk tribometer, optical microscopy, surface profile, and microhardness tester. The plasma carbonitriding treatment demonstrated high surface micro-hardness up to 725 HV0.1 compared with the untreated specimen (220 HV0.1). The corrosion and wear characteristics of the plasma-treated and untreated Fe-SMA surface were assessed by the electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP) techniques in a 1.0 M solution of HCl. The obtained findings indicated that carbonitrided films improve the corrosion resistance of Fe-SMA samples. This improvement was enhanced when the plasma-treating power increased from 300 to 450 W. The treated Fe-SMA sample at 450 W has the highest protection efficiency (91.4 %) and the lowest corrosion current density Icor (1.11 μA cm−2). Moreover, the surface morphology examination approves the corrosion protection of the treated Fe-SMA samples.

Title	Optimization for synthesized quinoline-based Cr^{3+}, VO^{2+}, Zn^{2+} and Pd^{2+}complexes: DNA interaction, biological assay and in-silico treatments for verification
Authors	Al-Abdulkarim, H.A., El-khatib, R.M., Aljohani, F.S., (...), El-Metwaly, N.M., Abu-Dief, A.M.
Journal	ournal of Molecular Liquids, 339,116797
Abstract	A novel momonuclear metal chelates were derived from Zn(II), Pd(II), VO(II) and Cr(III) ions with azomethine (BSQ) [BSQ = 4-Bromo-2-(quinolin-8-yliminomethyl)-phenol] ligand. The prepared compounds were subjected to different analytical and spectroscopic techniques as, IR, 1H NMR, UV–Vis, molar conductivity, magnetic moment and thermogravimetric analysis (TGA) to elucidate their structures. Accordingly, the most fitted geometry has been suggested for each complex. The ligand acts as a tri-dentate via NNO donors towards the metal ions inside octahedral geometry with Cr3+, square pyramidal with VO2+, tetrahedral with Zn2+ and square planner with Pd2+ ion. Thermo-kinetic parameters for the complexes have been determined and the values suggest the presence of ordered activated complexes. The reactivity of new compounds towards DNA was examined by different methods and the binding kinds seem to electrostatic, intercalation, or replacement. Also, in-vitro antimicrobial and anticancer potency of the compounds were evaluated. In addition, the therapeutic behavior of the complexes appeared promising towards breast cancer cells (MCF-7) in a concentration-dependent manner. Moreover, the redox potential of the newly synthesized compounds was evaluated and the results reflect suitability of Pd(II) complex in controlling the free radicals. Variable theoretical treatments were performed aiming to confirm the structural formulae as well as the biological assay results. A promising antimicrobial and anticancer behavior was recorded with Pd(II) complex (BSQPd) via in-vitro and in-silico ways.

Title	Optical characterization and effects of iodine vapor & gaseous HCl adsorption investigation of novel synthesized organic dye based on thieno[2,3-b]thiophene
Authors	Shokr, E.K., Kamel, M.S., Abdel-Ghany, H., El-Remaily, M.A.E.A.A.A.
Journal	Optik, 243,167385
Abstract	Comparison of the absorption spectra of the ethanolic solution (3 ppm) of some diethyl 3,4-diaminothieno[2,3-b]thiophene-2,5-dicarboxylate (TT amino ester) derivatives has revealed that the azo dye derivative compound 4 manifests smaller band gap and higher absorption maximum close to solar maximum wavelength. Very good adhesive thin films to glass substrates of the azo dye compound 4 have been successfully prepared by thermal evaporation technique. The optical spectral analysis of such compound film revealed three absorption transitions corresponding to the optical gap, the electron transition between impurity levels in band gap and the fundamental band gap (HOMO to LUMO $\pi \rightarrow \pi^*$ transitions). Absorption, dielectric and dispersion parameters have been determined for as- deposited and gas treated films and discussed. This film manifested a fast response and high sensitivity toward iodine vapor with a reasonable recovery time indicating a reversibility of iodine adsorption process. In contrast, the film illustrated slow response and weak sensitivity toward HCl gas with irreversible adsorption process. Besides, the azo dye compound 4 solution manifests strong emissive properties that recommend it as promising candidate for fluorescence sensors.

Title	Thermoelectric properties of Lenaite: A first principles study
Authors	Prakash, G., Paulraj, S., Adam, A.M., (...), Veluswamy, P., Kathirvel, V.
Journal	Materials Letters, 300,130146
Abstract	The electronic and transport properties of AgFeS2 were studied using first principles. The stable magnetic state of the material was found as antiferromagnetic. The band structure and DOS was calculated. The calculations show that the AgFeS2 system has an indirect bandgap of 0.94 eV. The transport properties were studied using the BoltzTraP2 code by solving the semiclassical Boltzmann transport equation. The orientation dependent transport properties of lenaite with respect to relaxation time shows moderate Seebeck coefficient, electrical conductivity, thermal conductivity, and power factor in y-direction. Our study reveals the high Seebeck coefficient of 1542 μV/K and power factor of 1.93 × 1011 W/mK2s, respectively, for the p-type counterpart. These results show that p-doped AgFeS2 will be a potential candidate for thermoelectric applications.

Title	Unveiling the exceptional synergism-induced design of Co-Mg-Al layered triple hydroxides (LTHs) for boosting catalytic activity toward the green synthesis of indol-3-yl derivatives under mild conditions
Authors	Hamad, H.A., Nageh, H., El-Bery, H.M., (...), Soliman, A.M.M., El-Remaily, M.A.E.A.A.A.
Journal	Journal of Colloid and Interface Science, 599, pp. 227-244
Abstract	The current study provides a novel insight into the role of synergism of the changes in Mg2+/ Al3+ in the best catalytic activity of indol-3-yl derivatives. A series of Co-Mg-Al layered triple hydroxides (LTHs) catalysts were produced by altering the Al3+/Mg2+ ratio with respect to Co2+. The physicochemical properties of LTHs were well characterized by ICP-AES, XRD, FTIR, FE-SEM, BET, Zeta-sizer, and VSM. The results show that the sample CMA4 (Co2+:Mg2+:Al3+ 2:4:4) is an exception to the physicochemical characteristics of the produced Co-Mg-Al LTHs, which is due to the synergism between the changes in Mg2+ and Al3+. To the best of our knowledge, this is the first study to report the synthesis of indol-3-yl derivatives from indole-3-carbaldehyde using Co-Mg-Al LTHs as highly efficient heterogeneous catalysts, which is an extremely appealing path. The selectivity of the synthesis was studied by condensing various nucleophiles through the one-pot method that established superior reactivity under mild conditions. Notably, the results show that the Co-Mg-Al LTHs system exhibited an extraordinarily catalytic activity, with the highest yield (98%) being obtained under the following optimal conditions: the concentration of Co-Mg-Al LTHs = 5 mol%, 30 min., water/ethanol as solvent. Furthermore, the reusable studies exhibited that the catalysts were found to be stable and reusable for up to six cycles without substantial loss of catalytic activity. Finally, a plausible reaction mechanism of the Co-Mg-Al LTHs system for indol-3-yl derivatives was put forward according to our comprehensive analysis. Our work illuminates a cheap and flexible strategy for the synthesis of indol-3-yl derivatives using Co-Mg-Al LTHs.

Title	Fractional-order delay differential equations for the dynamics of hepatitis C virus infection with IFN-α treatment
Authors	Rihan, F.A., Arafa, A.A., Rakkiyappan, R., Rajivganthi, C., Xu, Y.
Journal	Alexandria Engineering Journal, 60(5), pp. 4761-4774
Abstract	Herein, we propose a fractional-order delay differential model for the dynamics of Hepatitis-C Virus (HCV), with interferon-α(IFN-α) treatment. A fractional-order derivative is considered to represent the long-run immune memory required for intermediate cellular interactions. A discrete time-delay τ is also incorporated to represent the intracellular delay between initial infection of a cell by HCV and the release of new virions. By using time-delay τ as a bifurcation parameter, the stability of infection-free and infected steady states is investigated. The coefficients of the corresponding characteristic equation depend on τ, and geometric stability switch criteria is used to study the stability switching properties. The fractional-order delay differential model has been verified with real observations. Incorporating fractional-order and immune memory, in the model, greatly enriches the dynamics of the system and improves the consistency of the model with the observations.

Title	Group generated by total sextactic points of Kuribayashi quartic curve
Authors	Kamel, A.
Journal	Journal of Algebra and its Applications, 20(10),2150184
Abstract	A Kuribayashi quartic curve a: X4 + Y4 + Z4 + a(X2Y2 + Y2Z2 + Z2X2) = 0,a ∈C/{-1,±2}, carries total sextactic points if and only if a = 14 or a is a zero of P(a) = a3 + 68a2 - 91a + 98, cf. [1]. In [2], the authors describe the subgroup generated by the total sextactic points in the Jacobian of a Kuribayashi quartic curve when a is a zero of P(a). In this paper, we describe this group when a = 14.

Title	A hyperbolic two-temperature photo-thermal interactions in a semiconductor material
Authors	Saeed, T., Abbas, I.
Journal	Indian Journal of Physics, 95(10), pp. 2057-2062
Abstract	This work is concerned with the study of the thermodynamic temperature, conductive temperature, the carrier density, displacement and stress in a semi-infinite semiconductor medium during the photo-thermal process. The medium is considered to be a semiconducting media with an isotropic and homogeneous. Also, the thermal and elastic properties have been considered without neglecting the coupling between the thermoelastic and the plasma waves. The techniques of Laplace transforms are used to get the analytical solutions of the problem in the transformed domain by the eigenvalues method and the inversions of Laplace transformations have been carried numerically. The results are graphically represented to show the effects of the two-temperature parameter.

Title	Modified Hybrid Projection Methods with SP Iterations for Quasi-Nonexpansive Multivalued Mappings in Hilbert Spaces
Authors	Chaolamjiak, W., Yambangwai, D., Hammad, H.A.
Journal	Bulletin of the Iranian Mathematical Society, 47(5), pp. 1399-1422
Abstract	In this paper, we present a modified SP iteration with the inertial technical term for three quasi-nonexpansive multivalued mappings in a Hilbert space. We then obtain weak convergence theorem under suitable conditions. The strong convergence theorems are given using CQ and shrinking projection methods with our modified iteration. Finally, we test some numerical experiments to illustrate that our inertial forward–backward method with the inertial technique term has a more effective convergence than that of the standard forward–backward method and Halpern algorithm.

Title	Microplastics-Induced Eryptosis and Poikilocytosis in Early-Juvenile Nile Tilapia (Oreochromis niloticus)
Authors	Hamed, M., Osman, A.G.M., Badrey, A.E.A., Soliman, H.A.M., Sayed, A.E.-D.H.
Journal	Frontiers in Physiology, 12,742922
Abstract	This study aims to assess the impact of microplastics (MPs) on erythrocytes using eryptosis (apoptosis) and an erythron profile (poikilocytosis and nuclear abnormalities), considered to be novel biomarkers in Nile tilapia (Oreochromis niloticus). In this study, four groups of fish were used: The first was the control group. In the second group, 1 mg/L of MPs was introduced to the samples. The third group was exposed to 10 mg/L of MPs. Finally, the fourth group was exposed to 100 mg/L of MPs for 15 days, following 15 days of recovery. The fish treated with MPs experienced an immense rise in the eryptosis percentage, poikilocytosis, and nuclear abnormalities of red blood cells (RBCs) compared with the control group in a concentration-dependent manner. Poikilocytosis of MP-exposed groups included sickle cell shape, schistocyte, elliptocyte, acanthocyte, and other shapes. Nuclear abnormalities of the MPs-exposed groups included micronuclei, binucleated erythrocytes, notched, lobed, blebbed, and hemolyzed nuclei. After the recovery period, a greater percentage of eryptosis, poikilocytotic cells, and nuclear abnormalities in RBCs were still evident in the groups exposed to MPs when crosschecked with the control group. The results show concerning facts regarding the toxicity of MPs in tilapia.

Title	Condensation of Active Methylene and Substituted Aldehydes over Mesoporous Nickel Oxides Nanostructures: A Combined Experimental and DFT Study
Authors	Khairy, M., Mohamed, M., Ismael, M.
Journal	ChemistrySelect, 6(35), pp. 9508-9512
Abstract	Mesoporous NiO nanoarchitectures (NAs) with controlled hexagonal platelet- and flower-like morphology were synthesized using facile hydrothermal methods in different reaction conditions. The NiO NAs were characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), N2 adsorption /desorption isotherms, and wide-angle X-ray diffraction. It was found that controlled morphology, large surface areas, and high crystallinity of NiO NAs offered high catalytic reactivity toward Knoevenagel condensation reactions. Large reaction yields in an aqueous media and easy separation of the NiO NAs without losing the catalytic activity were observed. Further, the formation mechanism of (Formula presented.) bonds over NiO NAs surface was explored by density functional theory (DFT). These findings open a new avenue for efficient (Formula presented.) bonds formation using reusable NiO NAs catalyst without using any expensive solvents.

Title	Synthesis, experimental, and computational studies of water soluble anthranilic organoselenium compounds as safe corrosion inhibitors for J55 pipeline steel in acidic oilfield formation water
Authors	Abd El-Lateef, H.M., Shaaban, S., Khalaf, M.M., Toghan, A., Shalabi, K.
Journal	Colloids and Surfaces A: Physicochemical and Engineering Aspects 625,126894
Abstract	Herein, we report the synthesis and corrosion protection properties of two water-soluble anthranilic acid-based organoselenium compounds, namely, sodium 2-amino-5-selenocyanatobenzoate (AnSe) and sodium 5,5′-diselanediylbis(2-aminobenzoate) (AnSe-SeAn). The inhibition behavior of AnSe and AnSe-SeAn for the corrosion of J55 steel in simulated acidic oilfield formation water at 50 °C was assessed using weight loss, potentiodynamic polarization (PDP), electrochemical impedance spectroscopy (EIS), and surface morphology measurements. The diselenide-based anthranilic acid AnSe-SeAn manifested higher protection capacity (96.8%) than the selenocyanate analog AnSe (92.4%). The protective efficacy was enhanced in a concentration-dependent manner (up to 98.2% using 2.0 × 10−3 M of AnSe-SeAn at 50 °C). PDP plots indicated that AnSe and AnSe-SeAn were mixed-type inhibitors. The organoselenium molecules were adsorbed on the J55 steel surface and follow the Langmuir isotherm model via both physisorption and chemisorption. Surface morphology inspections via FTIR, FE-SEM/EDX, and XPS analysis affirmed the improvement of a protecting film that shields the J55 steel surface from corrosion at the optimal dose. Furthermore, computational studies via DFT and MC simulations were performed to discover the active sites on AnSe and AnSe-SeAn molecules responsible for the adsorption and protect the J55 steel surface. The current paper delivers very important findings in designing and preparation novel water-soluble anthranilic organoselenium inhibitors with high inhibition efficiency.

Title	Synthesis and antimicrobial activity assessment of calcium and iron phosphate nanoparticles prepared by a facile and cost-effective method
Authors	Elsawy, H., El-Lateef, H.M.A., Khalaf, M.M., (...), Touny, A.H., Toghan, A.
Journal	Chemical Physics Letters, 779,138839
Abstract	This article focuses on the influence of monetite calcium phosphate nanowhiskers (CaP) and iron phosphate produced by the chemical hydrothermal reflux method on the antibacterial and microbial properties. The two types of produced iron phosphate by reflux method are amorphous iron phosphate (A-FeP) and crystalline iron phosphate (C-FeP). The introduced materials are characterized using several techniques including field-emission scanning electron microscopy (FE-SEM), energy dispersive X-ray analysis (EDS), X-ray diffraction (XRD), and transmission electron microscopy (TEM). The antimicrobial activities for different phosphates are evaluated against different types of bacteria involving gram-negative, gram-positive, and C. Albicans fungal pathogen. The inhibition zone of the growth of the selected pathogens for different concentrations for metal phosphates indicates the high efficiency of these phosphates against all used bacteria. However, their effectiveness against G-negative was more superior to that of G-positive, indicating good selectivity against Gram-negative bacteria. Moreover, C-FeP NPs showed a higher antimicrobial impact than that of A-FeP.

Title	Electromagnetic field and three-phase lag in a compressed rotating isotropic homogeneous micropolar thermo-viscoelastic half-space
Authors	Bayones, F.S., Abo-Dahab, S.M., Abd-Alla, A.M., Kilany, A.A.
Journal	Mathematical Methods in the Applied Sciences 44(13), pp. 9944-9965
Abstract	Using a thermal shock of the ramp type, the authors constructed a unique mathematical three-phase-lag scheme in a compressed rotating isotropic homogeneous micropolar thermo-viscoelastic medium. The model is applied to solve an issue of an exactly performing half-space exposed to defined boundary circumstances with an electromagnetic field. Normal mode analysis and Lame's potentials methods were used to obtain the analytical answers. The authors were interested in studying the effect of the initial stress, ramp time, magnetic field, and rotation on distributing, displacement, temperature, and stress, as well as induced electric and magnetic distribution. The findings showed that the impact of the viscous, ramp parameter, rotation, phase lag, magnetic field, and initial stress on the micropolar thermo-viscoelastic medium is distinct.

Title	Measurement of the tensor analyzing power $T_{20}$for the reaction γ d → pnπ^0
Authors	Gauzshtein, V.V., Darwish, E., Fix, A.I., (...), Vasilishin, B.I., Zevakov, S.A.
Journal	Modern Physics Letters A, 36(28),2150199
Abstract	This paper presents new results for the T20-component of the tensor analyzing power of the reaction γd → pnπ0 in the photon energy range of 300MeV < Eγ < 500MeV. The experimental statistics accumulated in 2013 at the VEPP-3 accelerator-storage complex is used. The reaction events are identified by the coincidence registration of the proton and two γ-quanta from the decay of the neutral pion. To determine the T20-component, the asymmetry of the yields with respect to the change of sign of the tensor polarization of the deuterium target is measured. The experimental results are compared with the theoretical calculations in which the MAID 2007 model is used as the elementary pion-nucleon photoproduction amplitude and contributions from the pion-nucleon and nucleon-nucleon rescattering are taken into account.

Title	Terahertz spectroscopy of lead-substituted barium hexaferrites Ba1-xPbxFe12O19
Authors	Lukianov, M.Y., Ahmed, A.G., Bush, A.A., (...), Gorshunov, B.P., Alyabyeva, L.N.
Journal	Journal of Physics: Conference Series, 1984(1),012013
Abstract	Using methods of terahertz time-domain spectroscopy dielectric response of ceramic barium hexaferrites substituted with lead (Ba1-xPbxFe12O19, x = 0.00-0.30) was studied in the frequency range of 3-110 cm1 and at temperatures from 5 to 300 K. Obtained spectra are presented by a rich set of lines of different nature, i.e. excitations associated with electronic transitions within the fine-structure components of Fe2+ ions, A2u soft optical phonon, and ferroelectric-like soft mode. The frequency of the soft mode reveals power-law temperature variation vSM ∼ (T-Tc)025, which indicates a potential phase transition atrc. Analysis shows that Tc approaches zero for the concentrations x = 0.20-0.25.

Title	Hertz-to-infrared electrodynamics of single-crystalline barium-lead hexaferrite Ba1-xPbxFe12O19
Authors	Alyabyeva, L., Ahmed, A., Vinnik, D., (...), Lunkenheimer, P., Gorshunov, B.
Journal	Journal of Physics: Conference Series, 1984(1),012014
Abstract	Broadband electrodynamic response of single-crystalline lead-substituted barium hexaferrite Ba1-xPbxFe12O19 is studied at temperatures from 5 to 300 K in the range from 1 Hz to 240 THz that includes radio, sub-terahertz, terahertz and infrared frequencies and altogether spans over 14 frequency decades. Discovered phenomena include relaxational radio-frequency dynamics of domains and domain walls, temperature-unstable terahertz excitations connected with electric dipoles induced by off-center displacements in the ab-plane of the lead ions, narrow terahertz excitations associated with electronic transitions between the fine-structure components of the Fe2+ground state, dielectric gigahertz resonances presumably of magneto-electric origin and polar lattice vibrations.

Title	Origin of terahertz excitations in single-crystalline lead substituted M-type barium hexaferrite doped with Al
Authors	Ahmed, A.G., Prokhorov, A.S., Anzin, V.B., (...), Gorshunov, B.P., Alyabyeva, L.N.
Journal	Journal of Physics: Conference Series, 1984(1),012015
Abstract	Single-crystalline lead substituted M-type barium hexaferrites doped with different concentrations of Al3+, synthesized by flux technique are investigated at terahertz and infrared frequencies (8-8000 cm-1). The spectra of reflection coefficient (R), transmission coefficient (T), complex dielectric permittivity (ϵ' and ϵ'') were obtained using terahertz time-domain, and infrared Fourier transform spectrometers over a broadband frequency range 0.24-240 THz and at temperatures 5 K-300 K. The observed absorption lines are assigned to the electronic transitions within the fine-structured ground state of Fe2+ ions at terahertz frequencies and to optical phonon mode at far-infrared frequencies. To analyze the origin of terahertz excitations in the compounds, we provided a model that accounts for the second-order spin-orbit interactions, the triagonal distortion of the crystal field, and the selection rules of the (C3v) point group symmetry of tetrahedral site-position of Fe2+.

Title	Tracing the influence of small additions of antimony to zinc on the hydrogen evolution and anodic dissolution processes of zinc as anodes for alkaline batteries application
Authors	El-Sayed, A.E.-R., Shilkamy, H.A.E.-S., Elrouby, M.
Journal	International Journal of Hydrogen Energy, 46(61), pp. 31239-31252
Abstract	The processes of hydrogen evolution reaction and anodic dissolution of zinc and zinc-antimony alloys with different antimony amounts (0.5 and 1%) immersed in 6 M KOH were tested via many electrochemical methods as Tafel polarization, cyclic voltammetry (CV), impedance spectroscopy (EIS), and charge-discharge. Newly formed phases, the morphology of the surface, and chemical composition for Zn and Zn–Sb alloys after and before corrosion were determined via appreciated analysis instruments as X-ray diffraction (XRD), scanning electron microscopy (SEM) provided with an energy-dispersive X-ray spectroscopy detector (EDS). The results of Tafel plots exhibited that, the protection efficiency of corrosion (η%) gets greater with the increase of both temperature and Sb content. It is impressive to note that, η% for Zn–Sb alloy (1%Sb) reaches the highest value of 98.55% at the higher studied temperature (55 °C). The potential of corrosion (Ecorr.) is shifted to a more negative position with the increase of antimony addition to zinc. This reveals that minor alloying amounts of Sb with Zn plays an important role to improve the suppression of the evolved hydrogen, charge efficiency, capacitance, and lifetime of alkaline batteries. Surface investigations revealed the presence of ZnSb and Zn4Sb3 phases on the alloy surface have an essential function in the protection of zinc anodes, and improvement of charge-discharge.

Title	THE EFFICIENCY OF SOME ACTIVE INGREDIENTS OF ARUM PALAESTINUM AS INHIBITORS TO 3CL^{PRO} AND NSP15 PROTEINS
Authors	Mustafa, M., Wedian, F., Aldal'In, H.K., (...), Salman, H.A., Huneif, M.A.
Journal	Acta Poloniae Pharmaceutica - Drug Research 78(5), pp. 657-665
Abstract	Two active coronaviral proteins (3CLpro and Nsp15) have been studied using both the GC-MS and docking methods. These coronaviral proteins have been examined with the methanol extract generated from leaves of the Arum palaestinum. According to the GC-MS findings, 19 major natural compounds are present in the plant's methanolic extract. The lowest Binding Energy (LBE) and the inhibition constant (Ki) have been used to identify and classify the potential of these lead drugs with their pharmacological properties. The affinity of these compounds with coronaviral proteins has been evaluated to reveal the usage of these compounds at the active sites of the receptors, 3CLpro (PDB ID: 6LU7) and Nsp15 (PDB ID: 6VWW). The results of β-Sitosterol, Androstan-3-one, Phenobarbital, Maltose, and α-Tocopherol show more affinity to Nsp15 and 3CLpro than to the supporting control drugs. Furthermore, an evaluation of the interactions of these components with the amino acids of 3CLpro and Nsp15 revealed that β-Sitosterol has the best LBE score and Ki value as compared with those of the approved medication and all other compounds under investigation. Consequently, these potential compounds may be modern inhibitors of coronavirus. Further in vitro and in vivo studies are needed for such computational findings.

Title	Exciting fixed point results under a new control function with supportive application in fuzzy cone metric spaces
Authors	Hammad, H.A., De la Sen, M.
Journal	Mathematics, 9(18),2267
Abstract	The objective of this paper is to present a new notion of a tripled fixed point (TFP) findings by virtue of a control function in the framework of fuzzy cone metric spaces (FCM-spaces). This function is a continuous one-to-one self-map that is subsequentially convergent (SC) in FCM-spaces. Moreover, by using the triangular property of a FCM, some unique TFP results are shown under modified contractive-type conditions. Additionally, two examples are discussed to uplift our work. Ultimately, to examine and support the theoretical results, the existence and uniqueness solution to a system of Volterra integral equations (VIEs) are obtained.

Title	Novel fuzzy controller for a standalone electric vehicle charging station supplied by photovoltaic energy
Authors	Zaid, S.A., Albalawi, H., Alatawi, K.S., (...), Alhmiedat, T.A., Kassem, A.M.
Journal	Applied System Innovation, 4(3),63
Abstract	The electric vehicle (EV) is one of the most important and common parts of modern life. Recently, EVs have undergone a big development thanks to the advantages of high efficiency, negligible pollution, low maintenance, and low noise. Charging stations are very important and mandatory services for electric vehicles. Nevertheless, they cause high stress on the electric utility grid. Therefore, renewable energy-sourced charging stations have been introduced. They improve the environmental issues of the electric vehicles and support remote area operation. This paper proposes the application of fuzzy control to an isolated charging station supplied by photovoltaic power. The system is modeled and simulated using Matlab/Simulink. The simulation results indicate that the disturbances in the solar insolation do not affect the electric vehicle charging process at all. Moreover, the controller perfectly manages the stored energy to compensate for the solar energy variations. Additionally, the system response with the fuzzy controller is compared to that with the PI controller. The comparison shows that the fuzzy controller provides an improved response.

Title	Analysis of genetic diversity and population structure in bitter gourd (Momordica charantia l.) using morphological and ssr markers
Authors	Alhariri, A., Behera, T.K., Jat, G.S., (...), Ismail, E., Elkordy, A.
Journal	Plants, 10(9),1860
Abstract	The present investigation was carried out using 51 diverse bitter gourd accessions as material for studying genetic diversity and relatedness using morphological and SSR markers. A wide variation was observed for morphological traits like the number of days to the first female flower anthesis (37.33–60.67), the number of days to the first fruit harvest (47.67–72.00), the number of fruits/plant (12.00–46.67), fruit length (5.00–22.23 cm), fruit diameter (1.05–6.38 cm), average fruit weight (20.71–77.67 g) and yield per plant (513.3–1976 g). Cluster analysis for 10 quantitative traits grouped the 51 accessions into 6 clusters. Out of 61 SSR primers screened, 30 were polymorphic and highly informative as a means to differentiate these accessions. Based on genotyping, a high level of genetic diversity was observed, with a total of 99 alleles. The polymorphic information content (PIC) values ranged from 0.038 for marker BG_SSR-8 to 0.721 for S-24, with an average of 0.429. The numbers of alleles ranged from 2 to 5, with an average of 3.3 alleles per locus. Gene diversity ranged from 0.04 for BG_SSR-8 to 0.76 for S-24, showing a wide variation among 51 accessions. The UPGMA cluster analysis grouped these accessions into 3 major clusters. Cluster I comprised 4 small, fruited accessions that are commercially cultivated in central and eastern India. Cluster II comprised 35 medium- to long-sized fruited accessions, which made up an abundant and diverse group. Cluster III comprised 11 long and extra-long fruited accessions. The polymorphic SSR markers of the study will be highly useful in genetic fingerprinting and mapping, and for association analysis in Momordica regarding several economic traits.

Title	A novel sooty terns algorithm for deregulated MPC-LFC installed in multi-interconnected system with renewable energy plants
Authors	Ali, H.H., Fathy, A., Al-Shaalan, A.M., (...), Al-Shamma'a, A.A., Gabbar, H.A.
Journal	Energies, 14(17),5393
Abstract	This paper introduces a novel metaheuristic approach of sooty terns optimization algorithm (STOA) to determine the optimum parameters of model predictive control (MPC)-based deregulated load frequency control (LFC). The system structure consists of three interconnected plants with nonlinear multisources comprising wind turbine, photovoltaic model with maximum power point tracker, and superconducting magnetic energy storage under deregulated environment. The proposed objective function is the integral time absolute error (ITAE) of the deviations in frequencies and powers in tie-lines. The analysis aims at determining the optimum parameters of MPC via STOA such that ITAE is minimized. Moreover, the proposed STOA-MPC is examined under variation of the system parameters and random load disturbance. The time responses and performance specifications of the proposed STOA-MPC are compared to those obtained with MPC optimized via differential evolution, intelligent water drops algorithm, stain bower braid algorithm, and firefly algorithm. Furthermore, a practical case study of interconnected system comprising the Kuraymat solar thermal power station is analyzed based on actual recorded solar radiation. The obtained results via the proposed STOA-MPC-based deregulated LFC confirmed the competence and robustness of the designed controller compared to the other algorithms.

Title	Photocatalytic detoxification of some insecticides in aqueous media using tio2 nanocatalyst
Authors	Massoud, A., Derbalah, A., El-Mehasseb, I., (...), Albrakati, A., Elmahallawy, E.K.
Journal	International Journal of Environmental Research and Public Health 18(17),9278
Abstract	The present study was performed to fabricate a titanium dioxide (TiO2) nanocatalyst with proper characteristics for the removal of some insecticides (dimethoate and methomyl) from aqueous media. A TiO2 catalyst of regular (TiO2—commercial—/H2O2/UV) or nano (TiO2—synthesized—/H2O2/UV) size was employed as an advanced oxidation process by com-bining it with H2O2 under light. Moreover, the total detoxification of insecticides after treatment with the most effective system (TiO2(s)/H2O2/UV) was also investigated through exploring the biochemical alterations and histopathological changes in the liver and kidneys of the treated rats. Interestingly, the present study reported that degradation rates of the examined insecticides were faster using the TiO2 catalyst of nano size. Complete degradation of the tested insecticides (100%) was achieved under the TiO2(s)/H2O2/UV system after 320 min of irradiation. The half-life values of the tested insecticides under H2O2/TiO2(c)/UV were 43.86 and 36.28 for dimethoate and metho-myl, respectively, whereas under the H2O2/TiO2(c)/UV system, the half-life values were 27.72 and 19.52 min for dimethoate and methomyl, respectively. On the other hand, no significant changes were observed in the biochemical and histopathological parameters of rats administrated with water treated with TiO2(s)/H2O2/UV compared to the control, indicating low toxicity of the TiO2 nanocatalyst-. Altogether, the advanced oxidation processes using TiO2 nanocatalyst can be considered as a promising and effective remediation technology for the complete detoxification of methomyl and dimethoate in water. However, further future research is needed to identify the possible breakdown products and to verify the safety of the used nanomaterials.

Title	Facile synthesis of gold-nanoparticles by different capping agents and their anticancer performance against liver cancer cells
Authors	Khalaf, M.M., Abd El-Lateef, H.M., Mohamed, I.M.A., Zaki, M.E.A., Toghan, A.
Journal	Colloids and Interface Science Communications, 44,100482
Abstract	Herein, gold -nanoparticles (Au-NPs) were chemically synthesized by the use of carboxymethyl cellulose (CMC) and one of the two capping agents: sodium citrate (SC) or polyethylene glycol (PEG). The prepared Au-NPs by SC (Au/CMC-SC) and PEG (Au/CMC-PG) were compared in morphology, crystallinity, chemistry via FESEM, SAED, FT-IR, XRD, UV–visible spectroscopy, and DLS. The different characterization tools prove the presence of the same chemistry as Au/CMC-NPs and change in the morphology and crystallinity. The morphology of Au/CMC-SC was found as particles in nano-size with a regular and spherical shape. Conversely, the morphology of Au/CMC-PG has irregular shapes. The same functional groups were found in both Au/CMC-SC and Au/CMC-PG which indicate the presence of the same chemical content in the prepared samples. Anticancer action of both prepared gold nanoparticles against liver hepatocellular cells (HepG2) has been investigated. The introduced AuNPs exhibited more significant anticancer action against HepG2 cells at 100 µg concentration of AuNPs. The inhibitory activity of Au/CMC-SC on Hep-G2 cancer cells is superior to that of Au/CMC-PG. The super anticancer activity of Au/CMC-SC is indicated by the extent of the convergence between the cell viability % values of Au/CMC-SC (18%) and the standard drug (9%) used for liver cancer at a dose of 100 µg. The present work provides a simple synthesis approach that will open up a novel probability of functionalized AuNPs for studies in biomedical applications (treatment of HepG2 cells).

Title	Bioengineering, characterization, and biological activities of C@Cu_2O@Cu nanocomposite based-mediated the Vicia faba seeds aqueous extract
Authors	Al-Hakkani, M.F., Hassan, S.H.A., Saddik, M.S., El-Mokhtar, M.A., Al-Shelkamy, S.A.
Journal	Journal of Materials Research and Technology, 14, pp. 1998-2016
Abstract	Vicia faba seeds are a rich source of polyphenolic, and flavonoid compounds that have high antioxidant activity. The aqueous extract of V. faba seeds has been used for the biosynthesis of a nanocomposite (NC) consisting of three different types of nanoparticles that are deposited onto each other as C@Cu2O@Cu. Physicochemical, optical, electrical, and morphological properties of the as-biofabricated C@Cu2O@Cu NC were characterized using different analytical techniques as X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FT-IR), Ultraviolet–visible spectroscopy (UV–Vis), Photoluminescence (PL), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray (EDX), Raman, Zeta-potential, and water/moisture content). Results confirmed that V. faba seeds aqueous extract mediated the fabrication of C@Cu2O@Cu NC at high and pure crystalline nature. The nano-formulation had a face center cubic crystallographic system at the nano-scale range using Debye–Scherrer's equation (13.8 nm) in XRD analysis and (20.9 ± 6.2 nm) using TEM analysis. The crystallinity index (1.6) with a large surface area and polycrystalline nature were being investigated. In addition, the biological activity of the synthesized NC was analyzed. C@Cu2O@Cu NC showed high anti-inflammatory activity compared with diclofenac potassium with IC50 = 213.3 μg/mL. Moreover, the nano-formulation had a potent antibacterial activity, particularly against Gram-negative bacteria. Cytotoxicity of the C@Cu2O@Cu NC against MCF7, HCT116, and HepG2 cell lines showed efficient cytotoxic impact with IC50 = 84.8, 116.1, and 120.5 μg/mL, respectively. So, the nanocomposite C@Cu2O@Cu may provide a promising platform for the effective treatment of different types of cancer.

Title	Correction to: Fungal biodegradation and removal of cyanobacteria and microcystins: potential applications and research needs (Environmental Science and Pollution Research, (2021), 28, 28, (37041-37050), 10.1007/s11356-021-14623-w)
Authors	Mohamed, Z.A., Hashem, M., Alamri, S., Campos, A., Vasconcelos, V.
Journal	Environmental Science and Pollution Research, 28(35), pp. 49324
Abstract	Harmful cyanobacterial blooms (HCB) have severe impacts on marine and freshwater systems worldwide. They cause oxygen depletion and produce potent cyanotoxins that have detrimental effects on human and environmental health and deteriorate the water quality. Biological treatment of the water for control of cyanobacterial blooms and removal of cyanotoxins can be a more economical and environment-friendly way, as they do not result in production of undesirable by-products. Most biological treatments of cyanobacteria and cyanotoxins have concentrated largely on bacteria, with little attention paid to algicidal fungi. Therefore, this review aims to provide an overview of the current status and the main progresses achieved in fungal biodegradation of HCB and cyanotoxin research. The available data revealed that 15 fungal species had high lytic activity against cyanobacteria, and 6 species were capable of degrading microcystins (MCs). Some fungal species (e.g., Aurobasidium pullulans and Trichoderma citrinoviride) have been identified to selectively inhibit the growth of cyanobacteria rather than beneficial species of other algal groups. Interestingly, some fungal strains (Trichaptum abietinum, Trichoderma citrinoviride) exhibited di-functional trait, being efficient in lysing cyanobacteria and degrading MCs released from the cells after decay. Beyond a comprehensive review of algicidal and toxin-degrading activities of fungi, this paper also identifies and prioritizes research gaps in algicidal fungi. The review also gives insights to the potential applications of algicidal fungi for removal of cyanobacterial blooms and their cyanotoxins from the aquatic environment. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Title	Novel polyesters based on indazole moiety: Synthesis, characterization and applicability as efficient inhibitors for acidic X-65-steel corrosion
Authors	Aly, K.I., Abd El-Lateef, H.M., Yehia, N., (...), Sayed, M.M., El-Remaily, M.A.E.A.A.A.
Journal	Reactive and Functional Polymers, 166,105001
Abstract	In this report, novel series of unsaturated polyesters Vad and VIad containing indazole moiety were successfully prepared via interfacial polycondensation technique of indazole derivatives III and IV with different aromatic and aliphatic acid chlorides; isophthaloyl, terephthaloyl, adipoyl, and sebacoyl chlorides. The prepared polyesters were categorized by elemental analyses, IR, 1H NMR, Mass spectra, GPC, Thermogravimetric (TGA), X-ray analyses (XRD), and therefore the morphology was examined by scanning microscopy (SEM). They showed high thermal stability and different morphology structure. The corrosion protection performance of prepared polyesters Vad and VIad on X65steel in molar oil of vitriol was assessed using potentiodynamic polarization (PDP), electrochemical impedance spectroscopy (EIS), and SEM. Electrochemical tests (EIS and PDP) displayed polymers could efficiently impede the X65steel corrosion and acted as inhibitors of the mixed type. At the optimal dose of 150 mg/L, the protection capacities of Va-d and VIa-d polymers ranged from 86.9% to 97.8%. adsorption of Vad and VIad followed the adsorption model of Langmuir isotherm. Surface morphology examination by SEM also revealed that Vad and VIad polymers form an efficient block layer on the surface of X65steel to separate the acidic solution.

Title	The impact of indium metal as a minor bimetal on the anodic dissolution and passivation performance of zinc for alkaline batteries. Part II: galvanostatic, impedance spectroscopy, and charge–discharge evaluations
Authors	Elrouby, M., Shilkamy, H.A.E.–S., Elsayed, A.E.-R.
Journal	Journal of Solid State Electrochemistry, 25(8-9), pp. 2175-2187
Abstract	The anodic dissolution and passivation processes of zinc and zinc-indium alloys were investigated in an alkaline solution of 6 M KOH using galvanostatic, electrochemical impedance, and charge–discharge measurements. Galvanostatic measurements exhibit anodic potential/time transient of the zinc anode and its alloys in the concentrated alkaline solution at different current densities. The data reveal that the passivation time (tpass.) diminishes with increasing the content of indium in the alloy under investigation. This means that the alloying of minor indium with zinc retards its dissolution at the active region. The high oscillations in potential, which are observed in the case of zinc, disappeared with the addition of a minor indium content to zinc (Zn-In alloy). The data acquired from impedance (EIS) exhibited that the values of polarization resistance (Rp) and Warburg impedance increase, while the double-layer capacitance (Cdl) diminishes with increasing a minor indium content at both two investigated potentials (−500 and + 500 mV vs. SCE). It is interesting to show that the inductive loop for alloys I and II at −500 mV is observed at intermediate frequencies, in addition to the capacitive loop and Warburg tail. The results of charge–discharge measurements show that the average charge–discharge separation voltages of alloys I and II are 0.8 and 0.9 V, respectively, which are higher than that of pure zinc (0.7 V) at constant time. This indicates that indium alloying with zinc leads to improvement in both energy and charge efficiency.

Title	The impact of indium metal as a minor bimetal on the anodic dissolution and passivation performance of zinc for alkaline batteries: part I—potentiodynamic, potentiostatic, XRD, SEM, and EDAX studies
Authors	Elsayed, A.E.-R., Shilkamy, H.A.E.-S., Elrouby, M.
Journal	Journal of Solid State Electrochemistry, 25(8-9), pp. 2161-2174
Abstract	Zinc metal is an important element that can be used for long-life alkaline batteries. In this work, it is found that the addition of minor amounts of indium can slow down the corrosion rate and maintain the sacrificial protection of Zn in the alkaline media of batteries. The performance of anodic dissolution and passivation for Zn and Zn-In bimetal in the alkaline solution of 6 M KOH was investigated via potentiodynamic and potentiostatic methods. Furthermore, the surface morphology of the corroded and passive layers of Zn and its alloys were examined utilizing X-ray diffraction (XRD), scanning electron microscope (SEM), and X-ray spectroscopy analysis (EDAX). Potentiodynamic curves show the active–passive transition for all investigated electrodes. The active dissolution and passive currents are gradually decreased as an increase of indium addition to Zn. This explains that the formed film on the surface of alloy becomes better protective than that formed on the surface of zinc. The values of activation energy (Ea) for both active and passive regions increased with the increase of the content of indium, and consequently, the smallest dissolution rate was detected at 1% In. The data obtained from the potentiostatic measurements confirm the results which are obtained from the potentiodynamic ones, where the mixing of indium to Zn diminishes the current density of both active and passive regions. XRD, SEM, and EDX analysis exhibited that the corrosion products on the surface of pure zinc are Zn(OH)2 and ZnO. While ZnO as well as In2O3 are formed on the alloyed zinc surface.

Title	Properties of pure neutron matter at low and high densities
Authors	Gad, K.
Journal	Pramana - Journal of Physics, 95(3),108
Abstract	We report a new microscopic equation of state (EoS) of pure neutron matter (PNM) at zero temperature using the recent realistic two-body interaction derived in the framework of chiral perturbation theory (ChPT). The EoS is derived using the Brueckner–Bethe–Goldstone quantum many-body theory in the Brueckner–Hartree–Fock approach. We have calculated the EoS of PNM at low and high densities using LO, NLO, N2LO, N3LO, N4LO potentials at three different values of the momentum-space cut-off Λ = 450, 500 and 550 MeV. It is found that the EoS is not much affected by the cut-off variations at low densities. Also the binding energy of PNM has been computed within the framework of the Brueckner–Hartree–Fock (BHF) approach plus two-body density-dependent Skyrme potential which is equivalent to three-body forces. The effect of the two-body density-dependent Skyrme potential is to produce a stiffer EoS. This is actually needed to improve the saturation point of symmetric nuclear matter obtained using the two-body NN interaction. The results of several microscopic approaches are compared. It is found that the EoS is sensitive to the momentum-space cut-off Λ. Also the partial wave contributions to potential energy at the empirical saturation density ρ= 0.16 fm- 3 for different potentials are listed from 1S to 3F3 states. It is found that all contributions are nearly cut-off independent except the ones from 3P1, 3P2,3H4 and 3F4 states, which are increasing with the cut-off Λ. Actually, the size of these contributions is strongly dependent on the central and tensor components in the NN potential. The larger cut-off Λ corresponds to harder interactions and gives more repulsive contribution to the NN potential at short distance. It leads to smaller binding energy.

Title	Synthesis, spectral characterization, DFT calculations, pharmacological studies, CT-DNA binding and molecular docking of potential N, O-multidentate chelating ligand and its VO(II), Zn(II) and ZrO(II) chelates
Authors	Abdel-Rahman, L.H., Al–Farhan, B.S., Al Zamil, N.O., (...), El-Sayed Ahmed, H., Adam, M.S.S.
Journal	Bioorganic Chemistry, 114,105106
Abstract	The pharmacological efficacy of the variety tetradentate ligands encouraged us to design attractive compounds through effective synthetic procedure. The prepared Schiff base ligand 6,6′-((1E,1′E)-((4-chloro-1,2-phenylene)bis(azaneylylidene))bis(methaneylylidene))bis(2-ethoxy phenol (H2L), which derived from 4-chloro-o-phenylenediamine and 3-ethoxy-salicylaldehyde and its VO(II), Zn(II) and ZrO(II) metal chelates, have been synthesized and characterized with aim of that it may struggle the invasion of drug resistance. The chemical structural of studied compounds were discussed by TGA, elemental analysis, UV–Vis., 1H NMR, 13C NMR, FTIR, mass spectral, PXRD, molar conductance, magnetic susceptibility measurements and density functional theory. The results assigned square pyramid geometries for [VOL] and [ZrOL].2H2O chelates and an octahedral geometry for [ZnL(H2O)2].2H2O chelate. Powder XRD data showed that the complexes are monoclinic with polycrystalline nature. The results of CT-DNA interaction with the titled chelates showed that the binding between CT-DNA and the metal complexes occurs through intercalation mode. Their CT-DNA binding efficiency estimated in terms of their binding constants (Kb), which gave the order: VOL (6.9 × 105) > ZrOL (6.3 × 105) > ZnL(H2O)2 (5.5 × 105). The antimicrobial activities of the synthesized compounds were tested against selected fungal and bacterial strains using well diffusion technique. The obtained chelates showed higher antifungal and antibacterial activities than their corresponding ligand. Furthermore, the M−complexes showed higher potent cytotoxic effect toward HEK-293, human colorectal HepG-2, HCT-116 and MCF-7 adenocarcinoma cell lines compared to the free H2L ligand. Investigation of antioxidant property represented that all the prepared complexes have better radical scavenging potencies against DPPH radicals than the free H2L ligand. To study the molecular docking of proposed compounds versus Tyrosine kinases receptor (TKR), we used AutoDock1.5.6rc3® suite. The current compounds (H2L, VOL, ZrOL and ZnL(H2O)2) and STI were found to bind with C-kit of TKR with HBs at ILE789.A, ILE808.A, ASP810.A, GLU640.A and TYR846 amino acid residue and the binding energies were − 8.9, −8.93, −8.83, −1.48 and −10.39 kcal/mol respectively.

Title	Synthesis and study of poly[(hydrazinylazo)]thiazoles as potent corrosion inhibitors for cast iron-carbon alloy in molar HCl: A collective computational and experiential methods
Authors	Abd El-Lateef, H.M., Sayed, A.R., Gomha, S.M., Bakir, E.M., Shalabi, K.
Journal	Journal of Molecular Liquids, 337,116555
Abstract	Herein, two poly[(hydrazinylazo)]thiazoles derivatives named, Poly[2-(2-(4-methylthiazol-2-yl)hydrazinyl)-4-methyl-5-((4-((4-(diazenyl)phenyl)sulfonyl)phenyl)diazenyl)thiazole] (TZP-1) and Poly[2-(2-(4-methylthiazol-2-yl)hydrazinyl)-4-methyl-5-((3-(diazenyl)phenyl)diazenyl)thiazole] (TZP-2) were regulated good yields by treatment of N-(4-((4-(2-(1-chloro-2-oxo propylidene)-hydrazinyl)phenyl)-sulfonyl)-phenyl)-2-oxopropane hydrazonoyl chloride or 1,3-phenylene bis-(2-oxopropane hydrazonoyl chloride) with hydrazine-1,2-bis-(carbothioamide). The configurations of the polymers are categorized by FT-IR and 1H NMR spectra. The effect of two synthesized poly[(hydrazinylazo)]thiazoles derivatives on the corrosion protection of cast iron-carbon alloy in acid chloride solution was examined using AC impedance spectroscopy, and potentiodynamic polarization (PPD) methods. The polarization resistance increased, and the corrosion current density declined with increasing polymer dose. TZP-2 revealed the maximum protection capacity PPDP/%= 97.8% at 50 mg/L. PPD studies exhibited that the performance of the titled polymer as mixed-type inhibitors and competitive chemically and physically adsorbed on alloy interface following the adsorption model of Langmuir. The morphological change of alloy surface was categorized by scanning electron microscopy (SEM). The adsorption energies of investigated poly[(hydrazinylazo)]thiazoles on iron(1 1 0) interfaces were computed by Monte Carlo (MC) simulations. The relation among specific quantum parameters and the protection capacity has been interpreted and recognizable correlations were detected.

Title	A novel approach to investigate the synergistic inhibition effect of nickel phosphate nanoparticles with quaternary ammonium surfactant on the Q235-mild steel corrosion: Surface morphology, electrochemical-computational modeling outlines
Authors	Alnajjar, A.O., Abd El-Lateef, H.M.
Journal	Journal of Molecular Liquids, 337,116125
Abstract	Novel quaternary ammonium Surfactant, namely, N,N-dimethyl-N-(3-((2-nitrophenyl)sulfonamido)propyl)dodecan-1-aminium iodide (QAS-12) has been prepared and characterized. The inhibition performance of the individual QAS-12 surfactant and blended with nickel phosphate nanoparticles (NiPNPs) in 15% HCl on the Q235-mild steel was investigated by means of EOCP-t profiles potentiodynamic, LPR corrosion rate and EIS measurements. The findings display that the corrosion rate of Q235-mild steel is considerably decreased with rise in the surfactant dose where the protection power of QAS-12 extents a maximum value of 93.1% at 0.5 mM. Synergistic protection effect was detected between the cationic QAS-12 and the NiPNPs additives, with the maximum protection capacity as high as ~98.6%. The adsorption behavior obeyed the Langmuir isotherm model with competitive of physical and chemical adsorption between the surfactant and metal. The individual surfactant and mixed with NiPNPs performed as mixed type inhibitors. Surface morphology analysis using XPS, SEM/EDX, and UV–vis absorption studies verified the high efficiency of the cationic surfactant on the inhibition of Q235-mild steel in 15% HCl solution, and the synergistic effect on corrosion protection among the QAS-12 and the NiPNPs was confirmed. Correlation of Computational Modeling with empirical findings of the current work is discussed based on the DFT calculations and MC simulation. The proposed mechanism for the synergism resulting from both addition of the cationic surfactant and NiPNPs was also discussed according to the obtained outcomes.

Title	Analytical solutions of the temperature increment in skin tissues caused by moving heating sources
Authors	Hobiny, A.D., Abbas, I.A.
Journal	Steel and Composite Structures, 40(4), pp. 511-516
Abstract	In this paper, mathematical bioheat transfer model in skin tissues in the bounded domain due to moving heat source are considered. The thermal damage to the tissues is totally evaluated by the denatured protein ranges by the Arrhenius formulation. The temporal complete solutions in Laplace time domain obtained by using the inversion scheme of the Laplace transform, to obtain the general solution (exact solution) for the increment of temperature. The numerical result of temperature and the thermal injurie are graphically demonstrated. In conclusions, parametric analysis are devoted to the identifications of appropriates procedures for choosing serious designs variables to reach the effectives thermal in hyperthermias treatments.

Title	Development of New Thiazole Complexes as Powerful Catalysts for Synthesis of Pyrazole-4-Carbonitrile Derivatives under Ultrasonic Irradiation Condition Supported by DFT Studies
Authors	Ali El-Remaily, M.A.E.A.A., El-Dabea, T., Alsawat, M., (...), El-Metwaly, N., Abu-Dief, A.M.
Journal	ACS Omega, 6(32), pp. 21071-21086
Abstract	In this study, we are interested in preparing Fe(III), Pd(II), and Cu(II) complexes from new thiazole derivatives. All syntheses were elaborately elucidated to estimate their molecular and structural formulae, which agreed with those of mononuclear complexes. The square-planer geometry of Pd(II) complex (MATYPd) was the starting point for its use as a heterocatalyst in preparing pyrazole-4-carbonitrile derivatives 4a-o using ultrasonic irradiation through a facile one-pot reaction. The simple operation, short-time reaction (20 min), and high efficiency (97%) were the special advantages of this protocol. Furthermore, this green synthesis strategy was advanced by examination of the reusability of the catalyst in four consecutive cycles without significant loss of catalytic activity. The new synthesis strategy presented remarkable advantages in terms of safety, simplicity, stability, mild conditions, short reaction time, excellent yields, and use of a H2O solvent. This catalytic protocol was confirmed by the density functional theory (DFT) study, which reflected the specific characteristics of such a complex. Logical mechanisms have been suggested for the successfully exerted essential physical parameters that confirmed the superiority of the Pd(II) complex in the catalytic role. Optical band gap, electrophilicity, and electronegativity features, which are essential parameters for the catalytic behavior of the Pd(II) complex, are based mainly on the unsaturated valence shell of Pd(II).

Title	A synergetic effect of cerium oxide nanocubes and gold nanoparticles for developing a new photoelectrochemical sensor of codeine drug
Authors	Khairy, M.
Journal	Journal of Electroanalytical Chemistry, 895,115517
Abstract	A new photoelectrochemical sensor for codeine (COD) drug based on cerium oxide nanocubes (NCs) and gold nanoparticles (NPs) composite modified screen-printed electrode (SPE) is developed for the first time. Codeine belongs to the opiates drug family naturally found in the poppy plant, has intensive effects on the central nervous system. Although CeO2 NCs showed a photoelectrochemical signal, the combination with Au NPs significantly improves the sensitivity four times and selectivity toward COD. Further, the synergetic combination of CeO2 NCs/Au NPs allows the generation of photocurrent extended to the visible light region because it sensitizes charge carrier generation. The CeO2 NCs/Au NPs -SPE offers a promising, robust, and chemically stable non-enzymatic photoelectrochemical sensor for COD determination within a linear detection range up to 200 μM and a lower detection limit (LOD) (3S/N) of 0.02 μM. The proposed PECS showed high stability and good reproducibility which extend the applicability to generate a new monitoring system for in-set drug analysis.

Title	Dielectric, magnetic and structural properties of Co-doped hexaferrite synthesized by microwave digestion system
Authors	Abdel Hakeem, A.M., Ibrahim, E.M.M., Ali, H.M., (...), Hamazaoui, A., Ahmed, M.R.
Journal	Journal of Alloys and Compounds, 872,159669
Abstract	Co substitution in hexaferrites Sr1−xCoxFe12O19 compounds with doping values x = 0.0, 0.075, 0.15, 0.225 and 0.30 were prepared using microwave digestion system. Structural, morphological, magnetic and dialectic properties were investigated. X-ray diffraction pattern proved a hexagonal phase (SrFe12O19) existing as a main phase for all samples. The lattice parameters, crystallites size and other parameters such as microstrain and direct cell volume and dislocation density were calculated from the Rietveld refinement of the X-ray results. The SEM and TEM results confirmed a hexagonal structure existing. The histogram of the particle size distribution showed variation of the grain size with nano range between 90 nm and 178 nm. Magnetic results showed that the magnetization (M), saturation magnetization (Ms), and remnant magnetization (Mr) increased with increasing of Co substitution while the coercive magnetic field, Hc, fluctuated with increase of Co substitution because of the irregular change of the grain size of the samples. The sample x = 0.15 has a low coercive field because of the uniformity of the crystal grains. Such magnetic properties recommend this sample to be used in magnetic applications. The dielectric study of these samples revealed that the AC conductivity, σ, increases with increasing the frequency while impedance (Z), dielectric constant (ε), dielectric loss, and tan δ decrease exponentially with F(Hz). The dissipation factor was found to have a convert frequency point at low F(Hz) after its starting to decrease slowly to the end of F-range. These dielectric properties suggest the validity of these hexaferrites compounds to be used as a capacitor.

Title	Thermoelectric power properties of Ge doped PbTe alloys
Authors	Adam, A.M., Ibrahim, E.M.M., Panbude, A., (...), Veluswamy, P., Diab, A.K.
Journal	Journal of Alloys and Compounds, 872,159630
Abstract	In this work, stoichiometric Pb1−xGexTe (x = 0.0, 0.03, 0.06, 0.09, 0.12) crystalline alloys were synthesized using the monotonical temperature melting technique. The synthesized alloys were examined using x-ray diffraction and scanning electron microscope. It was revealed that the crystal structure in all samples is a cubic phase of PbTe. In terms of Seebeck coefficient and electrical conductivity, thermoelectric measurements were carried out in the temperature range of 83–373 K. The Seebeck coefficient of the compounds showed a positive sign, which refers to p-type conduction. The thermoelectric power factor (PF) was studied as a function of temperature, with different amounts of Ge content (x). The highest PF was recorded for the highly Ge-doped samples at higher temperatures (373 K). The maximum PF was observed at 3.2 × 102 μW/m K2 for the sample with x = 0.09, which is quite high for the studied compounds. The electronic part of thermal conductivity was calculated using the Wiedemann-Franz law. A noticeable reduction of this thermal conductivity was detected due to stronger point defect scattering introduced by Ge doping. The reduction in the electronic thermal conductivity can led to a considerable enhancement in the thermoelectric figure of merit.

Title	Applications to boundary value problems and homotopy theory via tripled fixed point techniques in partially metric spaces
Authors	Hammad, H.A., Agarwal, P., Guirao, J.L.G.
Journal	Mathematics, 9(16),2012
Abstract	In this manuscript, some tripled fixed point results were derived under (ϕ, ρ, ℓ)-contraction in the framework of ordered partially metric spaces. Moreover, we furnish an example which supports our theorem. Furthermore, some results about a homotopy results are obtained. Finally, theoretical results are involved in some applications, such as finding the unique solution to the boundary value problems and homotopy theory.

Title	Removal of a past varnish treatment from a 19th-century belgian wall painting by means of a solvent-loaded double network hydrogel
Authors	Al-Emam, E., Beltran, V., De Meyer, S., (...), Caen, J., Janssens, K.
Journal	Polymers, 13(16),2651
Abstract	Polymeric materials have been used by painting conservator-restorers as consolidants and/or varnishes for wall paintings. The application of these materials is carried out when con-fronting loose paint layers or as a protective coating. However, these materials deteriorate and cause physiochemical alterations to the treated surface. In the past, the monumental neo-gothic wall painting 'The Last Judgment' in the chapel of Sint-Jan Berchmanscollege in Antwerp, Belgium was treated with a synthetic polymeric material. This varnish deteriorated significantly and turned brown, obscuring the paint layers. Given also that the varnish was applied to some parts of the wall painting and did not cover the entire surface, it was necessary to remove it in order to restore the original appearance of the wall painting. Previous attempts carried out by conservator-restorers made use of traditional cleaning methods, which led to damage of the fragile paint layers. Therefore, gel cleaning was proposed as a less invasive and more controllable method for gently softening and removing the varnish. The work started by identifying the paint stratigraphy and the deteriorated varnish via optical microscopy (OM), scanning electron microscopy coupled with energy-dispersive X-ray spectroscopy (SEM-EDX), X-ray diffraction (XRD), and Fourier-transform infrared (FTIR) spectroscopy. A polyvinyl alcohol–borax/agarose (PVA–B/AG) hydrogel loaded with a number of solvents/solvent mixtures was employed in a series of tests to select the most suitable hydrogel composite. By means of the hydrogel composite loaded with 10% propylene carbonate, it was possible to safely remove the brown varnish layer. The results were verified by visual examinations (under visible light 'VIS' and ultraviolet light 'UV') as well as OM and FTIR spectroscopy.

Title	Enhanced conductivity and antibacterial behavior of cotton via the electroless deposition of silver
Authors	Liu, C., Liao, D., Ma, F., (...), Liu, J., Mohamed, I.M.A.
Journal	Molecules, 26(16),4731
Abstract	In this study, the surface-initiated atom transfer radical polymerization (SI-ATRP) technique and electroless deposition of silver (Ag) were used to prepare a novel multi-functional cotton (Cotton-Ag), possessing both conductive and antibacterial behaviors. It was found that the optimal electroless deposition time was 20 min for a weight gain of 40.4%. The physical and chemical properties of Cotton-Ag were investigated. It was found that Cotton-Ag was conductive and showed much lower electrical resistance, compared to the pristine cotton. The antibacterial properties of Cotton-Ag were also explored, and high antibacterial activity against both Escherichia coli and Staphylococcus aureus was observed.

Title	Design, synthesis, biological evaluation, and computational studies of novel tri-aryl imidazole-benzene sulfonamide hybrids as promising selective carbonic anhydrase IX and XII inhibitors
Authors	Al-Wahaibi, L.H., Youssif, B.G.M., Taher, E.S., (...), Abdelhamid, A.A., Marzouk, A.A.
Journal	Molecules, 26(16),4718
Abstract	A novel series of tri-aryl imidazole derivatives 5a–n carrying benzene sulfonamide moiety has been designed for their selective inhibitory against hCA IX and XII activity. Six compounds were found to be potent and selective CA IX inhibitors with the order of 5g > 5b > 5d > 5e > 5g > 5n (Ki = 0.3–1.3 µM, and selectivity ratio for hCA IX over hCA XII = 5–12) relative to acetazolamide (Ki = 0.03 µM, and selectivity ratio for hCA IX over hCA XII = 0.20). The previous sixth inhibitors have been further investigated for their anti-proliferative activity against four different cancer cell lines using MTT assay. Compounds 5g and 5b demonstrated higher antiproliferative activity than other tested compounds (with GI50 = 2.3 and 2.8 M, respectively) in comparison to doxorubicin (GI50 = 1.1 M). Docking studies of these two compounds adopted orientation and binding interactions with a higher liability to enter the active side pocket CA-IX selectively similar to that of ligand 9FK. Molecular modelling simulation showed good agreement with the acquired biological evaluation.

Title	Synthesis, dft calculations, antiproliferative, bactericidal activity and molecular docking of novel mixed-ligand salen/8-hydroxyquinoline metal complexes
Authors	Al-Farhan, B.S., Basha, M.T., Abdel Rahman, L.H., (...), Shehata, M.R., Abdalla, E.M.
Journal	Molecules, 26(16),4725
Abstract	Despite the common use of salens and hydroxyquinolines as therapeutic and bioactive agents, their metal complexes are still under development. Here, we report the synthesis of novel mixed-ligand metal complexes (MSQ) comprising salen (S), derived from (2,2′-{1,2-ethanediylbis [nitrilo(E) methylylidene]}diphenol, and 8-hydroxyquinoline (Q) with Co(II), Ni(II), Cd(II), Al(III), and La(III). The structures and properties of these MSQ metal complexes were investigated using molar conductivity, melting point, FTIR,1H NMR,13C NMR, UV–VIS, mass spectra, and thermal analysis. Quantum calculation, analytical, and experimental measurements seem to suggest the proposed structure of the compounds and its uncommon monobasic tridentate binding mode of salen via phenolic oxygen, azomethine group, and the NH group. The general molecular formula of MSQ metal complexes is [M(S)(Q)(H2O)] for M (II) = Co, Ni, and Cd or [M(S)(Q)(Cl)] and [M(S)(Q)(H2O)]Cl for M(III) = La and Al, respectively. Importantly, all prepared metal complexes were evaluated for their antimicrobial and anticancer activities. The metal complexes exhibited high cytotoxic potency against human breast cancer (MDA-MB231) and liver cancer (Hep-G2) cell lines. Among all MSQ metal complexes, CoSQ and LaSQ produced IC50 values (1.49 and 1.95 µM, respectively) that were comparable to that of cisplatin (1.55 µM) against Hep-G2 cells, whereas CdSQ and LaSQ had best potency against MDA-MB231 with IC50 values of 1.95 and 1.43 µM, respectively. Furthermore, the metal complexes exhibited significant antimicrobial activities against a wide spectrum of both Gram-positive and-negative bacterial and fungal strains. The antibacterial and antifungal efficacies for the MSQ metal complexes, the free S and Q ligands, and the standard drugs gentamycin and ketoconazole decreased in the order AlSQ > LaSQ > CdSQ > gentamycin > NiSQ > CoSQ > Q > S for antibacterial activity, and for antifungal activity followed the trend of LaSQ > AlSQ > CdSQ > ketoconazole > NiSQ > CoSQ > Q > S. Molecular docking studies were performed to investigate the binding of the synthesized compounds with breast cancer oxidoreductase (PDB ID: 3HB5). According to the data obtained, the most probable coordination geometry is octahedral for all the metal complexes. The molecular and electronic structures of the metal complexes were optimized theoretically, and their quantum chemical parameters were calculated. PXRD results for the Cd(II) and La(III) metal complexes indicated that they were crystalline in nature.

Title	New Cu(II) and VO(II)-O,N,O-aroylhydrazone complexes: Biological evaluation, catalytic performance, ctDNA interaction, DFT, pharmacophore, and docking simulation
Authors	Adam, M.S.S., Shaaban, S., Khalifa, M.E., Alhasani, M., El-Metwaly, N.
Journal	Journal of Molecular Liquids, 335,116554
Abstract	Polar mononuclear Cu(II) (CuSSL·H2O) and VO(II) (VOSSL·0.5H2O) complexes were prepared employing 4-hydroxy-3-((2-(4-methoxybenzoyl)hydrazineylidene)methyl)benzene sodium sulfonate ligand (H2SSL) under green conditions. The ligand and its complexes were characterized by various spectroscopic (1H & 13C NMR, IR, UV–Visible, and Mass) and analytical tools (elemental analysis (EA), thermogravimetric analysis (TGA), conductivity, and magnetic moments). The ionic sodium sulfonate group enhanced the catalytic potential of the two complexes, as green catalysts, in the epoxidation of 1,2-cyclohexene using H2O2 under homogeneous reaction conditions. Interestingly, complete epoxidation (100% conversion) of 1,2-cyclohexene was observed using water as an environmentally friendly solvent. The high valent ion (V4+) in the VO(II)-catalyst offered better catalytic efficiency than that of the low valent ion (Cu2+) in the Cu(II) catalyst. The new compounds' biological activity was assessed using different microbes (Staphylococcus aureus, Serratia Marcescence, Escherichia coli, Candida albicans, Aspergillus flavus, and Trichophyton rubrum), as well as various cancer cell lines (HepG2, MCF-7, and HCT-116). Additionally, their antioxidant potential was also examined by DPPH radical scavenging and SOD assays. Moreover, the activity of the new reagents was assessed towards ctDNA-interaction by spectrophotometry and viscosity measurements. Both M(II)-complexes offered higher antimicrobial, anticancer, and antioxidant potential compared to that of their free ligand. Conformational and in-silico studies were carried out to support the newly synthesized complexes' catalytic and biological properties.

Title	Optical properties upon ZnS film thickness in ZnS/ITO/glass multilayer films by ellipsometric and spectrophotometric investigations for solar cell and optoelectronic applications
Authors	Alzaid, M., Mohamed, W.S., El-Hagary, M., Shaaban, E.R., Hadia, N.M.A.
Journal	Optical Materials, 118,111228
Abstract	ZnS film with various thicknesses (d ≈ 100–350 nm) deposited on the ITO coated glass substrate (ZnS/ITO/glass) by an electron beam evaporation process was examined structurally and optically. Different techniques were used to specify and analyze the optical characteristics of the film, such as spectroscopic ellipsometric (SE) and spectrophotometric (SP). The ZnS/ITO/glass films exhibit a wurtzite hexagonal type structure entrenched in the crystalline background of ITO film. XRD analysis revealed changes in structural and microstructural parameters, such as a decrease in lattice parameters, a reduction in microstrain, and a raise in crystallite size. The optical constants and the optical energy gap were extracted from SE by constructing an ellipsometric optical model, while the optical constants were calculated from SP by using Murmann's exact equations. It was seen that the overall behaviour of the refractive index n of the ZnS/ITO/glass films obtained from SE and SP increases with an increase in ZnS layer thickness, which is attributed to the increment of the size of the grain. It was additionally found that, the overall behaviour of the extinction coefficient k of the ZnS/ITO/glass films increases, when the thickness of the ZnS layer increments. Also, the direct optical transition was observed with energy band gap diminishes from 3.423 (d = 100 nm) eV to 3.287 eV (d = 350 nm) that is because of the rise in grain size, the decrease in microstrain, and reduction in lattice constants. Furthermore, it was found that the deposition of ZnS on ITO coated glass substrate increases the absorption compared with the ZnS/glass film and then reduces the transmittance and energy band gap. It was concluded that as the ZnS thickness increases, the optical constants of ZnS/ITO/glass films enhance. Finally, the overall behaviour of the optical constants within the experimental error range of the ZnS/ITO/glass films with different ZnS layer thicknesses obtained by SE was found to be consistent with that calculated from SP measurement.

Title	Optoelectronic Properties and Surface Plasmon Polaritons of CdO/Ag/CdO Multilayer Films Deposited by DC Pulsed Magnetron Sputtering
Authors	El-Kassem, M.A., El-Hossary, F.M., Raaif, M., (...), Thabet, A., El-Moula, A.A.A.
Journal	Journal of Electronic Materials, 50(8), pp. 4933-4944
Abstract	The optoelectronic characteristics and surface plasmon polaritons (SPPs) of nanostructured CdO/Ag/CdO multilayer films prepared by DC pulsed magnetron sputtering were inspected. The multilayer films were deposited with different Ag metallic interlayer thickness ranging from 2 nm to 20 nm. It was observed that the CdO single-layer has high transmittance and it decreased from 85% to 70% in the visible range as the Ag metallic interlayer thickness increased from 2 nm to 20 nm. The CdO/Ag (20nm)/CdO multilayer film has the lowest transmittance and highest reflection in the NIR. The mobility, charge carrier concentration and the conductivity increased as the Ag metallic interlayer increased. The energy gap decreased from 2.77 eV for CdO single-layer to 2.44 eV for CdO/Ag (20nm)/CdO multilayer film. The CdO/Ag (16nm)/CdO multilayer film recorded the highest figure of merit value of 2.45 × 10-3 Ω-1, which acts as an electrode in optoelectronic applications. The absorption of light was interpreted by the creation of surface plasmon polaritons (SPPs) modes along Ag/CdO interface. It was found that the CdO/Ag/CdO multilayer films could be employed as SPPs nano-waveguide for telecommunication applications at excitation wavelengths of 775 nm and 1550 nm.

Title	Iron biodistribution profile changes in the rat spleen after administration of high-fat diet or iron supplementation and the role of curcumin
Authors	Awaad, A., Abdel Aziz, H.O.
Journal	Journal of Molecular Histology, 52(4), pp. 751-766
Abstract	Curcumin as active metal chelating and antioxidant agent has a potential role in metal reduction and free radicals' neutralization in tissues. Of note, long-term administration of high fat diet (HFD) is considered as a main factor of blood serum iron deficiency. This study aimed to investigate the biodistribution profiles of iron in the spleen after long-term administration of HFD along with iron supplementation. Furthermore, the ameliorative role of curcumin to reduce iron accumulation level and improve the histological abnormalities produced by iron in spleen will be evaluated in the rats. Treated albino rats of this experiment were divided into six groups. Group I was a control group where group II was treated with HFD. Group III and group IV were treated with combination of HFD and curcumin or HFD and iron supplement respectively. Additionally, group V and group VI were treated with combination of HFD, iron supplement and curcumin or curcumin only respectively. Mainly histological analysis was used to investigate iron biodistribution and induced abnormalities in spleen under light microscope. The histochemical specific staining of iron in the spleen showed different biodistribution profiles of iron in the spleen. Administration of the HFD or HFD and iron supplementation increased the iron accumulation in the spleen. Where, curcumin administration with HFD (Group III) or with HFD and iron supplementation (Group V) significantly reduced the iron levels in the spleen. The splenic tissue inflammation, cellular apoptosis and fibrosis produced by higher iron accumulation was ameliorated after administration of curcumin supplementation as shown in the animals treated with HFD/curcumin (Group III) or HFD/iron supplement/curcumin (Group V). This study recommended that, it is preferable to use iron supplementation along with curcumin supplement for less than 4 months to avoid additional iron accumulation in the healthy organs.

Title	Structural and electronic characteristics of Fe-doped β-Ga_2O_3 single crystals and the annealing effects
Authors	Zhang, N., Liu, H., Sai, Q., (...), Feng, Z.C., Mohamed, H.F.
Journal	Journal of Materials Science, 56(23), pp. 13178-13189
Abstract	Abstract: As capture traps, Fe impurities were intentionally incorporated into beta-gallium oxide (β-Ga2O3) crystals to compensate for unintentional n-type conductivity for applications of semi-insulated single-crystal substrates with high-performances. The systematic investigations are performed to comprehend the influence of the Fe addition on the structural, optical, electronic properties of the β-Ga2O3 crystal, and the annealing effect by using a combination of multi-disciplinary techniques. The Fe-doped β-Ga2O3 crystal exhibits a good single-crystal phase and a high optical transmittance from 400 nm to 2000 nm from the measurements of high-resolution X-ray diffraction and optical transmission spectroscopies. Raman scattering spectra revealed that the high-frequency phonon modes which belong to the stretching and bending of tetrahedron were significantly inhibited by the Fe addition to the β-Ga2O3 crystal. EPR results discovered that the presence of Fe3+ ions preferentially in the octahedral over the tetrahedral sites of the monoclinic structure. After an annealing treatment, the crystalline quality was improved and the oxygen vacancies were reduced. The absorption edge redshifted and the transmittance decreased slightly. In particular, it was discovered that the position of the Fermi level is deviated towards the valence band and the total number of spins of Fe3+ ions was halved from 5.32 × 1014 to 2.86 × 1014 spins/mm3. The annealing treatment not only improved the crystal quality, but also activated irons trap centers and further decreased the conductivity. Graphical Abstract: [Figure not available: see fulltext.]

Title	Higher order Hamiltonian approach for solving doubly clamped beam type N/MEMS subjected to the van der Waals attraction
Authors	Ismail, G.M., Cveticanin, L.
Journal	Chinese Journal of Physics, 72, pp. 69-77
Abstract	In this paper, Hamiltonian approach for solving vibration in the first approximation is extended into a high order Hamiltonian approach method for n order approximation. The method is applied for computation of the frequency of doubly clamped beam type N/MEMS subjected to the van der Waals attraction and the Duffing oscillator with seventh order nonlinearity. The obtained results are compared with numerically and other analytically obtained results. It is concluded that the solution in the third approximation gives the most appropriate solution in comparison to other analytical methods. The time history diagrams and the phase plane diagrams calculated analytically are on the top of the curves obtained numerically.

Title	Influence of transition metals dopant type on the structural, optical, magnetic, and dielectric properties of ZnS nanoparticles prepared by ultrasonication process
Authors	Othman, A.A., Osman, M.A., Ali, M.A., Ibrahim, E.M.M.
Journal	Materials Science and Engineering B: Solid-State Materials for Advanced Technology, 270,115195
Abstract	Undoped and (Ni, Co, and Mn)-doped ZnS nanoparticles (NPs) are successfully synthesized by a sonochemical-assisted co-precipitation technique. XRD patterns reveals the incorporation of dopant ions by substitution of Zn ions. Ni ions induce growth rate enhancement and the increase of crystallite size, whereas Co and Mn ions slow down the growth rate and caused the decrease of the corresponding crystallite size. The UV–visible absorption spectra exhibit a decrease in the optical band gap for all doped samples. The photoluminescence spectra of Co- and Mn-doped ZnS NPs show an improvement in the visible-light, whereas Ni-doping results in a slight decrease in the emission intensity allover spectral range. The room-temperature ferromagnetism of ZnS NPs is strongly improved by Ni- and Co-doping and slightly enhanced by Mn-doping. The AC conductivity of ZnS NPS is enhanced by Ni- and Co-doping and decreased by Mn-doping in the frequency range from 2 kHz to 1 MHz.

Title	Novel marine yeast strains as plant growth-promoting agents improve defense in wheat (Triticum aestivum) against Fusarium oxysporum
Authors	Abdel-Kareem, M.M., Zohri, A.-N.A., Nasr, S.A.E.M.E.
Journal	Journal of Plant Diseases and Protection, 128(4), pp. 973-988
Abstract	Yeasts are multilateral opportunistic plant symbionts that can cause intrinsic changes in the metabolism of host plants, thereby increasing plant growth and activating plant defense against various diseases. Although yeasts isolated from soil and plants have been evaluated as biological control agents, the search for new antagonists continues. Marine yeasts can be an option for the selection of new plant promoters and antagonistic agents. The objective of the present study was selected to demonstrate the potential of two marine yeast strains isolated from Red Sea water to award beneficial agronomic quality to promote wheat growth and induce defense mechanism against Fusarium oxysporum and its ability to produce zearalenone. These yeast strains were identified based on the genotypic identification as Candida orthopsilosis and Rhodotorula mucilaginosa, and their sequences were deposited in the GenBank database under the accession number MN784461 and MN784463, respectively. The results of in vitro assay showed great inhibition on mycelial growth and zearalenone production level. Also, wheat seeds primed with the two yeast strains in the presence and absence of Fusarium displayed early seedling emergence and enhanced growth compared with wheat treated by Fusarium only and untreated wheat (control). Also, under greenhouse conditions, C. orthopsilosis and R. mucilaginosa revealed remarkable improvement in the wheat growth parameters and resistance against Fusarium oxysporum and led to a complete inhibition of zearalenone production in treated wheat roots and spikes compared to those treated by Fusarium only. Our findings demonstrated the contribution of tested marine yeasts in the increase in metabolites accumulation.

Title	Influence of doping with Sb^{3+}, In^{3+}, and Bi^{3+} ions on the structural, optical and dielectric properties of ZnS nanoparticles synthesized by ultrasonication process
Authors	Othman, A.A., Osman, M.A., Ali, M.A., Ibrahim, E.M.M.
Journal	Physica B: Condensed Matter, 614,413041
Abstract	Doped-ZnS nanoparticles (NPs) with various trivalent elements ions (Sb3+, In3+, and Bi3+) were synthesized using the sonochemical method. X-ray diffraction patterns proved the formation of the ZnS cubic phase without any phase separation with the doping process. The dependence of the crystallite size and the internal micro-strain on the dopant type was demonstrated. Optical absorption spectra of doped ZnS NPs revealed a decrease in the optical band gap due to the formation of extended defect states below the conduction band. Photoluminescence spectra of the doped samples revealed the enhancement of visible light emission intensity compared with the as-prepared ZnS NPs. The AC electrical properties of the trivalent elements doped ZnS NPs were studied at room temperature in the frequency range from 2 kHz to 1 MHz, where In-doped ZnS NPs had the lowest dielectric constant and largest conductivity compared with the other samples.

Title	Comparison of different adsorption pairs based on zeotropic and azeotropic mixture refrigerants for solar adsorption ice maker
Authors	Mostafa, M., Ezzeldien, M., Attalla, M., (...), Hasaneen, M.F., Shmroukh, A.N.
Journal	Environmental Science and Pollution Research, 28(30), pp. 41479-41491
Abstract	One of the important ways to the efficiently use of low-grade thermal energy is the adsorption refrigeration technology. However, it has some drawbacks such as low specific cooling power and coefficient of performance, especially under using the conventional adsorption pairs. Therefore, new adsorption pairs are tested in solar adsorption ice-maker and compared with other conventional pairs data from open literature to find the tendency of improving the solar adsorption ice-maker performance. The experimental test rig has been built in Upper Egypt in Qena City. Four different new adsorption pairs of granular activated carbon/R-410A, granular activated carbon/R-511A, Maxsorb III/R-410A, and Maxsorb III/R-511A are used. It is demonstrated that Maxsorb III/R-511A pair based solar adsorption ice-maker produced the highest values for specific cooling power, coefficient of performance, and ice production per 1 kg of adsorbent of approximately 226.7 W/kgads, 0.197, and 1.96 kg/kgads, respectively. While granular activated carbon/R-410A based solar adsorption ice-maker produced the lowest values of ice production per 1 kg of adsorbent and coefficient of performance of 1.38 kg/kgads and 0.104, respectively. Moreover, it can be concluded that the tested pairs are feasible to be used in solar adsorption ice-maker systems, especially in such hot climate of Upper Egypt for food and vaccine preservation and storage.

Title	Dynamical properties of quantum Fisher information of a two-level atoms interacting with two-mode superposition coherent state
Authors	Alqannas, H.S., Khalil, E.M., Abdel-Khalek, S.
Journal	Alexandria Engineering Journal, 60(4), pp. 3751-3757
Abstract	A quantum cavity filled with a nonlinear medium (Kerr like medium) and contains a 2-mode field interacting with time dependence of 2-qubit is investigated. Part of the two qubits interact in the form of an amplifier, while the other is in the form of a ladder. The constants of motion are calculated by using the Heisenberg differential equation. Moreover, the analytical solution is calculated by solving the Schrodinger differential equations. Some statistical quantities are calculated to identify the features of the proposed model. The effective of the nonlinear term on the phenomena of collapse and revival are discussed through atomic population. The amount of entanglement between the quantum subsystem, whether it is between the 2-qubit and the cavity field, or between the 2-qubit together are calculated using the linear entropy and the concurrence. The results indicated that there is a superstructure between the atomic population and the linear entropy, concurrence. The intensity of oscillations decreases for the entanglement between the field and the two qubits when the Kerr like medium of the Hamiltonian system is included. The nonclassical distribution of the quantum system decreases after taking Kerr like medium into account.

Title	Microplastics induced histopathological lesions in some tissues of tilapia (Oreochromis niloticus) early juveniles
Authors	Hamed, M., Soliman, H.A.M., Badrey, A.E.A., Osman, A.G.M.
Journal	Tissue and Cell, 71,101512
Abstract	Although microplastics (MPs) have received increasing focus and currently have become an emerging area of research, there is limited knowledge about their effect on whole body histology of fish. In this study, tilapia (Oreochromis niloticus) early juveniles were exposed to 1, 10, or 100 mg/L of MPs for 15 days and 15 days post-exposure, after which whole body histological examinations were performed. Histological analysis of kidney revealed congestion of blood capillaries, inflammatory cells, loss of basophilic cytoplasm in several tubules, vacuolated tubules, shrinking of convoluted tubules, widening of intertubular space, complete deformation, glomerular atrophy, vacuolated glomerular cells, and signs of fatty tubules. The liver tissue exhibited vacuoles, hydropic degeneration, necrotic area, severe deformation of hepatocytes, pyknotic nuclei, and dilation and congestion of blood sinusoids. The pancreatic tissue revealed shrunken and degenerated acini with pyknotic nuclei, hemorrhage, necrotic area, inflammatory cells, fatty cells, and congested blood capillaries. In the muscle tissue, fiber core dissociation, edema, necrosis, segmented fibers, and inflammatory cells were detected. The gill tissue demonstrated dilation and congestion of blood vessels, complete lamellar fusions, lifting of epithelium, shortening and degeneration of secondary lamellae, hyperplasia, and deposition of MPs between primary lamellae. In the spinal cord and notochord, the effects were degeneration and protrusion of meninges, deformation and deviation of notochord from its central axis, edema, degeneration of notochord (disappearance of vacuolar cells), deviation of spinal cord from the central axis, and loss of vacuolar cells in notochord. The intestinal tissue exhibited degeneration of basement membrane, inflammatory cells, goblet cells, atrophy of submucosa, pyknotic nuclei, hemorrhage, and vacuolization of mucosal cells. The histopathological changes in different organs were noticed even post-exposure in fish exposed to MPs compared to those in control fish and these changes were concentration dependent. In conclusion, these data together with our previous data suggest that MPs can cause different changes, ranging from biochemical alterations in single cells to lesions in the entire tissue, which can affect the vitality and life of fish.

Title	Chaetopsina aquatica sp. nov. (Hypocreales, Nectriaceae) from the River Nile, Egypt
Authors	Bakhit, M.S., Ab del-Aziz, A.E.
Journal	Phytotaxa, 511(3), pp. 289-295
Abstract	A new species, Chaetopsina aquatica, collected from the River Nile, Sohag, Egypt, is described and illustrated. Phylogenetic analyses of the combined ITS and LSU rDNA placed the new species within Chaetopsina as a phylogenetically distinct species. Chaetopsina aquatica formed a basal clade to a node containing C. aurantisalinicola and C. penicillata. The new species is characterized by its longer conidia (20-35.2 × 5-8.5 µm on natural substrate, 27.5-41.5 × 5-7 µm in culture) than those reported in Chaetopsina species.

Title	One-pot synthesis of novel triphenyl hexyl imidazole derivatives catalyzed by ionic liquid for acid corrosion inhibition of C1018 steel: Experimental and computational perspectives
Authors	Abd El-Lateef, H.M., Shalabi, K., Abdelhamid, A.A.
Journal	Journal of Molecular Liquids, 334,116081
Abstract	Five novel triphenyl hexyl imidazole derivatives were synthesized with excellent yields (78–91%) in the presence of pyridinium-based ionic liquid as catalyst. The structures of all designed compounds were confirmed through spectral methods and their purity were tested by means of thin-layer chromatography, showing one-spot. The adsorption performance and inhibitive action of imidazole compounds on the C1018 steel alloy corrosion in molar HCl medium at 323 K were examined. The applied approaches were electrochemical trainings (electrochemical impedance spectroscopy [EIS], potentiodynamic polarization [PDP], linear polarization resistance [LPR] corrosion rate, and potential vs. time), and surface examination (field emission scanning electron microscopy [FESEM]). The findings analysis exhibited that the protection capacity augmented with increasing the additive dose to reach 89.6–98.1% with 2.0 × 10−3 mol/L of imidazole derivatives. PDP profiles designated that the imidazole derivatives perform as mixed-kind inhibitors. The triphenyl hexyl imidazole molecules were adsorbed at the interface of C1018 steel/HCl following the Langmuir isotherm model. The free energy of adsorption process values showed a competitive chemical and physical adsorption of prepared imidazole compounds on the C1018 steel interface. The outcomes from the potential of zero charge (Epzc) investigations support the above interpretations. The FESEM analysis of the corroded C1018 steel in the absence and presence of studied imidazole inhibitors evidently exhibited different findings. Furthermore, the relation between the protection abilities and the structure of inhibitors molecules was discussed by applying the theoretical study of density function theory (DFT) and Monte Carlo (MC) simulations.

Title	Mononucleating nicotinohydazone complexes with VO^{2+}, Cu^{2+}, and Ni^{2+} ions. Characteristic, catalytic, and biological assessments
Authors	Adam, M.S.S., Makhlouf, M.M., Ullah, F., El-Hady, O.M.
Journal	Journal of Molecular Liquids, 334,116001
Abstract	Three novel mononuclear complexes of Ni2+, Cu2+, and VO2+ ions (NiLnBu, CuLnBu, and VOLnBu, respectively) were synthesized by the chelation of a di-basic tridentate nicotinohydazone ligand (H2LnBu) with M2+ ions in 1: 1 M ratios. The ligand and its M-pincer chelates were identified and characterized using various spectroscopic tools included NMR, IR, UV–Vis. and EI-Mass spectra, beside, EI elemental analyses, and thermogravimetric analyses. The catalytic potential of NiLnBu, CuLnBu, and VOLnBu was investigated in 1,2-cyclooctene epoxidation using H2O2, as an efficient oxidant. Various parameters, including solvent, temperature, catalyst loading, and oxidant were investigated to identify the optimized reaction conditions. The central metal ion in their M-chelate catalysts revealed variation in the catalytic performance. The high valent metal ion (V4+) catalyst (VOLnBu) exhibited slightly better catalytic potential (96% yield) over the low valent metal ions (Ni2+ and Cu2+) complex catalysts (NiLnBu 91% yield and CuLnBu 93% yield, respectively). In addition to, the biological potential of free ligand H2LnBu and its complexes were examined in the ctDNA interaction process via UV–Vis. spectroscopy and viscosity measurements with the aid of distinguished docking studies. The obtained results showed that M-chelates possess effective biological activities with DNA, including the antimicrobial, antioxidant, and anticancer effects against different biological targets.

Title	Enhanced catalytic (ep)oxidation of olefins by VO(II), ZrO(II) and Zn(II)-imine complexes; extensive characterization supported by DFT studies
Authors	Adam, M.S.S., Abdel-Rahman, L.H., Ahmed, H.E.-S., (...), Alhasani, M., El-Metwaly, N.M.
Journal	Journal of Molecular Structure, 1236,130295
Abstract	Three mononuclear di-valent VO2+, ZrO2+ and Zn2+-complexes (VOL, ZrOL and ZnL, respectively) were prepared from asymmetrical di-basic tetradentate di-imine ligand (6,6′-((1E,1′E)-((4-chloro-1,2-phenylene)bis(azaneylylidene))bis(methaneylylidene))bis(2-ethoxy phenol, H2L). To confirm the M-complexes compositions, various spectral tools (FT-IR, EI/M and UV-Vis. spectra), molar conductance, thermal, elemental analysis and pXRD analyses were accomplished. Distorted octahedral geometry was confirmed for ZnL and square pyramidal geometry was elucidated for VOL and ZrOL. Their catalytic efficiency was investigated in the epoxidation of 1,2-cyclohexene by H2O2. They exhibited moderate to excellent catalytic control. The effect of temperature, time, solvent, type of oxidant and amount of catalysts were studied in order to determine the optimal catalytic atmosphere. The catalysts screening for epoxidation of alternative cyclic and acyclic olefins at optimization was reported. The variation of central metal ions from high to low valents (Zr4+, V4+and Zn2+ ions) and their capability for oxidation control their catalytic potential are the most effective aspects in the epoxidation reaction. The catalytic oxidation of 2-aminothiophene within VOL, ZrOL and ZnL, as a first trial, by H2O2 was examined. Also, QSAR parameters and DFT studies were performed to predict the catalytic properties of VOL, ZrOL and ZnL, to assert on chosen application. Effective surface properties of VO(II) complex were promoted for progressing its catalytic activity, which already happened. The catalytic mechanism was supported by the sequenced stability difference between proposed intermediates based on the difference in their recorded formation energy from the DFT study.

Title	A dual-phase-lag theory of thermal wave in a porothermoelastic nanoscale material by FEM
Authors	Saeed, T., Abbas, I.
Journal	Structural Engineering and Mechanics, 79(1), pp. 1-8
Abstract	In the current article, the dual phase lag theory is used to discussed the waves propagations in poroelastic nanoscale materials by the finite element method. Using the FEM to get the solutions of the complex formulation of the problem numerically. The numerical accuracy is further improved by the implementation of quadratic interpolation functions. The impacts of the thermal delay time and the porosity in a porothermal and elastic mediums are studied. The numerical outcomes for the components of displacement, the temperatures and the components of stress for the solid and liquid are represented graphically. Three theories of thermoelasticity viz. the Classical dynamical coupled (CT), Lord and Shulman (LS), and dualphase- lag (DPL) thermoelasticity theories are considered in this problem. the present analysis may have significant application and contribution in areas utilizing the non-simples porothermoelastic with various phases in details.

Title	Spirulina platensis Alleviated the Hemotoxicity, Oxidative Damage and Histopathological Alterations of Hydroxychloroquine in Catfish (Clarias gariepinus)
Authors	Sayed, A.E.-D.H., Hamed, M., Soliman, H.A.M.
Journal	Frontiers in Physiology, 12,683669
Abstract	The current study aims at evaluating the toxicity of hydroxychloroquine (HCQ) as a pharmaceutical residue in catfish (Clarias gariepinus) and the protective role of Spirulina platensis (SP). Four groups were used in this study: (1) a control group, (2) a group exposed to 3.16 mg/l of HCQ, (3) a group exposed to 3.16 mg/l of HCQ + 10 mg/l of SP, and (4) a group exposed to 3.16 mg/l of HCQ + 20 mg/l of SP for 15 days of exposure. The HCQ-treated group showed a significant decline in the hematological indices and glucose, total protein, and antioxidant levels in relation to the control group, whereas the HCQ-treated group showed a significant increase in the levels of creatinine, uric acid, aspartate aminotransferase (AST), and alanine aminotransferase (ALT) as well as the percentage of poikilocytosis and nuclear abnormalities of RBCs in relation to the control group. The histopathological evaluation of the liver indicated dilation of the central vein, vacuolization, degeneration of hepatocytes and pyknotic nuclei, as well as reduction of glomeruli, dilation of Bowman's space, and degeneration of renal tubules in the kidney of the HCQ-treated group. Spirulina platensis (SP) rendered the hematological and biochemical indexes as well as antioxidant levels and the histological architecture to normal status in a dose-dependent manner. Accordingly, the current study recommends the use of SP to remedy the toxic effects of HCQ.

Title	Preparation, characterization, and evaluation of macrocrystalline and nanocrystalline cellulose as potential corrosion inhibitors for ss316 alloy during acid pickling process: Experimental and computational methods
Authors	Toghan, A., Gouda, M., Shalabi, K., El-Lateef, H.M.A.
Journal	Polymers, 13(14),2275
Abstract	Converting low-cost bio-plant residuals into high-value reusable nanomaterials such as microcrystalline cellulose is an important technological and environmental challenge. In this report, nanocrystalline cellulose (NCC) was prepared by acid hydrolysis of macrocrystalline cellulose (CEL). The newly synthesized nanomaterials were fully characterized using spectroscopic and microscopic techniques including FE-SEM, FT-IR, TEM, Raman spectroscopy, and BET surface area. Morphological portrayal showed the rod-shaped structure for NCC with an average diameter of 10–25 nm in thickness as well as length 100–200 nm. The BET surface area of pure CEL and NCC was found to be 10.41 and 27 m2 /g, respectively. The comparative protection capacity of natural polymers CEL and NCC towards improving the SS316 alloy corrosion resistance has been assessed during the acid pickling process by electrochemical (OCP, PDP, and EIS), and weight loss (WL) measurements. The outcomes attained from the various empirical methods were matched and exhibited that the protective efficacy of these polymers augmented with the upsurge in dose in this order CEL (93.1%) < NCC (96.3%). The examined polymers display mixed-corrosion inhibition type features by hindering the active centers on the metal interface, and their adsorption followed the Langmuir isotherm model. Surface morphology analyses by SEM reinforced the adsorption of polymers on the metal substrate. The Density Functional Theory (DFT) parameters were intended and exhibited the anti-corrosive characteristics of CEL and NCC polymers. A Monte Carlo (MC) simulation study revealed that CEL and NCC polymers are resolutely adsorbed on the SS316 alloy surface and forming a powerful adsorbed protective layer.

Title	The effects of fractional time derivatives in porothermoelastic materials using finite element method
Authors	Marin, M., Hobiny, A., Abbas, I.
Journal	Mathematics, 9(14),1606
Abstract	In this work, a new model for porothermoelastic waves under a fractional time derivative and two time delays is utilized to study temperature increments, stress and the displacement components of the solid and fluid phases in porothermoelastic media. The governing equations are presented under Lord–Shulman theory with thermal relaxation time. The finite element method has been adopted to solve these equations due to the complex formulations of this problem. The effects of fractional parameter and porosity in porothermoelastic media have been studied. The numerical outcomes for the temperatures, the stresses and the displacement of the fluid and the solid are presented graphically. These results will allow future studies to gain a detailed insight into non-simple porothermoelasticity with various phases.

Title	Can thin layer agar test play a key role in the diagnosis of tuberculosis in low-resource settings?
Authors	Al Yousef, S.A., Abdelrahim, K., Ali, A.M.
Journal	Jundishapur Journal of Microbiology, 14(7),e116162
Abstract	Background: Fast, reliable, and cost-effective tests are recommended for tuberculosis diagnosis and drug susceptibility testing, especially in resource-limited settings. Objectives: This study aimed to evaluate the performance of thin-layer agar for tuberculosis diagnosis and drug susceptibility test-ing. Methods: Samples were collected from patients with presumptive tuberculosis and tested using thin-layer agar for tuberculosis and drug susceptibility testing in parallel with Lowenstein Jensen culture method for tuberculosis diagnosis and proportion method for drug susceptibility testing as the gold standard. Receiver operating characteristic curve analysis was performed to calculate the performance parameters. Results: Thin-layer agar method showed sensitivity and specificity values of 96.63% and 62.50%, respectively, for the isolation of Mycobacterium tuberculosis directly from specimens. Drug susceptibility results using thin-layer agar showed sensitivity values for isoniazid, rifampicin), ethambutol and streptomycin were 94.74%, 86.84%, 94.74% and 81.58%, respectively, while the specificity values were 100%, 100%, 86.27% and 100% for isoniazid, rifampicin, ethambutol and streptomycin, respectively. Results were available in a median time of 16 days for thin-layer agar and 25 days for the conventional method. Conclusions: The thin-layer agar method is a relatively rapid, simple, and cost-effective method for the diagnosis and drug susceptibility testing of M. tuberculosis. It may be a useful tool for establishing tuberculosis laboratories in resource-limited settings because it does not require expensive equipment and a high level of training. Our study may help in choosing the appropriate treatment and control of tuberculosis.

Title	Sea urchin-like calcium borate microspheres and synergistic action with cholinesterase-inhibiting insecticides for ecofriendly: Spodoptera littoralis control
Authors	Khairy, M., Ayoub, H.A., Rashwan, F.A., Abdel-Hafez, H.F.
Journal	Environmental Science: Processes and Impacts, 23(7), pp. 1006-1017
Abstract	The development of nanoagrochemicals has attracted much attention in the last decade to overcome the recent agricultural and environmental challenges associated with the intensive usage of insecticides. Herein, nanostructured calcium borate materials with hierarchical sea urchin-like microspheres and microblocks have been synthesized by a facile hydrothermal method. The insecticidal activity of CaB2O4 and its synergistic combination with cholinesterase-inhibiting insecticides are explored against Spodoptera littoralis (S. littoralis) for the first time via a feeding bioassay protocol. The insecticidal efficacy of sea urchin-like microspheres (CB-A) is estimated to be LC50 = 207 mg L-1 which is two-fold higher than that of microblocks (CBM-A) with LC50 = 406 mg L-1 after eleven days of exposure. The synergistic combination of the CB-A sample with methomyl and chlorpyrifos increases the toxicity to 2.4 and 2.6-fold higher than that of the individual insecticides, respectively. Significantly, sea urchin-like CaB2O4 microspheres cause physical damage to the external insect's cuticle layer, which consequently enhances the uptake of organic insecticides. Our results revealed that calcium borate micro-/nano-structures can be employed as a multifunctional nanoagrochemical in various agricultural programs for S. littoralis control and decrease the usage of cholinesterase-inhibiting insecticides.

Title	Finite element analysis of nonlinear bioheat model in skin tissue due to external thermal sources
Authors	Marin, M., Hobiny, A., Abbas, I.
Journal	Mathematics, 9(13),1459
Abstract	In this work, numerical estimations of a nonlinear hyperbolic bioheat equation under various boundary conditions for medicinal treatments of tumor cells are constructed. The heating source components in a nonlinear hyperbolic bioheat transfer model, such as the rate of blood perfusions and the metabolic heating generations, are considered experimentally tempera-ture-dependent functions. Due to the nonlinearity of the governing relations, the finite element method is adopted to solve such a problem. The results for temperature are presented graphically. Parametric analysis is then performed to identify an appropriate procedure to select significant design variables in order to yield further accuracy to achieve efficient thermal power in hyper-thermia treatments.

Title	Properties of transient spectrum and field purity for a qubit system in squeezed states
Authors	Osman, I.A., Kabashi, K.K., Abdel-Khalek, S., Berrada, K., Altowyan, A.S.
Journal	Results in Physics, 26,104297
Abstract	The present study investigates the transient spectrum (TS) of a two-level system that interacts with a generalized squeezed state without using the rotating wave approximation (RWA). We consider the purity of the optical field, which is developed in a generalized squeezed state, utilizing the linear entropy. The analytic expressions of the TS and field purity (FP) of the bipartite system are evaluated. Moreover, the study exhibits the influence of the squeezed parameter and some photons transition on the TS and FP. We obtain that the control of the FP may be generated based on an adequate choice of the photons transition and squeezed parameter. Such results can be utilized in the understanding and development of various tasks of quantum physics and optics.

Title	Optical properties of thin Bi_2Te_3 films synthesized by different techniques
Authors	Adam, A.M., Tolan, M., Refaat, A.A., (...), Petkov, P., Ataalla, M.
Journal	Superlattices and Microstructures, 155,106909
Abstract	Thin films of Bi2Te3 alloy were grown by vacuum thermal evaporation (VTE) and pulsed laser deposition (PLD) techniques. The growth was conducted on clean substrates of non-conductive glass. X-ray diffraction (XRD) analysis was used to study the materials crystal structure. The XRD patterns revealed the crystalline nature of the prepared films. Surface morphology was investigated by the atomic force microscopy (AFM) showing that the films are formed of crystallites bounded by twin boundaries oriented in the c-axis in a way that perpendicular to the substrate plane. The samples shown to be stoichiometric and of good morphology. Transmission and reflection spectral have been obtained at room temperature using a double beam Jasco spectrophotometer. Absorption coefficient, extinction coefficient and refractive index were determined. The optical band gap was evaluated by measuring the fundamental absorption and extrapolation of the linear portion of (αhv)2 versus hv plots. The plots indicated direct allowed transition. Comparison between all optical parameters of the films prepared by the two different methods has been performed.

Title	Fungal biodegradation and removal of cyanobacteria and microcystins: potential applications and research needs
Authors	Mohamed, Z.A., Hashem, M., Alamri, S., Campos, A., Vasconcelos, V.
Journal	Environmental Science and Pollution Research, 28(28), pp. 37041-37050
Abstract	Harmful cyanobacterial blooms (HCB) have severe impacts on marine and freshwater systems worldwide. They cause oxygen depletion and produce potent cyanotoxins that have detrimental effects on human and environmental health and deteriorate the water quality. Biological treatment of the water for control of cyanobacterial blooms and removal of cyanotoxins can be a more economical and environment-friendly way, as they do not result in production of undesirable by-products. Most biological treatments of cyanobacteria and cyanotoxins have concentrated largely on bacteria, with little attention paid to algicidal fungi. Therefore, this review aims to provide an overview of the current status and the main progresses achieved in fungal biodegradation of HCB and cyanotoxin research. The available data revealed that 15 fungal species had high lytic activity against cyanobacteria, and 6 species were capable of degrading microcystins (MCs). Some fungal species (e.g., Aurobasidium pullulans and Trichoderma citrinoviride) have been identified to selectively inhibit the growth of cyanobacteria rather than beneficial species of other algal groups. Interestingly, some fungal strains (Trichaptum abietinum, Trichoderma citrinoviride) exhibited di-functional trait, being efficient in lysing cyanobacteria and degrading MCs released from the cells after decay. Beyond a comprehensive review of algicidal and toxin-degrading activities of fungi, this paper also identifies and prioritizes research gaps in algicidal fungi. The review also gives insights to the potential applications of algicidal fungi for removal of cyanobacterial blooms and their cyanotoxins from the aquatic environment.

Title	Fractional chaotic cryptovirology in blockchain - analysis and control
Authors	Alqarni, M.M., Mahmoud, E.E., Abdel-Aty, M., (...), Trikha, P., Jahanzaib, L.S.
Journal	Chaos, Solitons and Fractals, 148,110989
Abstract	The manuscript analyzes fractional order chaotic cryptovirology in blockchain using various methods in dynamics such as Lyapunov exponents, stagnation points, symmetry, bifurcation diagrams etc. The internet is the most powerful tool that has changed every aspect of living. But this internet has also become primary medium of cyber-crime. The dynamics of the modeled system for variable fractional order between 0.8 to 1 is also observed. The chaos in the studied dynamical system is controlled about its two stagnation points using SMC controllers assuming uncertainties and disturbances.

Title	Identification and molecular study of medicinal Plectranthus species (Lamiaceae) from Saudi Arabia using plastid DNA regions and ITS2 of the nrDNA gene
Authors	Al-Juhani, W.S., Khalik, K.N.A.
Journal	Journal of King Saud University - Science, 33(5),101452
Abstract	Plectranthus is a genus of the Lamiaceae family that includes many species of medicinal and agricultural importance. However, this genus has been the subject of taxonomic debate and contains species that are difficult to distinguish. The present study focused on six Plectranthus species commonly found in Saudi Arabia: P. arabicus, P. tenuiflorus, P. barbatus, P. pseudomarrubioides, P. asirensis, and P. hijazensis. P. hijazensis is endemic to Saudi Arabia. The capacities of five different plastid DNA barcodes (matK, rbcL, trnH-psbA, and ITS1 and ITS2 regions of the nrDNA gene) to identify and distinguish between Plectranthus species were evaluated. The following analytical methods were used to evaluate the efficiencies of the selected markers: BLAST, inter- and intraspecific distance, barcode gap, secondary structure of ITS2, and maximum likelihood (ML) phylogenetic trees. The results demonstrated that the nuclear ITS2 region can be successfully amplified and sequenced (100%), leading to a strong ability to discriminate between species and a clear barcode gap. Furthermore, there were significant differences in the ITS2 secondary structure among Plectranthus spp. Samples of Plectranthus formed monophyletic groups according to species in the ML tree, with high supported values. Our results establish that all Plectranthus species in Saudi Arabia can be classified into two groups within the Coleus clade. To our knowledge, this is the first time that local and endemic Plectranthus spp. have been identified and compared with Plectranthus samples of different geographical origins. Our results confirm the diversity of Plectranthus species growing naturally in southwestern Saudi Arabia. In addition, P. hijazensis, which is endemic to Saudi Arabia, was determined to be genetically distinct from other Plectranthus species and should, therefore, be the focus of future research, in addition to the preservation of the natural environment of these species.

Title	Polycaprolactone tridentate ligand corrosion inhibitors coated on biodegradable Mg implant
Authors	Mousa, H.M., Mahmoud, M.A., Yasin, A.S., Mohamed, I.M.A.
Journal	Journal of Coatings Technology and Research, 18(4), pp. 1191-1197
Abstract	Magnesium (Mg) is widely used in different tissue engineering applications such as bone fracture fixations and cardiovascular stent applications. However, it exhibits high degradation properties in the physiological medium and hence loses its mechanical properties. Herein, AZ31 Mg alloy was spin-coated with polycaprolactone (PCL) polymer blended with Schiff base derived from amino acid as a corrosion inhibitor. Coated samples were characterized using field emission electron microscopy (FESEM) and Fourier-transform infrared spectroscopy (FTIR) analysis. Additionally, corrosion behavior was evaluated using electrochemical potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) techniques. Moreover, the bioactivity of the studied samples was confirmed in vitro with MC3T3-E1 osteoblasts cells. Results show that coated samples with corrosion inhibition efficiency of blended PCL and L-isoleucine Schiff (PCL-SI) reached 66% compared to that of pure PCL 39%. This suggests that the introduced materials were superior to control biodegradability and biocompatibility of the bare alloy in bone tissue engineering application.

Title	Experimental and theoretical studies of $(CdS)_{1-x}(ZnS)_x$ thin-films for second generation CdS/CdTe solar cells
Authors	Ahmed, M.R., Mohamed, H.A., Ali, S.S., Mohamed, W.S.
Journal	Physica B: Condensed Matter, 612,412903
Abstract	The current work focused on studying the optical and structural properties of (CdS)1-x (ZnS)x thin films fabricated by thermal vacuum evaporation approach. The evaporation was implemented at room temperature from bulk samples synthesis by sintering approach. The energy gap, index of refraction, extinction coefficient and absorption coefficient were estimated from the experiment and employed in our theoretical model to estimate quantitatively the solar cell efficiency and short-circuit current density of CdS:ZnS/CdTe structure. The calculations of cell efficiency as well as short-circuit current density were computed on the bases of the optical losses caused by reflection at interfaces and absorption process occurred in the frontal charge-collecting and window layers and the recombination losses at front and back surface of CdTe. The XRD analysis showed that the intensity and position of predominant peak of CdS gradually changes with increasing the ZnS content indicating a success of forming CdS:ZnS alloy. The films exhibited direct band-to-band transitions and the optical energy gap increased from 2.40 eV to 3.10 eV with increasing of ZnS content up to x = 0.50. The short-circuit current density increased from 16.50 mA/cm2 to 21 mA/cm2 and the cell efficiency increased from 13.10% to 17.10% due to the increase of the ZnS content from x = 0 to x = 0.50.

Title	Boosting the catalytic performance of manganese (III)-porphyrin complex MnTSPP for facile one-pot green synthesis of 1,4-dihydropyridine derivatives under mild conditions
Authors	Ali El-Remaily, M.A.E.A.A., Hamad, H.A., Soliman, A.M.M., Elhady, O.M.
Journal	Applied Organometallic Chemistry, 35(7),e6238
Abstract	In this study, the metal complex (5,10,15,20-tetrakis-(4-sulfonatophenyl)-porphyrin manganese (III) chloride; denoted as MnTSPP) represents a promising efficient and reusable heterogeneous solid catalyst for facile and highly efficient one-pot synthesis of 1,4 dihydropyridine derivatives via three-component condensation reaction of aromatic aldehyde, ethyl acetoacetate, and ammonium acetate under green and mild reaction conditions. The simple operation, short reaction time (15 min), and the high efficiency (99%) are the special advantage of this protocol. Furthermore, the green aspects of this synthetic protocol were more studied by examination of the reusability of MnTSPP for four consecutive cycles without a significant loss of catalytic activity. Remarkably, the new synthesis presented advantages in terms of safety, commercially available catalyst, simplicity, stability, mild conditions, short reaction time, and excellent yields, using a mixture of H2O and C2H5OH environmental-friendly solvent, operationally facile, wide tolerance of starting materials, and excellent recoverable of the catalyst.

Title	Tumor edge detection in mammography images using quantum and machine learning approaches
Authors	Tariq Jamal, A., Ben Ishak, A., Abdel-Khalek, S.
Journal	Neural Computing and Applications, 33(13), pp. 7773-7784
Abstract	Automatic processing and analysis of medical images may provide to doctor valuable assistance for diagnostic and therapeutic practice. In this work, the problem of breast cancer edge detection is addressed. We are faced with a challenging task considering the breast tissue specificities and the inevitable mammogram noise. To meet this challenge, we propose novel approaches involving quantum genetic algorithm and support vector machines. The first method uses the quantum genetic algorithm to solve a multilevel thresholding problem based on Tsallis entropy. In the second method, the support vector machines are trained, in different ways, on a simulated image in order to be able to detect breast cancer edge. The proposed approaches are compared to some standard methods of edge detection on a sample of mammographic images taken from a well-known benchmark databases. The evaluation results obtained by PSNR, SSIM and FSIM metrics demonstrated the effectiveness of the proposed approaches.

Title	Asymmetric nuclear matter and realistic potentials
Authors	Gad, K.
Journal	Indian Journal of Physics, 95(7), pp. 1499-1508
Abstract	The equation of state for asymmetric nuclear matter is presented within the Brueckner–Hartree–Fock (BHF) approach by using recent high-quality soft nucleon–nucleon potentials from next-to-leading order (NLO) up to fifth order (N4LO) of the chiral expansion for the wide range of densities and asymmetry parameter, which are very interesting these days in the heavy-ion collisions and neutron stars. For comparison purposes, the same calculations are performed for Brueckner–Hartree–Fock approach plus two-body density-dependent Skyrme potential which is equivalent to three-body forces. Also the results are compared with the other theoretical models, especially the Brueckner–Hartree–Fock plus three-body forces and the Dirac–Brueckner–Hartree–Fock approaches. Our equation-of-state models are able to reproduce the empirical symmetry energy E sym and its slope parameter L at the empirical saturation density ρ and are compatible with experimental data from collisions between heavy nuclei. The symmetry energy of about 30 MeV is obtained at the saturation nuclear matter density. There is very good agreement between the experimental symmetry energy value and those calculated in the Brueckner–Hartree–Fock approach.

Title	A web-based global educational model for training in semen analysis during the covid-19 pandemic
Authors	Agarwal, A., Finelli, R., Durairajanayagam, D., (...), Shah, R., Henkel, R.
Journal	World Journal of Men's Health, 39
Abstract	Purpose: In response to the COVID-19 pandemic, the American Center for Reproductive Medicine (ACRM) transitioned its annual training in assisted reproductive technology (ART) from a hands-on, laboratory-based training course to a fully online training endorsed by the American College of Embryology. Here we describe our experience and assess the quality of an online training format based on participant outcomes for the first three modules of a planned series of online ART training. Materials and Methods: These modules included manual semen analysis, sperm morphology and ancillary semen tests (testing for leukocytospermia, sperm vitality, and anti-sperm antibody screening). The virtual format consisted of lecture presentations featuring laboratory protocols with corresponding video demonstrations of routine techniques and best practices. Practical scenarios, troubleshooting, and clinical interpretation of laboratory results were also discussed. At the end of each module, an optional multiple choice question test was held as a prerequisite to obtain certification on the topics presented. Course quality was assessed using participant responses collected via online surveys. Results: The digital delivery methods used were found to have largely or completely met the participants' expectations for all questions (>85%). The majority (>87%) of the participants either strongly agreed or agreed that the course content was well-structured with appropriate depth, and that their overall expectations of the course had been met. Conclusions: This training format appears to be a realistic teaching option to freely share highly specialized expertise and technical knowledge with participants from anywhere in the world with varying levels of competency or experience.

Title	Sperm morphology assessment in the era of intracytoplasmic sperm injection: Reliable results require focus on standardization, quality control, and training
Authors	Agarwal, A., Sharma, R., Gupta, S., (...), Ambar, R.F., Shah, R.
Journal	World Journal of Men's Health, 39
Abstract	Semen analysis is the first, and frequently, the only step in the evaluation of male fertility. Although the laboratory procedures are conducted according to the World Health Organization (WHO) guidelines, semen analysis and especially sperm morphology assessment is very difficult to standardize and obtain reproducible results. This is mainly due to the highly subjective nature of their evaluation. ICSI is the choice of treatment when sperm morphology is severely abnormal (teratozoospermic). Hence, the standardization of laboratory protocols for sperm morphology evaluation represents a fundamental step to ensure reliable, accurate and consistent laboratory results that avoid misdiagnoses and inadequate treatment of the infertile patient. This article aims to promote standardized laboratory procedures for an accurate evaluation of sperm morphology, including the establishment of quality control and quality assurance policies. Additionally, the clinical importance of sperm morphology results in assisted reproductive outcomes is discussed, along with the clinical management of teratozoospermic patients.

Title	Synthesis and structural elucidation for new pyrano thiazole complexes: Biological screening and effects on DNA through in-vitro and in-silico approaches
Authors	Alzahrani, S.O., Abu-Dief, A.M., Alkhamis, K., (...), El-Remaily, M.A.E.A.A.A., El-Metwaly, N.M.
Journal	Journal of Molecular Liquids, 332,115844
Abstract	Novel bioactive complexes were prepared from Cu(II), Fe(III) and Pd(II) ions with pyrano thiazole derivative (PTP) [2-amino-6-oxo-3-(piperidinylamidino)-4-phenyl-6,7-dihydro-pyrano[2,3-d]-5,7-thiazol]. CHN, FT-IR, UV–Vis, 1H NMR, 13C NMR, molar conductance and TGA results have been used to determine the chemical formulae of new compounds. Accordingly, the octahedral geometry was proposed for the complexes except PTPPd complex (square-planer). The ligand acts as a neutral bidentate with all metal ions inside equi-molar ratio (1 L:1 M). Bioactivity of new compounds was observed through interaction with DNA, which studied by different methods. Also, antimicrobial, cytotoxicity and antioxidant activity, were examined and the complexes displayed significant antioxidant activity. Cytotoxicity against MCF-7, HCT-116 and HepG2 cell lines, introduced PTPPd complex as a hopeful anticancer agent. Moreover, important computational data were extracted from Gaussion09, Pharmit link and MOE docking software, to assess on some features. Structural optimization was performed to achieve essential physical properties and confirm binding mode. Whereas, pharmokinetic study exhibited the magnitude of allosteric binding between compounds and DNA protein as co-crystal PDB (2k4l). Furthermore, MOE docking approach clearly explain all interaction features that happened with 2k4l protein, which agree with in-vitro results. Finally it is worthy to note that, these complexes may be promising therapeutic based on in-vitro or in-silico results.

Title	Eco-Friendly Synthesis, Biological Evaluation, and In Silico Molecular Docking Approach of Some New Quinoline Derivatives as Potential Antioxidant and Antibacterial Agents
Authors	El-Saghier, A.M., El-Naggar, M., Hussein, A.H.M., (...), Olish, M., Abdelmonsef, A.H.
Journal	Frontiers in Chemistry, 9,679967
Abstract	A new series of quinoline derivatives 5–12 were efficiently synthesized via one-pot multicomponent reaction (MCR) of resorcinol, aromatic aldehydes, β-ketoesters, and aliphatic/aromatic amines under solvent-free conditions. All products were obtained in excellent yields, pure at low-cost processing, and short time. The structures of all compounds were characterized by means of spectral and elemental analyses. In addition, all the synthesized compounds 5–12 were in vitro screened for their antioxidant and antibacterial activity. Moreover, in silico molecular docking studies of the new quinoline derivatives with the target enzymes, human NAD (P)H dehydrogenase (quinone 1) and DNA gyrase, were achieved to endorse their binding affinities and to understand ligand–enzyme possible intermolecular interactions. Compound 9 displayed promising antioxidant and antibacterial activity, as well as it was found to have the highest negative binding energy of -9.1 and -9.3 kcal/mol for human NAD (P)H dehydrogenase (quinone 1) and DNA gyrase, respectively. Further, it complied with the Lipinski's rule of five, Veber, and Ghose. Therefore, the quinoline analogue 9 could be promising chemical scaffold for the development of future drug candidates as antioxidant and antibacterial agents.

Title	Anisotropic luminescence and third-order electric susceptibility of Mg-doped gallium oxide under the half-bandgap edge
Authors	Zhang, N., Kislyakov, I.M., Xia, C., (...), Wang, J., Mohamed, H.F.
Journal	Optics Express, 29(12), pp. 18587-18600
Abstract	Strong anisotropy of photoluminescence of a (100)-cut β-Ga2O3 and a Mg-doped β-Ga2O3 single crystals was found in UV and visible spectral range, the bands of which were attributed to different types of transitions in the samples. Green photoluminescence in the Mg-doped sample was enhanced approximately twice. A remarkable enhancement of two-photon absorption and self-focusing in β-Ga2O3 after doping was revealed by 340-fs laser Z-scanning at 515 nm. The absolute value of complex third order susceptibility χ(3) determined from the study increases by 19 times in [001] lattice direction. Saturable absorption and associated self-defocusing were found in the undoped crystal in the [010] direction, which was explained by the anisotropic excitation of F-centers on intrinsic oxygen defects. This effect falls out of resonance in the Mg-doped crystal. The χ(3) values which are provided by a decrease of bandgap in Mg-doped β-Ga2O3 are χ(3) [001] = 1.85·10-12 esu and χ(3) [010]=χ(3)yyyy = 0.92·10-12 esu. Our result is only one order of magnitude lower than the best characteristic in green demonstrated by a Mg-doped GaN, which encourages subsequent development of Mg-doped β-Ga2O3 as an effective nonlinear optical material in this region.

Title	Blueshifted dielectric properties and optical conductivity of new nanoscale nickel-(II)-tetraphenyl-21H,23H-porphyrin films as a function of UV illumination for energy storage applications
Authors	El-Denglawey, A., Alburaih, H.A., Mostafa, M.M., Adam, M.S.S., Makhlouf, M.M.
Journal	Optical and Quantum Electronics, 53(6),343
Abstract	Pristine thermally evaporated nickel-(II)-tetraphenyl-21H,23H-porphyrin (NiTPP) thin films are amorphous, but after 4 and 8 h of UV illumination, the films become crystalline with preferred orientations of (112), (103) and (004) and crystallite sizes of (13, 18, 16) and (42, 31, 38) nm after 4 and 8 h, respectively. After UV illumination for 4 and 8 h, the NiTPP thin films are characterized by blueshifted absorption coefficients, increasing the optical and fundamental gap values and decreasing the dispersion parameter values. The dielectric properties display energy storage regions corresponding to the peak values of optical conductivity, which provides an elegant confirmation of the tailoring and tuning of band gaps, energy storage properties and optical conductivity by UV illumination time. Therefore, NiTPP films may be good candidates for environmental and energy storage applications.

Title	Fixed-Time Synchronization of Second-Order MNNs in Quaternion Field
Authors	Wei, R., Cao, J., Abdel-Aty, M.
Journal	IEEE Transactions on Systems, Man, and Cybernetics: Systems, 51(6),8791003, pp. 3587-3598
Abstract	In this paper, we propose a novel class of networks named as quaternion-valued inertial memristor-based neural networks (QVIMNNs) by introducing inertial term and memristor into traditional quaternion-valued neural networks (QVNNs). The problem of fixed-time synchronization of the QVIMNNs is investigated based on the variable transformation and Lyapunov functional method. It is shown that two types of activation functions are considered and a novel criteria guaranteeing fixed-time synchronization for each cases are then achieved by designing different types of controllers. This paper attempts to pave a new way to investigate neural networks classes with numerical simulations support to demonstrate the correctness of the obtained results.

Title	Microstructural, optical, and electrical characteristics of Cu-doped CdTe nanocrystalline films for designing absorber layer in solar cell applications
Authors	Alzaid, M., Hadia, N.M.A., El-Hagary, M., Shaaban, E.R., Mohamed, W.S.
Journal	Journal of Materials Science: Materials in Electronics, 32(11), pp. 15095-15107
Abstract	This paper reports the microstructure, optical, and electrical characteristics of undoped and Cu-doped CdTe nanostructured thin films prepared on glass substrates by electron beam evaporation technique. The crystallographic study of X-ray diffraction shows that CdTe and Cu-doped CdTe films crystallize in the form of a cubic zinc blende structure. Microstructure analysis reveals that as the Cu-doping level increases, the average crystallite size increases, while the microstrian decreases due to the improvement of the crystallinity, thereby reducing defects. XRD and AFM investigations confirmed the nanostructure characteristic of undoped and Cu-doped films. It was found that the optical band gap energy increases from 1.485 to 1.683 eV as the Cu concentration increases from 0 to 10 wt%, which may be related to the Burstein–Moss effect. The refractive index is calculated from the Swanepoel envelope method and found to decrease with the increase of the Cu doping due to the decrease in the polarizability. Similarly, the extinction coefficient decreases with the increase of Cu in the CdTe matrix. The dc electrical conductivity is found to increase with increasing Cu doping, which is attributed to the increase in the grain size, thereby reducing the scattering of the grain boundary. Furthermore, two conduction mechanisms of the carrier transport in nanostructured undoped and Cu-doped CdTe films were observed. The low-temperature dependence of the conductivity of undoped and Cu-doped CdTe nanostructured films is explained based on Mott's variable range hopping conduction mechanism model (VRH). Interestingly, the calculated values of hopping distance R, the hopping energy W, and the density of states at the Fermi level N(EF) are consistent with Mott's VRH. Finally, Hall effect measurements show that all the films have p-type conduction behavior. Besides, the results show that as the Cu doping level increases, the carrier concentration and the Hall mobility increase due to the decrease in grain boundary scattering with the increase in grain size. Accordingly, it can be concluded that by increasing the Cu doping level in the CdTe film, the conductivity is increased, thereby improving the performance of the CdTe absorber layer in the solar cell structure.

Title	Cold RF oxygen plasma treatment of graphene oxide films
Authors	El-Hossary, F.M., Ghitas, A., El-Rahman, A.M.A., (...), Shahat, M.A., Fawey, M.H.
Journal	Journal of Materials Science: Materials in Electronics, 32(12), pp. 15718-15731
Abstract	Oxygen radio-frequency (RF) plasma technique is one of the most novel directions used to improve the physical and chemical properties of graphene oxide (GO). Herein, plasma treatment is used to enhance the chemical functionalization and reduced levels of the GO material for electronic and solar cell applications. GO films were chemically synthesized with high quality and uniformity. Then, they exposed to surface modification using RF oxygen plasma at a processing power of 100 W at different processing times. The microstructure and surface chemistry of the GO films were characterized by X-ray photoelectron spectroscopy (XPS) and Raman spectroscopy. Moreover, the effect of oxygen plasma on the thermal stability, surface roughness, contact angle, work of adhesion, wettability, spreading coefficient, and electrical properties have been studied. The results revealed a decrease in the amount of oxygen-containing groups (such as epoxides, carbonyls, and carboxyl groups) from 48.8% in pristine GO to 36.15% after 5 min of oxygen plasma treatment. Besides, the carbonyls groups (C = O) disappeared while new chemical bonds were created compared to the pristine GO film such as hybridized carbon atoms (SP3) and carboxyl's (O–C = O). Accordingly, the electrical conductivity increases from 0.11 S/m of pristine GO to an optimum value of 0.46 S/m after 5 min of plasma treatment, as a result of the incorporation of high amount of carboxyl, hydroxyl and carbonyl groups. The current results indicate that the properties of GO can be tuned by varying the degree of oxidation, which may pave the way for new developments in GO-based applications.

Title	Influence of rescattering effects on the helicity dependence of γ→d→→πNN near threshold and its implication to the E-asymmetry and the GDH sum rule
Authors	Darwish, E.M., Levchuk, M.I., Nevmerzhitsky, M.N., Almarashi, M.M., Saleh Yousef, M.
Journal	Chinese Journal of Physics, 71, pp. 319-332
Abstract	This work deals with investigation of the helicity dependence of the γ→d→→πNN reaction channels near threshold and its implication to the helicity E-asymmetry and the Gerasimov-Drell-Hearn sum rule. Our formalism based on the one loop corrections to the impulse approximation due to nucleon and pion rescattering, uses the realistic Paris NN potential model for the deuteron wave function and the unitary isobar MAID-2007 model for the elementary γN → πN amplitude. We present results for the doubly polarized differential and total cross sections for parallel and antiparallel helicity states, the deuteron spin asymmetry, the helicity E-asymmetry, and the deuteron GDH integral in the near-threshold region. The influence of NN and πN final-state rescattering on the estimated results has been discussed. It is shown that the inclusion of NN rescattering is important, and its inclusion strongly affected the estimated results in both π±- and π0-production channels. The inclusion of πN rescattering is found to be insignificant in π±-production, but it has a non- negligible contribution in the case of π0-production. A comparison with predictions of other theoretical models is given.

Title	Performance enhancement of adsorption cooling cycle by pyrolysis of Maxsorb III activated carbon with ammonium carbonate | [Amélioration des performances du cycle de refroidissement par adsorption par la pyrolyse du charbon actif Maxsorb III avec du carbonate d'ammonium]
Authors	Ghazy, M., Askalany, A., Kamel, A., (...), Mohammed, R.H., Saha, B.B.
Journal	International Journal of Refrigeration, 126, pp. 210-221
Abstract	Maxsorb III is the best available microporous activated carbon. The parent Maxsorb III has been modified by pyrolysis in the presence of ammonia carbonate. The adsorption isotherms and kinetics of HFC404A onto the modified Maxsorb III are experimentally measured over 25 °C to 75 °C. Tóth and Dubinin-Astakhov models are utilized to fit the experimentally measured data. The isosteric heat of adsorption is calculated by applying the Clausius-Clapeyron equation. The adsorption kinetics of the modified Maxsorb III/HFC404A are fitted using the linear driving force model and Fickian Diffusion equation. Experimental measurements indicate that the modified Maxsorb III has a maximum uptake of 2.65 kg.kg−1 of HFC404A at 25 °C, which is the highest reached value till today. Additionally, the adsorption cooling system efficacy is evaluated under typical operating conditions using the modified Maxsorb III/HFC404A pair. The modified Maxsorb III/HFC404A could achieve a specific cooling power (SCP) of 747 W per kg of adsorbent along with a coefficient of performance (COP) of 0.40. Compared to the parent Maxsorb III/HFC404A pair, the pyrolyzed Maxsorb III/HFC404A pair provides the SCP and COP by a factor of 2.23 and 1.7, respectively, which are are the current benchmark.

Title	Evolution and significance of clay minerals in the Esna Shale Formation at Dababiya area, Luxor, Egypt
Authors	El-Shater, A., Mansour, A.M., Osman, M.R., El Ghany, A.A.A., El-Samee, A.A.
Journal	Egyptian Journal of Petroleum, 30(2), pp. 9-16
Abstract	The Esna Shale Formation is broadly distributed in Egypt and one of the most of its important clay deposits. These deposits in the Dababiya area, Luxor region were subjected to intensive laboratory investigations (XRD, IR, and SEM analyses). The bulk and clay mineralogy of this formation varies from one layer to the next and comprises the phyllosilicates, calcite as principal minerals with remarkable amounts of quartz, feldspars dolomites, and anhydrite. Fluorapatite, pyrite, schaurteite, despujolsite, goethite, and halite are present in some beds but minor quantities. The clay mineralogy consists of smectite (41%), sepiolite-palygorskite (28%), illite (13%), smectite/illite mixed layers (13%), and kaolinite (6%). Smectite was differentiated into three species: nontronite (21%), Na-and Ca-montmorillonites (13%), and beidellite (8%). Smectites are dioctahedral with a typical fully turbostratic stacking mode and crystallite sizes varying from 2 to 3 nm. The detrital input is the dominant aspect responsible for distributing clay minerals in these marine sediments. The presence of shallow Paleogene constrained basins between arose land areas in Egypt, favorable to the neoformation of palygorskite and sepiolite, It indicates that most of the fibrous clay minerals present in this part of the Tethys could have formed in these coastal basins and that their presence is an indication of aridity. By transcending global sea level that occurred at the end of the Paleocene, the nonappearance of kaolinite at the Dababiya area (southern Egypt) and its richness at the Wadi Nukhul Section (Sinai, Egypt) no relationship is shown between differences in kaolinite abundance and sea level fluctuations during this period. Six units of clay mineral species were distinguished throughout this formation reflecting their evolution.

Title	ZnO thin films prepared by RF plasma chemical vapour transport for self-cleaning and transparent conducting coatings
Authors	El-Hossary, F.M., Mohamed, S.H., Noureldein, E.A., Abo EL-Kassem, M.
Journal	Bulletin of Materials Science, 44(2),82
Abstract	ZnO thin films were prepared by chemical vapour transport method in inductively coupled plasma (ICP). The films were synthesized at different substrate positions and various oxygen/argon ratios. X-ray diffraction (XRD) revealed that all the synthesized films at different positions are mixture of hexagonal ZnO and hexagonal Zn phases. The relative peak integrated intensity (RPII) of the ZnO phase is 83.6, 25.3 and 45.3%, for positions 1, 2 and 3, respectively. Morphology of ZnO films was found to be sensitive to substrate position. Flat flakes, bended nanowires (NWs) and nanoparticles morphologies are observed for positions 1, 2 and 3, respectively. The sample synthesized at 1 is stoichiometric, whereas the samples prepared in positions 2 and 3 are sub-stoichiometric. The films prepared at positions 1 and 3 have relatively high transmittance and low reflectance values, whereas the film prepared at position 2 has low transmittance and high reflectance. The ZnO film prepared at position 2 is hydrophobic with water contact angle of 112.2°, which can be used as self-cleaning coating. For ZnO films prepared with various O2 ratios, the RPII was 83.2, 88.0, 96.4 and 100% for films prepared with 10, 20, 30 and 40%, respectively. With increasing O2 ratio, the nanograins became bigger and the stoichiometry improved. The transmittance and optical bandgap increased, whereas the reflectance and refractive index decreased with increase in O2 ratio. The ZnO film synthesized with 30% O2 ratio has the highest figure of merit (FOM) value; thus, this film may be considered as the best ZnO film for transparent conducting coating applications.

Title	Change in properties upon thermal treatment of copper sulphide powder and thin films
Authors	Mohamed, S.H., Awad, M.A., Hafez, M.I., Hadia, N.M.A.
Journal	Bulletin of Materials Science, 44(2),81
Abstract	The thermal oxidation of CuS powder was examined under flow of nitrogen and dry air using thermogravimetry/differential thermal analysis. After 473 K, the oxidation of CuS occurred as a weight loss and accompanied with two overlapped exothermic peaks. The melting temperature delayed due to the formation of oxide and sulphate on the surface of the particles. X-ray diffraction revealed that the as-prepared thin films are mixed phases of hexagonal CuS, orthorhombic Cu2S and orthorhombic CuSO4. After annealing at 573 or 773 K, the films oxidized and new orthorhombic Cu8O phase appeared, and its intensity became dominant upon increasing the temperature and time. Nanoparticles morphology was observed for as-prepared films and upon annealing the nanoparticle became more rounded and bigger. The transmittance of the as-prepared films was almost zero over the entire measured range and it increased with increase in the annealing temperature and time, whereas the reflectance decreased. Both refractive and extinction coefficient values decreased with increase in annealing temperature and annealing time, while the bandgap virtually increased. The resistivity of the as-prepared film remained nearly constant until 543 K. Above 543 K the resistivity increased sharply. Negative and positive temperature coefficients in resistivity phenomena were explored in the annealed films and they were strongly dependent on both annealing temperature and time.

Title	Novel 1,2,4-oxadiazole-chalcone/oxime hybrids as potential antibacterial DNA gyrase inhibitors: Design, synthesis, ADMET prediction and molecular docking study
Authors	Ibrahim, T.S., Almalki, A.J., Moustafa, A.H., (...), El Subbagh, H.I., Mohamed, M.F.A.
Journal	Bioorganic Chemistry, 111,104885
Abstract	New antibacterial drugs are urgently needed to tackle the rapid rise in multi-drug resistant bacteria. DNA gyrase is a validated target for the development of new antibacterial drugs. Thus, in the present investigation, a novel series of 1,2,4-oxadiazole-chalcone/oxime (6a-f) and (7a-f) were synthesized and characterized by IR, NMR (1H and 13C) and elemental analyses. The title compounds were evaluated for their in-vitro antimicrobial activity by the modified agar diffusion method as well as their E. coli DNA gyrase inhibitory activity. The minimum inhibitory concentration (MIC) and the structure activity relationships (SARs) were evaluated. Among all, compounds 6a, 6c-e, 7b and 7e were the most potent and proved to possess broad spectrum activity against the tested Gram-positive and Gram-negative organisms. Additionally, compounds 6a (against S. aureus), 6c (against B. subtilis and E. hirae), 6e (against E. hirae), 6f, 7a and 7c (against E. coli) and 7d (against B. subtilis), with MIC value of 3.12 μM were two-fold more potent than the standard ciprofloxacin (MIC = 6.25 μM). Mechanistically, compounds 6c, 7c, 7e and 7b had good inhibitory activity against E. coli gyrase with IC50 values of 17.05, 13.4, 16.9, and 19.6 μM, respectively, in comparison with novobiocin (IC50 = 12.3 μM) and ciprofloxacin (IC50 = 10.5 μM). The molecular docking results at DNA gyrase active site revealed that the most potent compounds 6c and 7c have binding mode and docking scores comparable to that of ciprofloxacin and novobiocin suggesting their antibacterial activity via inhibition of DNA gyrase. Finally, the predicted parameters of Lipinski's rule of five and ADMET analysis showed that 6c and 7c had good drug-likeness and acceptable physicochemical properties. Therefore, the hybridization of the chalcone and oxadiazole moieties could be promising lead as antibacterial candidate which merit further future structural optimizations.

Title	Tailoring, structural inspection of novel oxy and non-oxy metal-imine chelates for DNA interaction, pharmaceutical and molecular docking studies
Authors	Adam, M.S.S., Abu-Dief, A.M., Makhlouf, M.M., (...), El-Metwaly, N.M., Mohamad, A.D.M.
Journal	Polyhedron, 201,115167
Abstract	A green synthetic pathway for two mononuclear M(II)-complexes (M = Ni2+ as a non-oxy-metal ion and ZrO2+ as an oxy-metal ion, NiLig and ZrOLig, respectively) of an imino-naphthalenol sodium sulfonate ligand (H2Lig) was followed. Using various physico-chemical tools, their chemical compositions were elucidated. The material-studio package was applied to confirm the structures of NiLig and ZrOLig via the DFT method. The biological potential of the ligand (H2Lig) and its NiLig and ZrOLig complexes was investigated for different microbial strains as well as different cancer cell lines. The redox potential of the newly synthesized complexes was evaluated using different biochemical assays, e.g. DPPH and SOD assays. The NiLig and ZrOLig complexes exhibited improved antimicrobial and anticancer activities as compared to the free ligand (H2Lig). Accordingly, the ZrOLig complex was the most active biological reagent. The binding nature of the M2+ complexes to calf thymus DNA (ctDNA) was examined by UV–Vis. spectrophotometry and viscosity measurements. Both the Ni2+ and ZrO2+ complexes interestingly demonstrated anti-proliferative action against the human cancer cell lines. Such ctDNA interactions were examined theoretically by molecular docking. The approaches between the exported in-silico drug-likeness and the considered DNA interaction study were explored. The binding action between the M2+ complex and DNA would be within the electrostatic minor groove, intercalation and replacement binding modes.

Title	Size-dependent biodistribution of thiol-organosilica nanoparticles and F4/80 protein expression in the genital tract of female mice after intravaginal administration
Authors	Awaad, A., Nakamura, M.
Journal	Histochemistry and Cell Biology, 155(6), pp. 683-698
Abstract	Recently the vaginal route consider as an ideal route for drug delivery systems (DDS) administration. This is because, it is suitable for lower drug dosage, higher drug concentration in the genital tract tissues and lower drug concentration in pregnant women blood circulation. However, the vaginal route administration faces many challenges due to the physiology as well as the complexity of vaginal tissue histology. Here in this study, during diestrus stage (optimal condition for foreign substance internalization), single or dual size of fluorescent thiol-organosilica nanoparticles (tOS-NPs) were administrated intravaginally. The biodistribution and reactivity of tOS-NPs in different tissues of the female genital tract were investigated under the fluorescence microscope. Furthermore, using immunohistochemical staining, the expression of F4/80 protein and the role of macrophages in transport and re-location of tOS-NPs from vaginal lumen into different genital tissues or other organs were investigated. This study showed that, tOS-NPs size and type of tissue are important in biodistribution and uptake of tOS-NPs in the genital tract. Small size (100 nm) of tOS-NPs was highly accumulated in the genital tract tissues especially endometrial epithelium compared with large tOS-NPs (1000 nm). Contradictory, the large size induced the expression of F4/80 protein and the number of vaginal macrophages compared with small size. However, both small and large sizes of tOS-NPs were found co-localized with F4/80+ macrophages, located in the vaginal, endometrial and ovarian tissues. The tOS-NPs intravaginally administrated were found in the splenic tissues, indicating its ability to enter the blood circulation from the vaginal lumen. Additionally, the high accumulation of tOS-NPs in the endometrial epithelium indicated the endometrial first pass effect of tOS-NPs. As a result, high concentration of tOS-NPs in the endometrial epithelium may reduce the concentration of tOS-NPs-based DDS in the blood circulation and their side effects. Furthermore, during vaginal tissue optimal condition (diestrus stage), understanding the fate and biodistribution of tOS-NPs will introduce important data about the development of save and effective DDS for the pregnant women.

Title	Synergistic inhibition effect of novel counterion-coupled surfactant based on rice bran oil and halide ion on the C-steel corrosion in molar sulphuric acid: Experimental and computational approaches
Authors	Abd El-Lateef, H.M., Khalaf, M.M.
Journal	Journal of Molecular Liquids, 331,115797
Abstract	The counterion-coupled surfactant (RBOS-12) based on rice bran oil is synthesized, characterized, and evaluated as a new inhibitor for carbon steel corrosion. The inhibition, and synergistic effect performance of individual RBOS-12, and that is combined with chloride ions on the corrosion of carbon steel in a molar sulphuric acid medium at 30–60 ± 1 °C has been examined using open circuit potential-time, linear polarization resistance (LPR) corrosion rate, impedance spectroscopy (EIS), potentiodynamic polarization (PDP), surface topology (Field emission-scanning electron microscopy/Energy dispersive X-ray analysis (FE-SEM/EDS), X-ray diffraction (XRD) and UV–vis spectroscopic studies), density functional theory (DFT) and molecular dynamics (MD) simulations. Experimental findings exhibited that the inhibition capacity of individual RBOS-12 is 95.5% at the concentration of 1.0 × 10−3 M. Synergistic inhibition effect was observed between the RBOS-12 surfactant and the Cl- ion additives, with the maximum corrosion inhibition capacity as high as ~99.1% at 1 × 10–5 M RBOS-12 + 0.1 M Cl- ions. The individual RBOS-12 and RBOS-12/Cl− system get adsorbed onto the metal interface through mixed categories of adsorption mainly with the chemisorption. Meanwhile, the adsorption mode follows the Langmuir isotherm model. FE-SEM/EDS and XRD investigates approve the protective and adsorption capabilities of the individual RBOS-12 and RBOS-12/Cl− inhibitor systems. UV–vis spectroscopic analysis display that the additive interacts with metal in H2SO4 medium to form Fe-inhibitor complexes. DFT calculations and MD simulations further support the empirical outcomes. The findings exhibited that the prepared RBOS-12/Cl- system can be used as economic, eco-friendly, and efficient corrosion inhibitor with good anticorrosion properties for metals in acidic environments.

Title	The effective reduction of graphene oxide films using RF oxygen plasma treatment
Authors	El-Hossary, F.M., Ghitas, A., El-Rahman, A.M.A., Shahat, M.A., Fawey, M.H.
Journal	Vacuum, 188,110158
Abstract	Graphene Oxide (GO) has attracted strong research interest due to its unique mechanical, thermal, electrical, and magnetic properties. Herein, a simple oxygen plasma process is used as an eco-friendly, novel and effective surface treatment technique to enhance the microstructure, adhesion force, and electrical properties of the GO films. GO films were treated in a plasma oxygen environment at a constant RF power of 300 W and different processing times ranging from 0 to 7 min. X-ray photoelectron spectroscopy (XPS) and Raman spectroscopy are utilized to examine changes in the type of surface groups and the distribution of bonds energy before and after plasma treatment. Additionally, the effect of RF oxygen plasma treatment on other properties, such as thermal stability, surface roughness, contact angle, work of adhesion, wettability, electrical conductivity, and sheet resistance has been studied. XPS data revealed that RF oxygen plasma treatment reduced the amount of oxygen-containing groups (such as epoxides (O–C[dbnd]O), carbonyls (C–O–C), and carboxyl's (O–C[dbnd]O) from 48.8% for the as-prepared GO film to 33.56% after 5 min of treatment. In addition, the average surface roughness (Ra) increased from ~7.8 of as-prepared GO film to ~8.7 μm, while the work of adhesion improved to reach 134.84 mN/m. However, with increasing plasma processing time up to 7 min, the thermogravimetric analysis (TGA) of the treated GO film showed a weight loss difference of 51.66%. Furthermore, introducing a high amount of C[dbnd]O bonds (carbonyl and SP2 groups of carbon atoms) after plasma treatment improved the electrical conductivity to a value of 0.156 S/m. The current results indicate that the properties of GO can be tuned by varying the degree of oxidation, which may pave the way for new developments in GO-based applications.

Title	$LiTaO_3$ assisted giant strain and thermally stable energy storage response for renewable energy storage applications
Authors	Alzaid, M., Alsalh, F., Malik, R.A., (...), Hadia, N.M.A., Mohamed, W.S.
Journal	Ceramics International, 47(11), pp. 15710-15721
Abstract	Piezoceramics with composition (1–z) [Bi0.5(Na0.84K0.16)0.5TiO3]0.96–0.04SrTiO3–zLiTaO3 (z = 0.00–0.030) were formulated by ordinary firing process following by rapid quenching treatment. Effect of LiTaO3 on the structural, electrical and energy-storage properties were analyzed. For the composition with molar ratio 0.025, room temperature large-field piezoelectric coefficient (Smax/Emax = d33*) of 885 pm/V at 3.6 kV/mm was recorded. Furthermore, for compositions z = 0.025 and 0.030, broad temperature stable dielectric constants and low losses from ~135 to 350 °C with a small variation of ± 15% was observed. Additionally, the energy density for z = 0.025 was ~0.60 J/cm3 in the broader temperature range of 75–125 °C, along with the energy-storage efficiency of greater than 70%. These observations suggest that the studied piezo-material compositions are promising for the ceramic actuators and capacitor applications.

Title	Investigating the effects of copper sulfate and copper oxide nanoparticles in Nile tilapia (Oreochromis niloticus) using multiple biomarkers: the prophylactic role of Spirulina
Authors	Soliman, H.A.M., Hamed, M., Sayed, A.E.-D.H.
Journal	Environmental Science and Pollution Research, 28(23), pp. 30046-30057
Abstract	Copper has toxic effects in fish, whereas the cyanobacterium Spirulina reportedly has protective effects against metal toxicity in various animal species. The current study, therefore, aimed to investigate the prophylactic role of Spirulina platensis against the effects of copper sulfate (CuSO4) and copper oxide nanoparticles (CuO-NPs) in Nile tilapia (Oreochromis niloticus). Biochemical, antioxidant, erthyron profile and histopathological endpoints were assessed after for 15 days of exposure in five separate treatment groups: (1) fish pre-fed the normal diet (control), (2) fish pre-fed the normal diet and exposed to 15 mg/L of CuSO4, (3) fish pre-fed the normal diet augmented with 0.25% Spirulina and exposed to 15 mg/L of CuSO4, (4) fish pre-fed the normal diet and exposed to 15 mg/L of CuO-NPs, and (5) fish pre-fed the normal diet augmented with 0.25% Spirulina and exposed to 15 mg/L CuO-NPs. Exposure to CuSO4 or CuO-NPs significantly increased superoxide dismutase and catalase activities in fish, as well as serum total protein, glucose, aspartate aminotransferase, alanine aminotransferase, creatinine, and uric acid concentrations. In contrast, most hematological indices in fish significantly decreased after CuSO4 or CuO-NPs exposure. Moreover, CuSO4 and CuO-NPs caused a significant increase in the percentage of poikilocytosis and nuclear abnormalities of red blood cells, as well as histopathological changes in the brain, liver, intestine, and kidneys. Importantly, Spirulina supplementation mitigated against physiological disruption caused by CuSO4 or CuO-NPs. Graphical abstract: [Figure not available: see fulltext.]

Title	An overtime production inventory model for deteriorating items with nonlinear price and stock dependent demand
Authors	Abdul Halim, M., Paul, A., Mahmoud, M., (...), Alazzawi, A.Y.M., Ismail, G.M.
Journal	Alexandria Engineering Journal, 60(3), pp. 2779-2786
Abstract	The goal of this work is to discuss a production inventory model for deteriorating items with nonlinear price and linear stock dependent market demand along with an overtime production opportunity. The corresponding optimization problem is articulated mathematically and hence solved by using lingo software. To examine the proposed nonlinear optimization problem's significance, one numerical example is deliberated. A sensitivity analysis is accomplished on the basis of the systematic changes of the system parameters. As a final point, based on the accomplished analysis an effectual conclusion is reflected.

Title	Role of Cu dilute on microstructures, optical, photoluminescence, magnetic and electrical properties of CdS film
Authors	Alzaid, M., Alwshih, M., Abd-el Salam, M.N., Hadia, N.M.A.
Journal	Materials Science in Semiconductor Processing, 127,105687
Abstract	Thin films of CdS1-xCux (with 0 ≤ x ≤ 0.10) were deposited using electron beam evaporation. Using XRD, EDX, SEM and UV–Vis–NIR spectroscopy, the impact of [Cu]/[S] on the film properties was examined. The influences of various concentrations of Cu are also elucidated on the optical parameters of the films. The XRD analysis shows that the thin films of CdS1-xCux have been improved and have hexagonal polycrystalline structure with the increase of Cu doping ratio. Additionally, the crystallite size is reduced while the micro-strain ε increases with enhancement of the incorporation of Cu in CdS lattice. The envelope method was used to extract the optical parameters of the undoped and Cu-doped CdS films. With the increase of Cu concentration, the energy optical bandgap decreased, and the variation values of band gap could play an important role in solar cell applications. Another optical parameters such as, dissipation factor and real/imaginary dielectric constant parts were evaluated and demonstrated a strong Cu doping dependence. The shift observed in the photoluminescence spectra emission band confirmed Cu's substitution to CdS lattice. The measurements of magnetization using vibrating sample magnetometer illustrated a hysteresis loop in Cu-doped CdS films, and confirmed the room temperature ferromagnetism. Finally, the Hall effect results show that the pure CdS film corresponds to an n-type semiconductor with a resistivity of 8.11 × 10-2 Ω cm and a carrier concentration of 29.6 × 1019 cm-3, and the CdS:Cu film is a p-type semiconductor and the resistivity is reduced from 6.8 × 10-2 to 3.7 × 10-2 Ωcm, and the carrier concentration is reduced from 26.4 × 1019 to 4.1 × 1019 cm-3, which has potential application prospects in solar cells.

Title	Electromagnetic field and initial stress on a photothermal semiconducting voids medium under thermoelasticity theories
Authors	Khalil, E.M., Abo-Dahab, S.M., Kilany, A.A.
Journal	Mathematical Methods in the Applied Sciences, 44(9), pp. 7778-7798
Abstract	In this paper, we investigate a volume fraction, electromagnetic field, photothermal, and initial stress impact on a homogeneous isotropic semiconducting generalized thermoelasticity solid. Three generalized thermoelasticity theories are considered: classical dynamical (CD), Lord and Shulman (LS), and dual-phase-lags (DPL). The equations governing the problem are presented considering the voids, photothermal, semiconducting, initial stress, and parameters concerning the theory of thermoelasticity in a generalized form. We applied the normal mode technique analysis to solve the algebraic system of equations in this phenomenon under suitable boundary conditions. The results showed that the photothermal, voids as a volume fraction, process of semiconductor, electromagnetic field, thermal relaxation times, and initial stress have a significant impact on the phenomenon. The physical quantities with some analytical comparisons are introduced analytically and displayed in graphs. A comparison was made between the obtained results and the works presented by others. If the volume fraction, electromagnetic field, and initial stress are neglected, the results obtained are deduced to Abo-Dahab and Lotfy as a special case from the present study. The results obtained with neglecting the external parameters, viz, electromagnetic field, initial stress, voids, and phase lags, and considering the Laplace transform technique agree with the results of other works.

Title	Hyperbolic Two-Temperature Photo-Thermal Interaction in a Semiconductor Medium with a Cylindrical Cavity
Authors	Abbas, I., Saeed, T., Alhothuali, M.
Journal	Silicon, 13(6), pp. 1871-1878
Abstract	Photo-thermal-elastic interactions in an unbounded semiconductor media containing a cylindrical hole under a hyperbolic two-temperature are investigated using the coupled theory of thermo-elasticity and plasma waves. A new hyperbolic two-temperature model is used to study this problem. The internal surface of the cylindrical cavity is loaded by exponentially decaying pulse boundary heat flux and traction free. The Laplace transform technique are presented to obtain the exact solutions of this problem in the transformed domains by the eigenvalue approach. The inverse of Laplace transforms was numerically carried. The results show that the analytical solutions can overcome the mathematical problems to analyzes this problem. According to the numerical outcomes, the hyperbolic two-temperature thermoelastic theory offers finite velocity of the mechanical waves and thermal waves propagations.

Title	Characteristics of the temporal behavior of quantum Fisher information and entanglement between radiation field and two atoms under atomic motion effect
Authors	Hilal, E., Alkhateeb, S., Khalil, E.M., (...), Alotaibi, H., Almowalled, A.A.
Journal	Modern Physics Letters B, 35(15),2150259
Abstract	The influence of time dependence on the model which consists of two qubits interacting with a two-mode electromagnetic field of the parametric amplifier type is investigated. The analytical solution of the wave function is obtained. The quantum Fisher information, entanglement and population inversion for a time-dependent system are analyzed. The photon statistics of a single-mode are quantified by the evolution of the Mandel parameter. Our results showed that there exists a positive relationship between the time-dependent parameter and entanglement. In other words, the time-dependent parameter due to the degree of entanglement is increased. Also, the quantum quantifier is strongly affected by the time-dependent coupling parameter in the absence and presence of the detuning parameter. This enables new parameters to control the degree of entanglement and quantum Fisher information, especially in quantum communication.

Title	Development of silk fibers decorated with the in situ synthesized silver and gold nanoparticles: antimicrobial activity and creatinine adsorption capacity
Authors	Rehan, M., El-Naggar, M.E., Al-Enizi, A.M., (...), Nafady, A., Abdelhameed, R.M.
Journal	Journal of Industrial and Engineering Chemistry, 97, pp. 584-596
Abstract	In this study, to impart silk fibers with excellent coloration, UV-protection, antimicrobial activity, as well as creatinine adsorption from artificial blood, silk fibers were designed via facile fabrication approach. These diverse properties were introduced by in-situ incorporation of nanoparticles based on either silver (AgNPs) or gold (AuNPs) as well as bimetallic (Ag-AuNPs) onto silk fibers using an eco-friendly, effective one-pot process. The proteins present in the silk fibers acted as a redox-active bio-template to reduce the Ag(I) and Au(III) ions to their zero-valent state with simultaneous deposition of the generated nanoparticles onto the silk fiber surfaces. The obtained results clearly indicated that both AgNPs and AuNPs colored the silk fibers with brown and red color, respectively, thereby affirming the deposition of these metallic NPs onto and inside the surface of silk fibers as S/Ag-AuNPs. Significantly, the prepared colored silk fibers exhibited excellent antimicrobial and cytotoxicity activities against different pathogenic microbes as well as very good UV protection properties. Moreover, the results attested that the as prepared S/AgNPs and S/AuNPs fibers have good adsorption potential with maximal adsorption capacity of creatinine in artificial blood was found to be 94.2 mg/g for S/AuNPs sample, which is 1.55 times greater than that of silk fibers.

Title	Ni(II) mixed-ligand chelates based on 2-hydroxy-1-naphthaldehyde as antimicrobial agents: Synthesis, characterization, and molecular modeling
Authors	Ismael, M., Abdel-Mawgoud, A.-M.M., Rabia, M.K., Abdou, A.
Journal	Journal of Molecular Liquids, 330,115611
Abstract	New Ni (II) ternary chelates; based on 2-hydroxy-1-naphthaldehyde Schiff-base ligand with various N-heterocyclic co-ligands, were synthesized and characterized. Structural analysis were performed to estimate the chelates stability based on the cis- and trans-orientation around the Ni(II)-center using density functional theory (DFT) calculations. Moreover, selected quantum chemical descriptors had been computed using frontier molecular orbitals to evaluate the reactivity based on the electronic structural analysis. Pharmaceutical potential of the subject molecules have been estimated by screening the most important drug-likeness parameters. In silico investigation revealed that the target compounds could be potential bioactive drug-like molecules. Mixed-ligand effect on antimicrobial activity was in-vitro screened against pathogenic bacteria; E. coli (G−), and B. cereus (G+), as well as A. fumigatus fungi. Interestingly, presence of co-ligand in the ternary Ni (II) chelates led to higher enhancement in the antimicrobial behavior comparing with its binary one. Finally, both theoretical and experimental data were combined for generating a structure activity relationship (SAR) model that might be used for the developing of new metal chelates as antimicrobial agents.

Title	Generalized thermo-elastic interaction in a fiber-reinforced material with spherical holes
Authors	Hobiny, A.D., Abbas, I.A.
Journal	Structural Engineering and Mechanics, 78(3), pp. 297-303
Abstract	In this paper, a mathematical model is used to the evaluation of thermoelastic interactions in fiber-reinforced material with a spherical cavity. With the goal of establishing the generalized thermoelastic model with thermal relaxation time are exploited. inner surface of the spherical cavity is tractions free and loaded by the uniform step in temperature. The finite element scheme is used to get the problem numerical solutions. The numerical results have been discussed graphically to show the impacts of the presence and the absence of reinforcement.

Title	Sensitivity of Polarization Observables in γ d→ π^0d Reaction Near Threshold to the Choice of Elementary γ N → πN Amplitude and Deuteron Wave Function
Authors	Darwish, E.M., Al-Ghamdi, H.M.
Journal	Moscow University Physics Bulletin, 76(3), pp. 136-150
Abstract	Abstract: We study the sensitivity of polarization observables in γ d→ π0d reaction near threshold to the choice of elementary γN → πN amplitude and NN potential model adapted for the deuteron wave function (DWF). Numerical results for various beam, target, and beam–target polarization observables are presented and systematic uncertainties caused by the use of different elementary operators and DWFs are evaluated. The calculations are based on a γd → π0d approach in which realistic models for the elementary pion production amplitude and the DWF are used. We find considerable dependencies of the estimated results for all possible polarization observables on the elementary amplitude. The spin asymmetries Σ, Tc21, Tl10, and Tl20, and T20 show large sensitivities to the DWF. In contrast, the asymmetries T11, T2M (M = 0, 1, 2),, and E as well as the helicity differenced(σP − σA)/dΩ have slight dependence on the DWF only at photon energies very close to π-threshold. The unpolarized differential cross section is also predicted and compared with the available experimental data, and a satisfactory agreement is obtained only at forward pion angles. We expect that the results presented here may be useful to interpret the recent measurements from Jefferson Lab, TAPS@ELSA, A2 and GDH@MAMI Collaborations.

Title	A novel four-step iterative scheme for approximating the fixed point with a supportive application
Authors	Hammad, H.A., Rehman, H.U., De La Sen, M.
Journal	Information Sciences Letters, 10(2), pp. 333-339
Abstract	Our goal of this manuscript is to introduce a novel iterative scheme for approximate fixed point within a fewer number of steps under weak contraction condition in Banach spaces (BSs). Moreover, we present a problem raised from the modeling of electrical circuits as an application of our proposed procedure. Also, to demonstrate the performance and validity of our iterative scheme, we presented numerical examples and figures.

Title	Analytical-numerical solutions of photo-thermal interactions in semiconductor materials
Authors	Abbas, I., Hobiny, A.D.
Journal	Information Sciences Letters, 10(2), pp. 189-196
Abstract	Analytical and numerical solutions are two basic tools in the study of photothermal interactions problems in semiconductor medium. This paper is devoted to a study of the photothermal interaction in semiconductor media in the context of the coupled photo-thermal theory. The governing relations are expressed in Laplace transforms domain and solved in the domain by the eigenvalue scheme. The numerical solution is obtained by using the implicit finite difference method (IFDM), the studied fields are obtained numerically and presented graphically. A comparison between the numerical solutions and the analytical solution are obtained. It is found that the implicit finite difference method (IFDM) is applicable, simple and efficient for such problems.

Title	Entanglement of a Nanowires System with Rashba Interaction
Authors	Mohamed, R.I., Eldin, M.G., Sakr, M.R., Ramadan, A.A., Abdel-Aty, M.
Journal	International Journal of Theoretical Physics, 60(5), pp. 1651-1661
Abstract	We propose a scheme to investigate the behavior of a ballistic nanowire system with Rashba interaction within a perpendicular magnetic field. The quantum entanglement of a nanowire system is discussed via the negativity. When the strong and weak magnetic fields are applied, we discuss the influence of the spin-orbit interaction and the initial states on the population inversion and the negativity. Our results show that the degree of entanglement for the nanowire system mainly depends on the effect of the spin-orbit interaction and the initial states of the system. This opens up new avenues for designing nanowire systems for future quantum computation and communication applications.

Title	Design, synthesis, and antibacterial screening of some novel heteroaryl-based ciprofloxacin derivatives as dna gyrase and topoisomerase iv inhibitors
Authors	Al-Wahaibi, L.H., Amer, A.A., Marzouk, A.A., (...), Youssif, B.G.M., Abdelhamid, A.A.
Journal	Pharmaceuticals 14(5),399
Abstract	A novel series of ciprofloxacin hybrids comprising various heterocycle derivatives has been synthesized and structurally elucidated using1H NMR,13C NMR, and elementary analyses. Using ciprofloxacin as a reference, compounds 1–21 were screened in vitro against Gram-positive bacterial strains such as Staphylococcus aureus and Bacillus subtilis and Gram-negative strains such as Escherichia coli and Pseudomonas aeruginosa. As a result, many of the compounds examined had antibacterial activity equivalent to ciprofloxacin against test bacteria. Compounds 2–6, oxadiazole derivatives, were found to have antibacterial activity that was 88 to 120% that of ciprofloxacin against Gram-positive and Gram-negative bacteria. The findings showed that none of the compounds tested had antifungal activity against Aspergillus flavus, but did have poor activity against Candida albicans, ranging from 23% to 33% of fluconazole, with compound 3 being the most active (33% of fluconazole). The most potent compounds, 3, 4, 5, and 6, displayed an IC50 of 86, 42, 92, and 180 nM against E. coli DNA gyrase, respectively (novobiocin, IC50 = 170 nM). Compounds 4, 5, and 6 showed IC50 values (1.47, 6.80, and 8.92 µM, respectively) against E. coli topo IV in comparison to novobiocin (IC50 = 11 µM).

Title	Hydrogeochemical processes controlling groundwater in Western Sohag Governorate, Upper Egypt
Authors	Embaby, A., Ali, M.
Journal	Arabian Journal of Geosciences 14(9),789
Abstract	In the Sohag Governorate, groundwater is a crucial source for rural households and public supply. Even some major villages rely on groundwater for drinking and irrigation. Groundwater in the investigated villages (i.e., Araya and Gaziert Shandwel) occurs in the Pleistocene porous aquifer resting on marine Pliocene clay sheets. The geochemistry and multivariate statistics (i.e., correlation matrix (CM) and cluster analysis (CA) have been utilized to assess processes affecting groundwater hydrogeochemistry and to investigate the degree of water-rock interaction and mixing processes. The major ions including (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, SO_4^{2-}, Cl^{-}, HCO_3^{-}) and the minor (NO_3^{-}, NH_4^{+}, Fe, and Mn) chemical constituents were measured in all groundwater samples. The data show that the groundwater chemistry is mainly affected by the geologic setting and impacted by the intense use of chemical fertilizers and wastewater percolation. Groundwater classification, binary diagrams, and hydrochemical processes were anticipated to evaluate groundwater characteristics in the regions of interest. The major ions reveal two main water types: Na-HCO_3 and Ca-HCO_3. Based on the chemical analyses, groundwater hydrogeochemistry is distinguished into two categories. The correlation analysis results indicate that natural processes are the prevailing processes affecting the groundwater geochemistry, whereas cluster analysis indicates the possible effects of human activities on the groundwater chemistry of both villages.

Title	Chaos control and Penta-compound combination anti-synchronization on a novel fractional chaotic system with analysis and application
Authors	Mahmoud, E.E., Trikha, P., Jahanzaib, L.S., Eshmawi, A.A., Matoog, R.T.
Journal	Results in Physics 24,104130
Abstract	The article introduces the fractional modified Sprott A chaotic system with its thorough dynamical analysis such as solution of system, Lyapunov dynamics, route to chaos etc. Penta-compound combination anti-synchronization is introduced and applied on twelve chaotic systems of fractional order using adaptive SMC. The system is also controlled about a randomly chosen point and The synchronization technique is illustrated as application to secure communication. The simulations are performed using MATLAB software.

Title	Electrical resistivity and magnetic susceptibility of substoichiometric CdO and In doped CdO films
Authors	Awad, M.A., Mohamed, S.H., Mohamed, S.A.
Journal	Applied Physics A: Materials Science and Processing 127(5),343
Abstract	Undoped and In doped substoichiometric CdO nanostructured films were prepared via vapor transport method. Mixed phases of hexagonal Cd and cubic CdO were obtained. No peaks related to In or indium oxides were observed in the In doped CdO pattern. Net-like assembles of nanowires were observed for undoped CdO sample whereas a regular morphology of equally shaped grains was observed for In doped CdO sample. The evaluated room temperature electrical resistivity values for undoped and In doped CdO films were 1.56 × 102 and 2.31 × 10–2 Ωcm, respectively. The temperature dependent resistivity measurements elucidated the semiconducting behavior for undoped CdO films, whereas a semiconductor–metal with a transition around 367 K was obtained for In doped CdO film. The magnetic susceptibility showed paramagnetic-antiferromagnetic transition with Néel temperatures of 266 and 308 for undoped and In doped CdO samples, respectively.

Title	Manipulation of optical properties in thin tetradymite layers
Authors	Adam, A.M., Elsehly, E.M., Elshafaie, A., (...), Diab, A.K., Nafady, A.
Journal	Optical Materials 115,111026
Abstract	Thin Bi2Se3 layers are promising material for many optical and optoelectronic applications. In this work, thin crystalline layers of Bi2-chalcogenides were deposited on highly cleaned glass substrates by vacuum thermal evaporation technique. The optical properties of the concerned layers were investigated with ultraviolet–visible-near infra-red (UV–Vis–NIR) spectra. The effect of thickness reduction and the annealing treatment have been studied. Thinning the film to few nanometers resulted in a significant enhancement of light transmission through the prepared materials. Also, simultaneous reduction of layer's thickness and annealing treatment significantly improved the optical transmission. Such transmissivity enhancement opens avenues for transparent electrode applications.

Title	Effect of Cu Metallic Interlayer Thickness on Optoelectronic Properties of TiO_2-Based Multilayers Deposited by DC Pulsed Magnetron Sputtering
Authors	El-Moula, A.A.A., El-Hossary, F.M., Raaif, M., Thabet, A., El-Kassem, M.A.
Journal	Journal of Electronic Materials, 50(5), pp. 2699-2709
Abstract	The effect of interference on the optoelectronic properties of TiO2/Cu/TiO2 multilayers deposited by DC pulsed magnetron sputtering was scrutinized. The TCT multilayers were arranged with different thicknesses of the Cu metallic interlayer. The outcomes revealed that the band gap energy of TiO2/Cu/TiO2 multilayers decreased with increasing Cu metallic interlayer thickness. The Eg value for TiO2 single layer recorded 3.49 eV and decreased to a value of 3.12 eV for the multilayer film deposited with a 30-nm Cu metallic interlayer. Moreover, the optical conductivity increased as the Cu interlayer thickness increased. Transmittance plots with reasonable numbers of interference fringes were employed to calculate the refractive index of the examined multilayers. The results indicated that the values of n gradually increased with increasing the Cu metallic interlayer thickness. The dispersion energy Ed and the single-oscillator energy Eo were determined using a WDD single oscillator model.

Title	Boosting the catalytic performance of zinc linked amino acid complex as an eco-friendly for synthesis of novel pyrimidines in aqueous medium
Authors	Ahmed, E.A., Soliman, A.M.M., Ali, A.M., Ali El-Remaily, M.A.E.A.A.
Journal	Applied Organometallic Chemistry, 35(5),e6197
Abstract	Zinc linked amino acid complex, Zn(l-proline)2, is considered as a green catalyst for the synthesis of novel series of pyrimidine derivatives 5a–q. The pyrimidines 5a–q were prepared via two pathways: the first is a one-pot reaction of guanidines 3a–c with aromatic aldehyde 1 and acetophenones 2; and the second one is the reaction of guanidines 3a–c with different chalcones 4a–j in aqueous medium. The simplicity of the operation, the short reaction time, and the high efficiency (97%) are the main advantages of this protocol. Furthermore, the green aspects of this synthetic protocol were further investigated by examining the reusability of Zn(l-proline)2 complex throughout five consecutive cycles without a significant loss of catalytic activity. This new procedure has presented remarkable advantages in terms of safety, simplicity, stability, mild conditions, a short reaction time, excellent yields, and high purities without using any organic solvents.

Title	Development and structure elucidation of new VO^{2+}, Mn^{2+}, Zn^{2+}, and Pd^{2+} complexes based on azomethine ferrocenyl ligand: DNA interaction, antimicrobial, antioxidant, anticancer activities, and molecular docking
Authors	Aljohani, E.T., Shehata, M.R., Alkhatib, F., Alzahrani, S.O., Abu-Dief, A.M.
Journal	Applied Organometallic Chemistry, 35(5),e6154
Abstract	An organometallic azomethine ferrocenyl ligand (FCAP) and its transition metal complexes ([M (FCAP)2], where M = VO2+, Mn2+ cations, and [M (FCAP) (CH3COO− or NO3−)], where M = Zn2+ and Pd2+ cations) were prepared. Their structures were confirmed via various spectral and physicochemical studies performed. The crystallinity of the investigated metal chelates was confirmed by X-ray diffraction data. The spectral data of the FCAP azomethine ligand and its metal chelates were explained concerning the structural changes due to complex formation. From the electronic spectra and the magnetic moments, the information about geometric structures can be concluded. The activation thermodynamic parameters of the thermal degradation for FCAP complexes were calculated utilizing the method of Coats–Redfern. in vitro antimicrobial, anticancer, and antioxidant activities of FCAP azomethine ligand and its complexes were screened. All the investigated metal chelates exhibited superiority on the free FCAP ligand in successful treatment. Moreover, the binding nature of the investigated complexes with calf thymus DNA (ctDNA) was examined by various methods such as spectrophotometry, viscosity, and, gel electrophoresis. Their binding feature to ctDNA was proposed to be electrostatic, intercalation, or replacement mode. Furthermore, molecular docking inspection has been conducted to clarify the nature of the binding and binding affinity of protein synthesized compounds (PDB:3hb5).

Title	Influence of different types of substrates on the physical properties of CdSe films
Authors	Ahmed, M.R., Ali, H.M., Hasaneen, M.F.
Journal	Physica B: Condensed Matter, 608,412747
Abstract	Cadmium Selenide, CdSe, thin films deposited on different substrate types; FTO/glass,/glass, and ITO/glass substrates were produced by thermal evaporation method in the room temperature. The influence of different types of substrates on the structural, optical and electrical properties of the films was studied by X-ray diffraction and absorption photo spectroscopy respectively. X-ray diffractions revealed that all the CdSe films have a polycrystalline with cubic structure having preferred orientation (111) at 2θ ≈ 25.1°. The optical energy band, Eg, values support the fact that the films have semiconductor behavior which can be attributed to the quantum confinement effect. It was observed that the optical properties such as transmittance, reflectance, optical bandgap, and refractive index and some another parameters of CdSe films were strongly affected by types of substrates. The electrical properties were measured at room temperature using two probe methods.

Title	Finite difference technique to solve a problem of generalized thermoelasticity on an annular cylinder under the effect of rotation
Authors	Abd-Alla, A.M., Abo-Dahab, S.M., Kilany, A.A.
Journal	Numerical Methods for Partial Differential Equations, 37(3), pp. 2634-2646
Abstract	This article estimates the action of rotation on a generalized thermoelasticity model which contains one thermal relaxation time for an infinitely long, annular, isotropic cylinder with temperature-dependent physical properties. This is numerically solved using the finite difference technique under the effect of rotation, and the effect of decaying heat flux on the obtained components is graphically presented. Numerical results are presented to show the influence of the various parameters. A comparison between the current results and previous results obtained by others neglecting the new parameters is provided.

Title	Structural, conformational and therapeutic studies on new thiazole complexes: drug-likeness and MOE-simulation assessments
Authors	Abu-Dief, A.M., El-Metwaly, N.M., Alzahrani, S.O., (...), El-Dabea, T., Ali El-Remaily, M.A.E.A.A.
Journal	Research on Chemical Intermediates, 47(5), pp. 1979-2002
Abstract	A series of new complexes derived from Pd(II), Cu(II) and Fe(III) ions reacted with thiazole derivative (HL, CPTP) was prepared. Structures of all new compounds were characterized and confirmed using analytical and spectroscopic (IR, UV–Vis and 13C&1H NMR) techniques. All complexes have non-electrolytic nature based on molar conductance measurements. TGA was executed to confirm the presence of water molecules inside or outside the coordination sphere as well as the mono-nuclear feature of isolated complexes. Accordingly, thermo kinetic parameters were calculated for all decomposition steps. The obtained analytical data regarding complexation in solution, molar ratio and continuous variation methods suggest 1 M:1 L molar ratio. The oriented structures using advanced program assert on best distribution for coordinating sites (NH& NH2). Moreover, electrostatic potential map as well as iso-surface with array plot of ligand reflects high nucleophilic feature with reduced outer contour on two coordinating sites. In vitro antimicrobial, anticancer and antioxidant activities of ligand and its complexes were checked. All complexes exhibited superiority on free ligand in successful treatment, specifically CPTPPd complex. Drug-likeness as well as MOE-docking simulation outcomes indicates promising inhibitory feature of CPTPPd and CPTPCu complexes, in agreement with in vitro results.

Title	Flood hazard assessment and characteristics of cement kiln dust in Ain Sukhna industrial area, north-western part of the Gulf of Suez, Egypt
Authors	Redwan, M., Mahran, T.M., Mohamed, M.T., Mohamed, Y.S.
Journal	Environmental Progress and Sustainable Energy, 40(3),e13546
Abstract	This study investigated the geochemical and mineralogical characteristics combined with heavy elements concentrations of Cement kiln dust (CKD) in Ain Sukhna industrial area, North-western part of the Gulf of Suez, Egypt and the influence of flash floods in its stability. Flooding severity is moderate with several water erosional processes. The CKD characterized by very poorly sorted/very fine-sands to silt. CaO and SiO2 are major components with enrichment of chloride/sulfate ions. High enrichment of Sr, Zn, Pb, Cd, Sb, and Se are related to variations in shale/limestone feeds during cement formation. The threshold effect level exceeds the standard value for Cd, Pb, and Zn at S3 that indicates adverse biological effects. Sylvite, calcite, and halite minerals were dominated. Three main principal components recognized the shale, calcium/magnesium carbonate dissolution, and the scavenging effect of sulfate for heavy elements. Monitoring the CKD leachability and proper management plans are prerequisite for environmental protection in the future.

Title	Hepatosplenic Protective Actions of Spirulina platensis and Matcha Green Tea Against Schistosoma mansoni Infection in Mice via Antioxidative and Anti-inflammatory Mechanisms
Authors	Ramez, A.M., Elmahallawy, E.K., Elshopakey, G.E., (...), Abdo, W., El-Shewehy, D.M.M.
Journal	Frontiers in Veterinary Science, 8,650531
Abstract	Schistosomiasis, a major parasitic illness, has high morbidity and negative financial effects in subtropical and tropical countries, including Egypt. The present study investigated the therapeutic effects of Spirulina platensis (SP) and matcha green tea (MGT) in Schistosoma mansoni-infected mice combined with tracing their possible antioxidant and anti-inflammatory impacts and their protective potency. A total of 60 Swiss albino mice were randomly allocated into six groups (n = 10): control group (CNT, received normal saline); SP–MGT group [received oral SP (3 g/kg bodyweight/day) plus MGT (3 g/kg bodyweight/day)]; S. mansoni group (infected with S. mansoni cercariae, 100 ± 10/mouse, using the tail immersion method); SP-infected group (infected with S. mansoni and received oral SP); MGT-infected group (received oral MGT after S. mansoni infection); and SP–MGT-infected group (received combined treatment of SP and MGT after S. mansoni infection). Treatment with SP and MGT started 4 weeks after S. mansoni infection and ended 10 weeks after. SP and MGT treatment (SP-infected and MGT-infected groups) and the combined treatment (SP–MGT-infected group) minimized the hepatic damage induced by S. mansoni; circulating alanine aminotransferase and aspartate transaminase decreased, and total protein, albumin, and globulin serum levels increased. The serum level of malondialdehyde significantly declined, and catalase, glutathione peroxidase, superoxide dismutase, and total antioxidant capacity increased in SP-infected, MGT-infected, and SP–MGT-infected groups compared with the infected group. Co-administration of SP and MGT reduced serum cytokine levels (tumor necrosis factor-alpha, interferon-gamma, and interleukin-13) and increased interleukin-10 levels after S. mansoni infection compared with the infected group. Moreover, treatment with SP and/or MGT decreased the number of granulomas in hepatic and splenic tissues compared with the infected group. Collectively, our results suggest that combined SP and MGT treatment is effective for S. mansoni infection. Liver and spleen tissue alterations were improved, the antioxidant systems were stimulated, and the inflammatory response was suppressed. Further research is recommended to investigate the mechanisms of the combined SP and MGT treatment effects to facilitate the development of novel therapies against this disease.

Title	Synthesis of highly crystalline $LaFeO_3$nanospheres for phenoxazinone synthase mimicking activity
Authors	Khairy, M., Mahmoud, A.H., Khalil, K.M.S.
Journal	RSC Advances, 11(29), pp. 17746-17754
Abstract	LaFeO3 nanospheres with an orthorhombic perovskite structure were synthesized by a sol-gel autocombustion method in the presence of different citric acid ratios (x = 2, 4, 8, and 16) and utilized for the photocatalytic conversion of o-aminophenol (OAP) to 2-aminophenoxazine-3-one (APX) for the first time. OAP is one of the most toxic phenolic derivatives used as a starting material in many industries; however, the dimerization product APX has diverse therapeutic properties. Photocatalytic conversion was carried out in ethanol/water and acetonitrile/water mixtures in the absence and presence of molecular oxygen at ambient temperature via the oxidative coupling reaction that mimics phenoxazinone synthase-like activity. The LaFeO3 samples showed a superior photocatalytic activity of OAP to APX with rate constants of 0.43 and 0.92 min-1 in the absence and presence of molecular oxygen, respectively. Thus, the LaFeO3 nanozymes could be used as promising candidates in industrial water treatment and phenoxazinone synthase-like activity.

Title	Towards a highly efficient air purifier using annular photonic crystals in UV regimes
Authors	Ameen, A.A., Elsayed, H., Aly, A.H.
Journal	RSC Advances, 11(25), pp. 14915-14921
Abstract	Air purifiers play a vital role in fighting the spread of airborne transmitted diseases like COVID-19, rubeola, Mycobacterium tuberculosis, and varicella-zoster, which represent a fundamental challenge. This paper introduces a new enhancement to ultraviolet (UV) air purifiers in air ventilation systems, which delivers a higher inactivation UV dose, eliminating the need for either higher exposure time or a stronger UV source. The modified transfer matrix method in the cylindrical geometry represents the main tool of our theoretical considerations. The new enhancement utilizes an annular photonic crystal (APC) for reflecting UV radiation 99%. The numerical simulation shows that the structure is stable over a wide range of operating scales that fit the extensive range of air purifiers, working at different scales. Additionally, the possibility of using APC over a wide range of UV sources is investigated.

Title	Characterization of defect levels in β-Ga_2O_3single crystals doped with tantalum
Authors	Liu, H., Zhang, N., Yin, J., (...), Wan, L., Mohamed, H.F.
Journal	CrystEngComm, 23(15), pp. 2835-2841
Abstract	We present a detailed study on the crystal structure of 0.10 mol% Ta-doped β-Ga2O3crystals before and after annealing treatment in air by high-resolution X-ray diffraction and Raman spectroscopy, as well as the detection of point defects through the variation of photoluminescence excitation (PLE) and photoluminescence (PL) with temperature. Based on the experimental data, the band diagram of the 0.10 mol% Ta-doped β-Ga2O3crystal is constructed. The crystal quality of the 0.10 mol% Ta-doped β-Ga2O3crystal was improved after annealing treatment. The PL spectra exhibited two ultraviolet emission bands (UV ∼3.59 eV, UV′ ∼3.22 eV) and a blue emission band (BB ∼2.73 eV) , which are ascribed to the recombination of self-trapped excitons at the trigonal OIand OIIsites and gallium vacancies in the (2−) charge state (tetrahedral site), respectively. The work function of the 0.10 mol% Ta-doped β-Ga2O3crystal increased from 5.28 eV to 5.38 eV as a result of annealing treatment.

Title	Synthesis and anti-hyperglycemic evaluation of novel carboximidamides derived from cyanamides
Authors	Moustafa, A.H., Ahmed, W.W., Khodairy, A., (...), Moustafa, A., El-Sayed, M.F.
Journal	Journal of Molecular Structure, 1230,129888
Abstract	Carboximidamides 4-10 and 4,5-dihydro-1H-imidazol-2-amines 11, 12 linked with pyrimidine moiety were obtained via reaction of N-(pyrimidin-2-yl)cyanamides 1-3 with amines such as; morpholine, piperidine, piperazines and/or ethylenediamine, respectively. N-(4,6-Dimethylpyrimidin-2-yl)morpholine-4-carboximidamide 4 is subjected to react with 4-methylbenzenesulphonyl-, benzoyl-, and/or terephthaloyl chloride to give the corresponding N-substituted carboximidamides 13-16. The structure of new compounds was confirmed by using FT-IR and NMR spectral data. X-ray single crystal diffraction analysis of 15 revealed that the structure belongs to the monoclinic system and has a chair conformation in a morpholine ring. DMSO and carboximidamides 6, 8 caused a significant decrease in the serum level of glucose, comparing with the diabetic-treated group (streptozotocin-treated group). Furthermore they restored the serum levels of ALT, AST, triglyceride and cholesterol (Biomarker of liver function) to the levels similar or slightly higher than of the negative control group. Also, the biomarkers of kidney function (serum urea and creatinine) were restored to the level urea or slightly higher than their negative control on the administration of DMSO and carboximidamides 6, 8. So it can be concluded that, DMSO and carboximidamides 6, 8 may be used as ameliorative agents against streptozotocin-induced a pathological effects on blood glucose, liver function and kidney function. Morever, it can be stated that these compounds may be more effective in reducing the pathological effects of streptozotocin-induced diabetes than that of metformin.

Title	Fabrication of electrospun nickel sulphide nanoparticles onto carbon nanofibers for efficient urea electro-oxidation in alkaline medium
Authors	Abdel Hameed, R.M., Mohamed, I.M.A., Al-Enizi, A.M., (...), Shaikh, S.F., Yousef, A.
Journal	International Journal of Hydrogen Energy, 46(24), pp. 12944-12960
Abstract	o design and synthesize a noble-metal free electrocatalyst with increased efficiency and stability during urea electro-oxidation in alkaline solution is still an important challenge in the electrocatalytic field. In this work, carbon nanofibers were decorated with nickel sulphide nanoparticles [NiS@CNFs] through the electrospinning technique with subsequent heating into an argon atmosphere at 900 °C for 2 h. This formed nanomaterial was extensively characterized through X-ray diffraction (XRD), field-emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), energy dispersive X-ray analysis (EDX), Raman spectroscopy and N2 adsorption-desorption measurements. A conductive network of intertwined CNFs was clearly detected by FE-SEM analysis technique with varied diameters in the range of 0.6–1 μm. A highly porous nature could be suggested after incorporating NiS nanospecies resulting in increased specific surface area and valuable electrocatalytic activity for urea molecules electro-oxidation. The pore size distribution curves showed a decreased average pore diameter for NiS@CNFs nanocomposite by 2.53 folds when compared to that at CNFs. The electroactivity of NiS@CNFs nanomaterial for catalyzing urea electro-oxidation was investigated using cyclic voltammetry, chronoamperometry and electrochemical impedance spectroscopy measurements. Increased activity of this nanocatalyst was registered when urea molecules were added in increased concentrations into KOH solution. Lowered resistance values were also obtained describing the charge transfer process to confirm the feasibility of the studied reaction at NiS@CNFs surface. Moreover, its drawn chronoamperogram showed a stable performance during operation for long periods revealing a lowered catalytic decay. Accordingly, the aforementioned results of our fabricated nanomaterial could provide a good guide for fabricating suitable electrocatalysts for various electrocatalytic purposes.

Title	Experimental and computational approaches of sustainable quaternary bisammonium fluorosurfactants for corrosion inhibition as protective films at mild steel/H_2SO_4 interface
Authors	Tantawy, A.H., Soliman, K.A., Abd El-Lateef, H.M.
Journal	Colloids and Surfaces A: Physicochemical and Engineering Aspects, 614,126141
Abstract	Three novel quaternary bisammonium fluorosurfactants (FGS-4, FGS-6, and FGS-8) were designed and synthesized using furan-2,5-diylbis(methylene) bis(2-bromoacetate) with N-(3-(dimethylamino)propyl)-1,1,2,2,3,3,4,4,4-nonafluoroalkan-1-sulfonamide through a heterocyclic spacer of 3,3′-((furan-2,5-diylbis(methylene))bis(oxy))bis(3-oxopropan-1-ylium) to connect two fluorocarbon tails. Their corrosion protection characteristics of mild steel/1.0 M H2SO4 solution interface at different temperatures were inspected by electrochemical (PDP and EIS) and weight loss measurements. The PDP plots established that the three-quaternary bisammonium fluorosurfactants are mixed-type inhibitors; EIS experiments exhibited that the as-prepared surfactants possess the superior protection capacities of 93.5 % (FGS-4), 95.5 % (FGS-6), and 96.6 % (FGS-8) at the optimum dose of 2.00 mmol L−1. The Adsorption considerations showed that the three additives demonstrated both the physisorption and chemisorption mechanisms and followed the Langmuir model. Surface morphology investigations indicated that the synthesized fluorocarbon surfactants impeded mild steel corrosion. The relationships between the protection performance of the fluorocarbon surfactants, their molecular configurations, and the adsorption mode were checked by DFT calculations and MD simulations, which confirmed that FGS-8 has a higher protection power than FGS-4 and FGS-6. The current investigation exhibited that quaternary bisammonium fluorosurfactants could be used as eco-friendly, economic, and efficient inhibitors for mild steel corrosion with the probable for extensive applications.

Title	Microbial detoxification of dimethoate and methomyl residues in aqueous media
Authors	Derbalah, A., Massoud, A., El-Mehasseb, I., (...), Al-Brakati, A., Elmahallawy, E.K.
Journal	Water (Switzerland), 13(8),1117
Abstract	AbstractThe extensive and random application of major organic pollutants, mainly pes-ticides, threatens ecosystems and human health. The present study was conducted to isolate and identify microorganisms from some water resources contaminated with pesticides. We investigated the ability of the identified microbes to grow in water spiked with dimethoate and methomyl. We also evaluated the potential effect of the identified microbial isolates on dimethoate and methomyl biodegradation in water. In addition, the total detoxification of dimethoate and methomyl residues in water after treatment with the most effective microbial isolates was confirmed using toxicity tests and analyzing biochemical parameters and histopathological changes in the kidney and liver of treated rats. The microbial isolates were identified as Xanthomonas campestris pv. Translucens and Aspergillus fumigates. Results showed that X. campestris pv. Translucens and A. fumigatus grow in media supplemented with dimethoate and methomyl faster than in other media without both pesticides. About 97.8% and 91.2% of dimethoate and 95% and 87.8% of methomyl (initial concentration of both 5 mg L−1) were biodegraded within 32 days of incubation with X. campestris pv. Translucens and A. fumigatus, respectively. There was no remaining toxicity in rats treated with dimethoate-and methomyl-contaminated water with respect to biochemical parameters and histopathological changes. Collectively, the identified bacterial isolate showed high potential for the complete degradation of dimethoate and methomyl residues in water.

Title	Complex Dynamics of a Filippov Three-Species Food Chain Model
Authors	Hamdallah, S.A.A., Arafa, A.A., Tang, S., Xu, Y.
Journal	International Journal of Bifurcation and Chaos, 31(5),2150074
Abstract	In order to avoid high extinction risks of prey and keep the stability of the three-species food chain model, we introduce a Filippov food chain model (FFCM) with Holling type II under threshold policy control. The threshold policy is designed to play a pivotal strategy for controlling the three species in the FFCM. With this strategy, no control is applied if the density of the prey population is less than the threshold, thus the exploitation is forbidden. However, the exploitation is permitted if the density of the prey population increases and exceeds the threshold. The dynamic behaviors and the bifurcation sets of this model including the existence and stability of different types of equilibria are discussed analytically and numerically. Moreover, the regions of sliding and crossing segments are analyzed. The dynamic behaviors of sliding mode including the bifurcation sets of pseudo-equilibria are investigated. Numerically, the bifurcation diagram and maximum Lyapunov exponents are computed and plotted to show the complex dynamics of FFCM, for instance, it has stable periodic, double periodic and chaotic solutions as well as double periodic sliding bifurcation. It is demonstrated that the threshold policy control can be easily implemented and used for stabilizing the chaotic behavior of FFCM.

Title	Comparative study between Croton tiglium seeds and Moringa oleifera leaves extracts, after incorporating silver nanoparticles, on murine brains
Authors	Aboulthana, W.M., Youssef, A.M., Seif, M.M., (...), El-Baz, H.A., Omar, N.I.
Journal	Egyptian Journal of Chemistry, 64(4), pp. 1709-1731
Abstract	Croton tiglium seeds and Moringa oleifera leaves extracts are rich in phytoconstituents with the antioxidant efficiency which can be enhanced by incorporating silver nanoparticles (Ag-NPs). The present study was designed to compare the effect of C. tiglium seeds and M. oleifera leaves nano-extracts on brain tissues of murine models. During the current study, acetylcholine esterase (ACHE), β-amyloid (Aβ) content and inflammatory markers were measured in brain tissues. Moreover, native protein, lipoprotein and isoenzymes patterns were electrophoretically detected. Also, the interferon-gamma (INF-γ) receptor protein was studied by molecular dynamic simulation to evaluate the significant alterations on brain tissues. It was found that ACHE, Aβ contents and inflammatory markers increased in C. tiglium nano-extract treated group at a dose of 6.5 ml/kg. Furthermore, it caused qualitative electrophoretic abnormalities represented by lowering similarity index (SI) values. Also, the resides range 119~127 represent the most reactive and flexible site in INF-γ receptor protein. On the other hand, it was shown that no significant differences were induced by silver M. oleifera nano-extract.

Title	A weak tripled contraction for solving a fuzzy global optimization problem in fuzzy metric spaces
Authors	Hammad, H.A., De la Sen, M.
Journal	Symmetry, 13(4),565
Abstract	In the setting of fuzzy metric spaces (FMSs), a global optimization problem (GOP) obtaining the distance between two subsets of an FMS is solved by a tripled fixed-point (FP) technique here. Also, fuzzy weak tripled contractions (WTCs) for that are given. This problem was known before in metric space (MS) as a proximity point problem (PPP). The result is correct for each continuous τ−norms related to the FMS. Furthermore, a non-trivial example to illustrate the main theorem is discussed.

Title	Crystal structures of 1-(4-chlorophenyl)-4-(4-methylphenyl)-2,5-dioxo-1,2,5,6,7,8-hexahydroquinoline-3-carboxylic acid and 4-(4-methoxyphenyl)-1-(4-methylphenyl)-2,5-dioxo-1,2,5,6,7,8-hexahydroquinoline-3-carbonitriled
Authors	Allah, O.A.A., Kaur, M., Akkurt, M., (...), Elgarhy, S.M.I., Jasinski, J.P.
Journal	Acta Crystallographica Section E: Crystallographic Communications, 77, pp. 351-355
Abstract	In the title compounds C23H21ClN2O3 [I, namely 1-(4-chlorophenyl)-4-(4-methylphenyl)-3,8-dioxo-1,2,5,6,7,8-hexahydroquine-3-carboxylic acid] and C24H22N2O3 [II, namely 4-(4-methoxyphenyl)-1-(4-methylphenyl)-2,5-dioxo-1,2,5,6,7,8-hexahydroquinoline-3-carbonitrile], each of the cyclohexene and dihydropyridine rings of the 1,2,5,6,7,8-hexahydroquinoline moieties adopts a twisted-boat conformation. The asymmetric units of both compounds I and II consist of two independent molecules (A and B). In II A, three carbon atoms of the cyclohexene ring are disordered over two sets of sites in a 0.670 (11):0.330 (11) occupancy ratio. In the crystal of I, molecules are linked through classical N-H···O hydrogen bonds, forming inversion dimers with an R 2 2(8) ring motif and with their molecular planes parallel to the crystallographic (020) plane. Non-classical C-H···O hydrogen-bonding interactions connect the dimers, resulting in a three-dimensional network. In the crystal of II, molecules are linked by C-H···N, C-H···O and C-H···π interactions, forming a three-dimensional network.

Title	Taxonomic revisiting and phylogenetic placement of two endangered plant species: Silene leucophylla boiss. and silene schimperiana boiss. (caryophyllaceae)
Authors	El-banhawy, A., Nour, I.H., Acedo, C., (...), Olwey, A.O., Ellmouni, F.Y.
Journal	Plants, 10(4),740
Abstract	The genus Silene L. is one of the largest genera in Caryophyllaceae, and is distributed in the Northern Hemisphere and South America. The endemic species Silene leucophylla and the near-endemic S. schimperiana are native to the Sinai Peninsula, Egypt. They have reduced population size and are endangered on national and international scales. These two species have typically been disregarded in most studies of the genus Silene. This research integrates the Scanning Electron Microscope (SEM), species micromorphology, and the phylogenetic analysis of four DNA markers: ITS, matK, rbcL and psb-A/trn-H. Trichomes were observed on the stem of Silene leucophylla, while the S. schimperiana has a glabrous stem. Irregular epicuticle platelets with sinuate margin were found in S. schimperiana. Oblong, bone-shaped, and irregularly arranged epidermal cells were present on the leaf of S. leucophylla, while Silene schimperiana leaf has “tetra-, penta-, hexa-, and polygonal” epidermal cells. Silene leucophylla and S. schimperiana have amphistomatic stomata. The Bayesian phylogenetic analysis of each marker individually or in combination represented the first phylogenetic study to reveal the generic and sectional classification of S. leucophylla and S. schimperiana. Two Silene complexes are proposed based on morphological and phylogenetic data. The Leucophylla complex was allied to section Siphonomorpha and the Schimperiana complex was related to section Sclerocalycinae. However, these two complexes need further investigation and more exhaustive sampling to infer their complex phylogenetic relationships.

Title	Tikhonov regularization terms for accelerating inertial mann-like algorithm with applications
Authors	Hammad, H.A., Ur Rehman, H., Almusawa, H.
Journal	Symmetry, 13(4),554
Abstract	In this manuscript, we accelerate the modified inertial Mann-like algorithm by involving Tikhonov regularization terms. Strong convergence for fixed points of nonexpansive mappings in real Hilbert spaces was discussed utilizing the proposed algorithm. Accordingly, the strong convergence of a forward–backward algorithm involving Tikhonov regularization terms was derived, which counts as finding a solution to the monotone inclusion problem and the variational inequality problem. Ultimately, some numerical discussions are presented here to illustrate the effectiveness of our algorithm

Title	Secondary minerals in a calcareous environment: an example from Um Gheig Pb/Zn mine site, Eastern Desert, Egypt
Authors	Redwan, M., Rammlmair, D., Berkh, K.
Journal	Environmental Earth Sciences, 80(7),274
Abstract	Alteration of abandoned mine sites and wastes generates variable secondary mineral phases that incorporate different toxic trace elements with a prospective threat to the neighboring ecosystems. The main focus of this study was to investigate the mineralogical and geochemical changes at neutral pH where dry condition prevails around oxidation-primary contacts interface and the surface in Um Gheig Pb/Zn mine, Eastern Desert, Egypt. The secondary minerals were determined by M4 Tornado µ-EDXRF, Raman microscope and scanning electron microscopy with energy-dispersive system. Two alteration zones were recognized depending on ion availability and the Eh/pH conditions. The first include anglesite as an initial phase that quickly transformed into a more stable cerussite and hydrocerussite. Mendipite formation was controlled by the availability of Cl− ions in the solution. Hemimorphite was formed after sphalerite in the pore spaces, depending on the accessibility of Si ions from silicates dissolution. Iron (oxy) hydroxides were formed in a later stage due to their restricted mobility in carbonates. The second zone includes gypsum and anhydrite formed at the surface of the mine wastes due to continuous evaporation in arid environments. These secondary mineral phases can undergo different mineral transformations depending on the prevailing conditions. The element release ratios in the mine surface zone compared to the capillary fringe zone reached 12.1, 2.8, 1.6, 0.17, 0.09 and 0.03 for Sr, Cr, Pb, Zn, Cu, and Ni in the mine surface zone compared to 5.86, 0.01, 0.05, 0.02, 0.07 and 0.01 in the capillary fringe zone. The findings from this investigation have important implications for the management and the control of elements mobility from secondary phases formed in mined areas.

Title	Impacts of microcystins on morphological and physiological parameters of agricultural plants: A review
Authors	Campos, A., Redouane, E.M., Freitas, M., (...), Oudra, B., Vasconcelos, V.
Journal	Plants, 10(4),639
Abstract	Cyanobacteria are a group of photosynthetic prokaryotes that pose a great concern in the aquatic environments related to contamination and poisoning of wild life and humans. Some species of cyanobacteria produce potent toxins such as microcystins (MCs), which are extremely ag-gressive to several organisms, including animals and humans. In order to protect human health and prevent human exposure to this type of organisms and toxins, regulatory limits for MCs in drinking water have been established in most countries. In this regard, the World Health Organization (WHO) proposed 1 µg MCs /L as the highest acceptable concentration in drinking water. However, regulatory limits were not defined in waters used in other applications/activities, constituting a potential threat to the environment and to human health. Indeed, water contaminated with MCs or other cyanotoxins is recurrently used in agriculture and for crop and food production. Several del-eterious effects of MCs including a decrease in growth, tissue necrosis, inhibition of photosynthesis and metabolic changes have been reported in plants leading to the impairment of crop productivity and economic loss. Studies have also revealed significant accumulation of MCs in edible tissues and plant organs, which raise concerns related to food safety. This work aims to systematize and analyze the information generated by previous scientific studies, namely on the phytotoxicity and the impact of MCs especially on growth, photosynthesis and productivity of agricultural plants. Morphological and physiological parameters of agronomic interest are overviewed in detail in this work, with the aim to evaluate the putative impact of MCs under field conditions. Finally, concentration-dependent effects are highlighted, as these can assist in future guidelines for irrigation waters and establish regulatory limits for MCs.

Title	Article the impact of melatonin and nlrp3 inflammasome on the expression of micrornas in aged muscle
Authors	Sayed, R.K.A., Fernández-Ortiz, M., Fernández-Martínez, J., (...), Acuña-Castroviejo, D., Rusanova, I.
Journal	Antioxidants, 10(4),524
Abstract	Muscular aging is a complex process and underlying physiological mechanisms are not fully clear. In recent years, the participation of the NF-kB pathway and the NLRP3 inflammasome in the chronic inflammation process that accompanies the skeletal muscle's aging has been confirmed. microRNAs (miRs) form part of a gene regulatory machinery, and they control numerous biological processes including inflammatory pathways. In this work, we studied the expression of four miRs; three of them are considered as inflammatory-related miRs (miR-21, miR-146a, and miR-223), and miR-483, which is related to the regulation of melatonin synthesis, among other targets. To investigate the changes of miRs expression in muscle along aging, the impact of inflammation, and the role of melatonin in aged skeletal muscle, we used the gastrocnemius muscle of wild type (WT) and NLRP3-knockout (NLRP3−) mice of 3, 12, and 24 months-old, with and without melatonin supplementation. The expression of miRs and pro-caspase-1, caspase-3, pro-IL-1β, bax, bcl-2, and p53, was investigated by qRT-PCR analysis. Histological examination of the gastrocnemius muscle was also done. The results showed that age increased the expression of miR-21 ($p < 0.01$), miR-146a, and miR-223 ($p < 0.05$, for both miRs) in WT mice, whereas the 24-months-old mutant mice revealed decline of miR-21 and miR-223 ($p < 0.05$), compared to WT age. The lack of NLRP3 inflammasome also improved the skeletal muscle fibers arrangement and reduced the collagen deposits compared with WT muscle during aging. For the first time, we showed that melatonin significantly reduced the expression of miR-21, miR-146a, and miR-223 ($p < 0.05$ for all ones, and $p < 0.01$ for miR-21 at 24 months old) in aged WT mice, increased miR-223 in NLRP3− mice ($p < 0.05$), and induced miR-483 expression in both mice strains, this increase being significant at 24 months of age.

Title	Landslide mechanisms along carbonate rock cliffs and their impact on sustainable development: a case study, Egypt
Authors	El-Haddad, B.A., Youssef, A.M., El-Shater, A.-H., El-Khashab, M.H.
Journal	Arabian Journal of Geosciences, 14(7),573
Abstract	Recently, Egypt has faced unprecedented development with rapid urban and infrastructure expansion. Vast areas of Egypt are underlain by karst rocks (carbonate and evaporite). Highways and roads constructed along these karst areas are susceptible to slope stability problems. Various factors could trigger different landslides along the carbonate rock cliffs and slopes. Hence, urgent actions need to be considered to understand the landslide mechanisms that could occur along these cliffs and slopes. Carbonate rock cliffs and slopes along with some highways in Sohag-Assiut area, Egypt, were chosen as a case study in this work. Field and laboratory investigations were carried out as tools in understanding and identifying these failure mechanisms. In addition, remote sensing high-resolution images were applied to help in identifying different features, causing slope instability. Our finding indicated that five landslide mechanisms in carbonate rock cliffs and slopes were identified and categorized. These five slope instability mechanisms are including collapses of weak materials from filled caves, the breakdown of caves, instability due to differential erosions, dissolution along discontinuities, and sliding along weak surfaces. This study could help the decision-makers and planners to understand the causes of slope instability problems, to maintain the sustainability of the infrastructure, and to design appropriate prevention and remediation measures to avoid future problems.

Title	Generating Bézier curves for medical image reconstruction
Authors	Abdel-Aziz, H.S., Zanaty, E.A., Ali, H.A., Saad, M.K.
Journal	Results in Physics, 23,103996
Abstract	The boundaries of medical images can be represented by a sequence of 2D curves from image slices taken from uncalibrated cameras. The 2D curves are used to reconstruct a 3D tissues volume in order to understand of anatomical functionality and morphological analysis. For that, new curves are needed to represent a sequence of 2D points sampled along the boundary. In this paper, we construct and analyse special types of Bézier curves for improving medical image reconstruction. The special types of Bézier curves are derived from the moving Frenet frames accompanying them. We describe and analysis of these curves in terms of their curvatures, torsions and control points. In addition, we introduce some important theories regarding the geometric properties of these curves. The thoughtful work represents the first attempt to deal with constructing such curves and might deliver fundamentals which are an important input in the algorithm for creating 3D surfaces. We provided an example with drawing as application, through which we demonstrate confirmation of our theoretical results.

Title	Impact of pangolin bootleg market on the dynamics of COVID-19 model
Authors	Ullah, A., Ahmad, S., Rahman, G.U., Alqarni, M.M., Mahmoud, E.E.
Journal	Results in Physics, 23,103913
Abstract	In this paper we consider ant-eating pangolin as a possible source of the novel corona virus (COVID-19) and propose a new mathematical model describing the dynamics of COVID-19 pandemic. Our new model is based on the hypotheses that the pangolin and human populations are divided into measurable partitions and also incorporates pangolin bootleg market or reservoir. First we study the important mathematical properties like existence, boundedness and positivity of solution of the proposed model. After finding the threshold quantity for the underlying model, the possible stationary states are explored. We exploit linearization as well as Lyapanuv function theory to exhibit local stability analysis of the model in terms of the threshold quantity. We then discuss the global stability analyses of the newly introduced model and found conditions for its stability in terms of the basic reproduction number. It is also shown that for certain values of R0, our model exhibits a backward bifurcation. Numerical simulations are performed to verify and support our analytical findings.

Title	Synthesis and theoretical studies of novel conjugated polyazomethines and their application as efficient inhibitors for C1018 steel pickling corrosion behavior
Authors	Abd El-Lateef, H.M., Sayed, A.R., Shalabi, K.
Journal	Surfaces and Interfaces, 23,101037
Abstract	The idea of the existing work is to progress the preparation of four conjugated polyazomethines contained thiazole through the backbone of the polymer. The synthesized conjugated polyazomethines were categorized and assessed as novel inhibitors for the C1018 steel pickling corrosion behavior at 298–328 K using surface morphology of C1018 steel electrode, potentiodynamic polarization (PDP), and electrochemical impedance spectroscopy (EIS). The assessed polymers performed as effective inhibitors for C1018 steel corrosion in pickling solution. The protection capacity of the polyazomethines augmented with a rise in concentration to attain 98.2% efficacy with 150 mg L − 1 at 298 K. PDP plots designated that the conjugated polyazomethines performs as mixed-type inhibitors and adsorbed on the C1018 steel interface via chemisorption. Isotherm model of Langmuir was found the preeminent mode for the adsorption of polymers. The surface morphology examinations established the development of a protective layer getting a thick coverage at the optimal dose. Moreover, theoretical study of Monte Carlo (MC) simulations and density functional theory (DFT) were used to govern the association among protection capacity and molecular structure. This study could be provided novel polyazomethines inhibitors for C1018-steel corrosion protection in different industrial environments, especially in the pickling solution.

Title	Fractional order biological snap oscillator: Analysis and control
Authors	Trikha, P., Mahmoud, E.E., Jahanzaib, L.S., Matoog, R.T., Abdel-Aty, M.
Journal	Chaos, Solitons and Fractals, 145,110763
Abstract	The manuscript studies the four dimensional fractional order biological snap oscillator. Its thorough dynamical analysis is performed using dynamical tools such as phase portraits, Lyapunov and bifurcation analysis, system's solution, stagnation points analysis etc. The impact of fractional order on the chaotic system is also discussed by plotting phase diagrams, Lyapunov and bifurcation diagrams for variable order. Considering uncertainties and disturbances trajectories are stabilized about its unique stagnation point using adaptive SMC technique. The controllers are constructed to compensate undesirable chaotic/ hyper chaotic behavior of the biological system which may give rise to fatal health pathological conditions. Also SMC technique show immediate effect in controlling of chaos in the system. Numerical simulations are performed using MATLAB.

Title	Design, synthesis, structural inspection of Pd^{2+}, VO^{2+}, Mn^{2+}, and Zn^{2+} chelates incorporating ferrocenyl thiophenol ligand: DNA interaction and pharmaceutical studies
Authors	Aljohani, E.T., Shehata, M.R., Abu-Dief, A.M.
Journal	Applied Organometallic Chemistry, 35(4),e6169
Abstract	Some new transition metal chelates ([M(FSH)2] and [M(FSH) (CH3COO− or NO3−)], where M = Pd2+, VO2+, Mn2+, Zn2+, and cations) incorporating ferrocenyl thiophenol imine ligand (FSH) were prepared. Various spectral and physicochemical studies were performed to elucidate the geometric structure of the investigated compounds. The spectral data of FSH imine ligand and its metal chelates were explained concerning the structural changes due to complex formation. From the electronic spectra and the magnetic moments, the information about geometric structures can be concluded. The activation thermodynamic parameters of the thermal degradation for FSH complexes were calculated utilizing the method of Coats–Redfern. Correlation of all physicochemical tools employed in the investigation and DFT calculation, FSH imine ligand acts as a bidentate ligand and coordinates to Mn2+ in octahedral geometry, VO2+ in square pyramidal geometry, Pd2+ in square planner geometry and Zn2+ in distorted octahedral geometry. in vitro antimicrobial, anticancer and antioxidant activities of FSH ligand and its complexes were checked. All complexes exhibited superiority on the free ligand in successful treatment, specifically the FSHPd complex. The new complexes were subjected to study their DNA binding via various methods such as spectrophotometry, viscosity and gel electrophoresis. Their binding feature to ctDNA was proposed to be electrostatic, intercalation or replacement mode. Finally, the molecular docking studies were performed to understand the essence of the protein synthesized compounds' binding and binding affinity (PDB:3hb5).

Title	Secure CT-Image Encryption for COVID-19 Infections Using HBBS-Based Multiple Key-Streams
Authors	Reyad, O., Karar, M.E.
Journal	Arabian Journal for Science and Engineering, 46(4), pp. 3581-3593
Abstract	The task of preserving patient data is becoming more sophisticated with the evolution of technology and its integration with the medical sector in the form of telemedicine and electronic health (e-health). Secured medical image transmission requires adequate techniques for protecting patient privacy. This study aims at encrypting Coronavirus (COVID-19) images of Computed Tomography (CT) chest scan into cipherimages for secure real-world data transmission of infected patients. Provably safe pseudo-random generators are used for the production of a "key-stream" to achieve high privacy of patient data. The Blum Blum Shub (BBS) generator is a powerful generator of pseudo-random bit-strings. In this article, a hashing version of BBS, namely Hash-BBS (HBBS) generator, is presented to exploit the benefits of a hash function to reinforce the integrity of extracted binary sequences for creating multiple key-streams. The NIST-test-suite has been used to analyze and verify the statistical properties of resulted key bit-strings of all tested operations. The obtained bit-strings showed good randomness properties; consequently, uniform distributed binary sequence was achieved over the key length. Based on the obtained key-streams, an encryption scheme of four COVID-19 CT-images is proposed and designed to attain a high grade of confidentiality and integrity in transmission of medical data. In addition, a comprehensive performance analysis was done using different evaluation metrics. The evaluation results of this study demonstrated that the proposed key-stream generator outperforms the other security methods of previous studies. Therefore, it can be successfully applied to satisfy security requirements of transmitting CT-images for COVID-19 patients.

Title	Bernstein basis functions based algorithm for solving system of third order initial value problems
Authors	Malik, R., Khan, F., Basit, M., (...), Mahmoud, E.E., Lotayif, M.S.M.
Journal	Alexandria Engineering Journal, 60(2), pp. 2395-2404
Abstract	For obtaining numerical solutions of the system of ordinary differential equations (ODEs) of third order, a new numerical technique is proposed by using operational matrices of Bernstein polynomials. These operational matrices can be utilized to solve different problems of integral and differential equations. The System of third-order ODEs occur in various physical and engineering models. In this paper, an iterative algorithm is constructed by using operational matrices of Bernstein polynomials for solving the system of third order ODEs. The proposed technique provides a numerical solution by discretizing the system to a system of algebraic equations which can be solved directly. The method will be verified by using appropriate examples which are arising in Physics and some Engineering problems. The comparison of approximate and exact solution of the given examples is demonstrated with the help of tables and graphs.

Title	Numerical solution of 2D-fuzzy Fredholm integral equations using optimal homotopy asymptotic method
Authors	Ahsan, S., Nawaz, R., Akbar, M., (...), Mahmoud, E.E., Alqarni, M.M.
Journal	Alexandria Engineering Journal, 60(2), pp. 2483-2490
Abstract	This paper deals with the solution of system of 2D-fuzzy Fredholm integral equations (2D-FFIEs) depend upon the parametric form fuzzy number; using an efficient algorithm called Optimal Homotopy Asymptotic Method (OHAM). The efficiency and effectiveness of the proposed technique is tested upon some numerical example and the results are compared with modified homotopy perturbation method, 2D triangular function method and Lagender interpolation. It is observed from the results that the suggested method is accurate, straightforward and convenient to solve the 2D-fuzzy Fredholm integral equations.

Title	Electrocatalytic performance of inorganic nanoflakes nickel phosphates under adjusted synthetic parameters towards urea and methanol oxidation in alkaline media
Authors	Khalaf, M.M., Abd El-Lateef, H.M., Touny, A.H., Saleh, M.M., Mohamed, I.M.A.
Journal	Microchemical Journal, 163,105901
Abstract	Inorganic nanoflakes nickel phosphates (Ni-P) were introduced to enhance the activity of the working electrode for the electrooxidation of small organic molecules: methanol and urea. The urea proportions during the synthesis of the Ni-P material were evaluated and its impact on Ni-P morphology and structure was determined. The as-fabricated Ni-P material was studied in terms of Fourier-transform infrared spectroscopy (FTIR), Field emission scanning electron microscope/ energy-dispersive X-ray spectroscopy (FESEM/EDX), Transmission electron microscopy (TEM), X-ray diffraction (XRD), and Brunauer–Emmett–Teller (BET) surface area analyses. These techniques indicate the synthesized material is Ni-P with nanoflakes morphology. Cyclic voltammetry (CV), as well as impedance spectroscopy (EIS) techniques, were investigated in the reference/working/counter electrodes system to study the electrocatalytic performance of the introduced nanoflakes phosphate material for both methanol and urea oxidation in presence of KOH aqueous medium. 0.8 M of urea was the optimum proportion found for the electrocatalytic oxidation of methanol. The synthesized phosphates showed enhanced electrocatalytic oxidation of methanol and urea at different scan rates. Besides, the EIS approves the ability of the synthesized nanoflakes phosphate to electrochemically oxidize methanol and urea. This study presents cheap electrocatalysts to help in the commercial process of fuel cells as well as water treatment from organics like urea.

Title	A study on photo-thermo-elastic wave in a semi-conductor material caused by ramp-type heating
Authors	Hobiny, A.D., Alzahrani, F.S., Abbas, I.A.
Journal	Alexandria Engineering Journal, 60(2), pp. 2033-2040
Abstract	A mathematical model of the Green-Naghdi photo-thermoelastic model due to ramp-type heating is presented to study the photo- thermo-elastic waves in a two-dimension semi-conductor material. By using Fourier and Laplace transforms with the eigenvalue scheme, the variables are analytically obtained. A semiconductor media such as silicon is investigated. Numerical outcomes for all the physical quantities are implemented and illustrated graphically. The results show that the ramp-type source has varying degrees of influence on physical quantities. The derived methods are evaluated with numerical outcomes which are applied to the semi-conductor material in simplified geometry. Finally, it can be found that the ramp-type heating source has great effects on the studying fields.

Title	Spectral approximation methods for non equilibrium transport in turbulent channel flows using fADE
Authors	Ghosh, S., Kundu, S., Kumar, S., Mahmoud, E.E.
Journal	Applied Numerical Mathematics, 162, pp. 53-66
Abstract	In this work, the study of suspended sediment transport under unsteady, uniform and non equilibrium condition is extended using space fractional diffusion equation (fADE) with parameter α. Semi analytical solutions of this space fADE with realistic boundary conditions are obtained using spectral method developed on Chebyshev orthogonal polynomials. Solutions obtained from this method are compared with previous analytical solutions for the case α=2 and satisfactory results are obtained. Apart from these, the effect of non-locality on non equilibrium transport of particles is discussed and it is found that in unsteady condition sediment concentration increases when α<2 except for near bed region. Whereas sediment concentration increases over the full water depth under steady condition when α<2. Also in unsteady condition, the increase of sediment diffusivity increases the sediment concentration except for the near bed region. This new analytical technique shows that new kind of solutions can be generated using Chebyshev orthogonal polynomials.

Title	Synthesis, structural characterization, and biological studies of ATBS–M complexes (M(II) = Cu, Co, Ni, and Mn): Access for promising antibiotics and anticancer agents
Authors	Ismael, M., Abdel-Rahman, L.H., Abou El-ezz, D., Ahmed, E.A.H., Nafady, A.
Journal	Archiv der Pharmazie, 354(4),2000241
Abstract	A new bidentate Schiff base ligand (ATBS [4-bromo-2-(thiazole-2-yliminomethyl)phenol]) was synthesized via the condensation reaction of 2-aminothiazole with 5-bromosalicylaldehyde in ethanol. The reaction of ATBS with transition metal salts of Cu(II), Co(II), Ni(II), and Mn(II) afforded the corresponding ATBS–M complexes. Results from physicochemical and spectral analyses, such as elemental analysis, infrared, UV–Vis spectroscopy, magnetic susceptibility, and molar conductance, revealed a nonelectrolytic nature with octahedral (Oh) geometry and a metal/ligand ratio of 1:2 for Cu(II), Co(II), and Ni(II), but 1:1 for the Mn(II) complex. The density functional theory (DFT) calculations are correlated very well with the proposed structure and molecular geometry of the complexes as [M(ATBS)2] (M = Cu, Co, and Ni) and [Mn(ATBS)(H2O)2]. Significantly, the prepared compounds showed strong inhibition activity for a wide spectrum of bacteria (Escherichia coli, Bacillus subtilis, and Staphylococcus aureus) and fungi (Candida albicans, Aspergillus flavus, and Trichophyton rubrum), with the ATBS–Ni complex being the most promising antibiotic agent. Molecular docking studies of the binding interaction between the title complexes with the bacterial protein receptor CYP51 revealed clear insights about the inhibition nature against the studied microorganisms, with the following order: ATBS–Cu > ATBS–Mn > ATBS–Ni > ATBS–Co for complex stability. Moreover, the cytotoxicity measurements of all prepared metal complexes against the colon carcinoma (HCT-116) and hepatocellular carcinoma (Hep-G2) cell lines showed exceptional anticancer efficacy of the complexes as compared with the free ATBS Schiff base ligand. Significantly, the results attested that ATBS–Cu is the most effective complex against HCT-116 cells, whereas ATBS–Mn has the highest cytotoxic efficiency against Hep-G2 cells. Furthermore, electronic spectra, viscosity measurements, and gel electrophoresis techniques were employed to probe the interaction of all prepared ATBS–metal complexes with calf thymus (CT)-DNA. Results confirmed that all complexes are strongly bound to CT-DNA via intercalation mode, with the ATBS–Co complex having the highest binding ability.

Title	New application for TiO_2 P25 photocatalyst: A case study of photoelectrochemical sensing of nitrite ions
Authors	Mokhtar, B., Kandiel, T.A., Ahmed, A.Y., Komy, Z.R.
Journal	Chemosphere, 268,128847
Abstract	Developing photoelectrochemical (PEC) sensors based on photocatalytic materials has recently attracted great interest as an emerging technology for environmental monitoring. TiO2 P25 is a well-known highly active photocatalyst, cheap, and produced commercially on a large scale. In the current work, a practical and durable TiO2-based PEC sensor has been fabricated by immobilizing TiO2 P25 nanoparticles at disposable screen-printed carbon substrates using drop-casting method. The fabricated PEC sensor has been applied for the anodic-detection and determination of nitrite (NO2−) ions under UV(A) light (LED, 365 nm) using chronoamperometry (CA) and differential pulse voltammetry (DPV). Linear calibration curves were obtained between the photocurrent responses and the concentrations of NO2− ions in the ranges of 0.1–5.0 and 0.5–10 mg L−1 for CA and DPV, respectively. Surprisingly, the detection limits (sensitivities) of the fabricated sensor towards NO2− ions under light were enhanced by a factor of 4.75 (4.1) and 8.3 (37.4) for CA and DPV, respectively, in comparsion with those measured in the dark. It is found that the photo-excitation of TiO2 facilitates the photooxidation of NO2− ions via the photo-generated holes whereas the photogenerated electrons contribute to the enhanced photocurrent and consequently the enhanced detection limit and sensitivity. The fabricated TiO2-based PEC sensor exhibits a good stability, durability, and satisfying selectivity for NO2− ions determination. These results indicate that the TiO2-based PEC sensor fabricated by utilizing cheap and commercially available components has great potential for being transferred from lab-to-factory.

Title	Facile synthesis and assessment of 2-alkoxy-4-(4-hydroxyphenyl)-6-arylnicotinonitrile derivatives as new inhibitors for C1018-steel corrosion in HCl: a combined theoretical and experimental investigation
Authors	Mohamed, M.A.A., Abdelhamid, A.A., Abd El-Lateef, H.M., Moustafa, A.H.
Journal	Journal of the Iranian Chemical Society, 18(4), pp. 961-976
Abstract	Abstract: An effective and accessible synthesis of alkoxy arylnicotinonitriles was achieved via a four-component reaction of 4-hydroxybenzaldehyde, acetophenones, and malononitrile in the presence of sodium alkoxide. The synthesized alkoxy arylnicotinonitrile derivatives containing pyridine moiety were predestined as inhibitors for C1018-steel (CS) corrosion in 1.0 M HCl using Tafel polarization and electrochemical impedance spectroscopy methods in the temperature range of 20–50 °C. Tafel polarization plots were demonstrated that the arylnicotinonitriles behave as typical inhibitors of the mixed type. They have also suppressed the CS corrosion at a lower inhibitor concentration and accomplished an inhibition capacity ranged from 87.6 to 98.2% in 0.7 mM. Their adsorption on the CS interface follows the isotherm model of Langmuir, and they include both chemisorption and physisorption mechanisms, with a preference of chemisorption. The morphology of the CS surface was examined utilizing Fourier transform infrared spectroscopy and field-emission scanning electron microscopy. Moreover, density functional theory calculations confirm the empirical findings and the adsorption of arylnicotinonitrile derivatives on the CS interface. Graphic abstract: [Figure not available: see fulltext.].

Title	The Antidepressant Mirtazapine Rapidly Shifts Hepatic B Cell Populations and Functional Cytokine Signatures in the Mouse
Authors	Almishri, W., Davis, R.P., Shaheen, A.-A., (...), Jenne, C.N., Swain, M.G.
Journal	Frontiers in Immunology, 12,622537
Abstract	Introduction: B cells are important regulators of both adaptive and innate immunity. The normal liver contains significant numbers of B cells, and their numbers increase dramatically in immune-mediated liver diseases. Our previous observations suggest a hepatoprotective effect of the antidepressant mirtazapine in human and experimental immune-mediated liver disease. Therefore, we performed a series of experiments to determine the impact of mirtazapine treatment on hepatic B cell homeostasis, as reflected by B cell number, trafficking and phenotype using flow cytometry (FCM) and intravital microscopy (IVM) analysis. Mirtazapine treatment rapidly induced a significant reduction in total hepatic B cell numbers, paralleled by a compositional shift in the predominant hepatic B cell subtype from B2 to B1. This shift in hepatic B cells induced by mirtazapine treatment was associated with a striking increase in total hepatic levels of the chemokine CXCL10, and increased production of CXCL10 by hepatic macrophages and dendritic cells. Furthermore, mirtazapine treatment led to an upregulation of CXCR3, the cognate chemokine receptor for CXCL10, on hepatic B cells that remained in the liver post-mirtazapine. A significant role for CXCR3 in the hepatic retention of B cells post-mirtazapine was confirmed using CXCR3 receptor blockade. In addition, B cells remaining in the liver post-mirtazapine produced lower amounts of the proinflammatory Th1-like cytokines IFNγ, TNFα, and IL-6, and increased amounts of the Th2-like cytokine IL-4, after stimulation in vitro. Conclusion: Mirtazapine treatment rapidly alters hepatic B cell populations, enhancing hepatic retention of CXCR3-expressing innate-like B cells that generate a more anti-inflammatory cytokine profile. Mirtazapine-induced hepatic B cell shifts could potentially represent a novel therapeutic approach to immune-mediated liver diseases characterized by B cell driven pathology.

Title	Synthesis and characterization of Fe(III), Pd(II) and Cu(II)-thiazole complexes; DFT, pharmacophore modeling, in-vitro assay and DNA binding studies
Authors	Abu-Dief, A.M., El-Metwaly, N.M., Alzahrani, S.O., (...), El-Dabea, T., El-Remaily, M.A.E.A.A.A.
Journal	Journal of Molecular Liquids, 326,115277
Abstract	New pharmacologically active complexes were prepared from Pd (II), Fe (III), and Cu (II)ions with 2-amino-6-oxo-3-(piperidinylamidino)-4-(4methoxyphenyl)-6,7-dihydro-pyrano[2,3-d]-5,7thiazol ligand (MPTP). The ligand acted as neutral bidentate with the metals via NH and NH2 groups. FT-IR spectra, CHN-analysis, TGA, UV–Vis, molar conductance and 1H &13C NMR spectra were used to characterize the new compounds. Also stability constant of MPTP-complexes was identified in solution and pH-profile indicates high stability of complexes. Computational study was implemented to extract significant features for MPTP and its complexes. In addition to, essential maps were demonstrated over formulated chk-file. In-silico assay was executed by two different approaches over compounds to evaluate their biological behavior and degree of interaction with biological systems, before practical application. MPTPPd complex displayed priority in interaction with amino acid residues and drug-like feature. In-vitro assay was then carried out for compounds against different microbes and MPTPPd and MPTPCu showed high antimicrobial activity. Also, their cytotoxic behavior was examined against MCF-7, HCT-116, and HepG2 carcinoma cell lines, high cytotoxicity was clearly recorded with MPTPPd and MPTPCu complexes. Furthermore, antioxidant activity was examined and the complexes exhibited high reactivity with trapping free radicals. The interaction of metal chelates with DNA was detected by gel electrophoreses, viscosity and spectral studies. Spectrophotometric titration and viscosity studies expose that each of tested complex is an avid binder to DNA. This may be due to enhanced hydrophobic & electrostatic interaction of aromatic rings. Finally, such complexes may be considered as a promising bioactive agents.

Title	A study on thermo-elastic interactions in 2D porous media with-without energy dissipation
Authors	Alzahrani, F., Abbas, I.A.
Journal	Steel and Composite Structures, 38(5), pp. 523-531
Abstract	The generalized thermoelastic analysis problem of a two-dimension porous medium with and without energy dissipation are obtained in the context of Green–Naghdi's (GNIII) model. The exact solutions are presented to obtain the studying fields due to the pulse heat flux that decay exponentially in the surface of porous media. By using Laplace and Fourier transform with the eigenvalues scheme, the physical quantities are analytically presented. The surface is shocked by thermal (pulse heat flux problems) and applying the traction free on its outer surfaces (mechanical boundary) through transport (diffusion) process of temperature to observe the analytical complete expression of the main physical fields. The change in volume fraction field, the variations of the displacement components, temperature and the components of stress are graphically presented. Suitable discussion and conclusions are presented.

Title	Synthesis, characterization, molecular modeling and preliminary biochemical evaluation of new copper (II) mixed-ligand complexes
Authors	Ismael, M., Abdel-Mawgoud, A.-M.M., Rabia, M.K., Abdou, A.
Journal	Journal of Molecular Structure, 1227,129695
Abstract	Three new Cu(II) mixed-ligand complexes of the type [Cu(primary ligand)(secondary co-ligand)], were synthesized, characterized and preliminary tested for their biochemical activities. The primary ligand (HL) was derived from condensation of p-toluidine with 2-hydroxy-naphthalhyde. Three different N-heterocyclic compounds, 8-hydroxy-quinoline (HQ), 2-(1H-benzimidazol-2-yl)phenol (HB), and 2-(4,5-diphenyl-1H-imidazol-2-yl)phenol (HI), were used as secondary co-ligands. Inhibitory capacity of the synthesized compounds were screened against the growth of pathogenic bacteria [E. coli (G–) and B. cereus (G+)] and fungi (A. fumigatus), in terms of inhibition zone (IZ, mm), and minimum inhibitory concentration (MIC, µg/mL) using the disc diffusion method. Furthermore, the complexes were tested for their phenoxazinone synthase-like activity in terms of Kcat. Density functional theory (DFT) calculations based on B3LYP with LanL2DZ level of theory were performed to prove the proposed geometry of the complexes as well as evaluate the electronic parameters responsible for their reactivity. Structure activity relationship formula was derived by correlating the experimental data (MIC or Kcat) with the calculated electronic parameters.

Title	Theoretical analysis of the effect of doping and minority charge carrier life time in CIGS solar cells
Authors	Mohamed, H.A., Taya, Y.A.
Journal	Optoelectronics and Advanced Materials, Rapid Communications, 15(3-4), pp. 157-163
Abstract	In this work the optical and recombination losses for CuInGaSe (CIGS) thin-film solar cells have been theoretically studied. The optical losses have been studied on the basis of the thickness of frontal charge-collecting layer (ZnO:Al) effect. The recombination losses have been studied as a function of CIGS doping (NA) and electron lifetime (τn). The optical and recombination losses effect on short circuit current density, (Jsc), the open circuit voltage (Voc), the fill factor (FF) and conversion efficiency (η) of thin-film solar cells based on n-CdS/p-CIGS has been investigated. It was found that the film with the transparent conducting layer 100 nm thickness is suitable to give the highest Jsc value of about 29.5 mA/cm2 and the lowest value of optical losses of about 26%. The CIGS doping has a significant effect on the values and behavior of the internal efficiency. There is a weak effect of the relaxation time on the efficiency of this solar cell as it increases from 18.7% to 19.1% with increase the lifetime from the value of 10 nS to 80 nS, respectively.

Title	A minimal timescale for the continuum in 4U 1608-52 and Aql X-1
Authors	Mohamed, K., Sonbas, E., Dhuga, K.S., (...), Abd Allah, N.N., Ibrahim, A.
Journal	Monthly Notices of the Royal Astronomical Society: Letters, 502(1), pp. L72-L78
Abstract	Similar to black hole X-ray binary transients, hysteresis-like state transitions are also seen in some neutron-star X-ray binaries. Using a method based on wavelets and light curves constructed from archival Rossi X-ray Timing Explorer observations, we extract a minimal timescale over the complete range of transitions for 4U 1608-52 during the 2002 and 2007 outbursts and the 1999 and 2000 outbursts for Aql X-1. We present evidence for a strong positive correlation between this minimal timescale and a similar timescale extracted from the corresponding power spectra of these sources.

Title	Crystal structure and Hirshfeld surface analysis of ethyl 2-[9-(2-hydroxyphenyl)-3,3,6,6-tetramethyl-1,8-dioxo-2,3,4,4a,5,6,7,8a,9,9a,10,10a-dodecahydroacridin-10-yl]acetate
Authors	Abd Allah, O.A.A., Kaur, M., Akkurt, M., (...), Jasinski, J.P., Elgarhy, S.M.I.
Journal	Acta Crystallographica Section E: Crystallographic Communications, 77, pp. 247-250
Abstract	In the title compound, C27H33NO5, a 3,3,6,6-tetramethyltetrahydroacridine-1,8-dione ring system carries an ethyl acetate substituent on the acridine N atom and an o-hydroxyphenyl ring on the central methine C atom of the dihydropyridine ring. The benzene ring is inclined to the acridine ring system at an angle of 80.45 (7)° and this conformation is stabilized by an intramolecular O - H···O hydrogen bond between the hydroxy substituent on the benzene ring and one of the carbonyl groups of the acridinedione unit. The ester C=O oxygen atom is disordered over major and minor orientations in a 0.777 (9):0.223 (9) ratio and the terminal -CH3 unit of the ethyl side chain is disordered over two sets of sites in a 0.725 (5): 0.275 (5) ratio. In the crystal, C - H···O hydrogen bonds combine to link the molecules into a three-dimensional network. van der Waals H···H contacts contribute the most to the Hirshfeld surface (66.9%) followed by O···H/H···O (22.1%) contacts associated with weak hydrogen bonds.

Title	A combination of modeling and experimental approaches to investigate the novel nicotinohydrazone Schiff base and its complexes with Zn(II) and ZrO(II) as inhibitors for mild-steel corrosion in molar HCl
Authors	El-Lateef, H.M.A., Soliman, K.A., Al-Omair, M.A., Adam, M.S.S.
Journal	Journal of the Taiwan Institute of Chemical Engineers, 120, pp. 391-408
Abstract	Two novel metal-complexes of 5-sodium sulfonate-2-hydroxybenzylidene)nicotinohydrazone (H2LCs) with Zn2+ and ZrO2+ ions were synthesized and characterized (ZnLCs and ZrOLCs), respectively. Condensation of nicotinohydrazide with salicylaldehyde-5-sodium sulfonate salt afforded H2LCs. Inhibition effectiveness of H2LCs and its complexes with Zn(II) and Zr(II) for M-steel in a 1.0 M HCl solution was examined by electrochemical (EOCP vs. time, impedance spectroscopy (EIS) and potentiodynamic polarization (PDP)) methods. In comparison with H2LCs, ZnLCs and ZrOLCs display enhanced protection capacities. Particularly, the ZrOLCs compound displays higher protection power, and the efficacy is up to 97.4% at 5 × 10−4 mol L − 1 at 303 K. PDP studies exhibited that the as-prepared additives act as inhibitors of the mixed-kind, and adsorbed on M-steel surface via chemisorption following the Langmuir isotherm model. The surface morphology inspections (FE-SEM/EDX, and FT-IR) display that the M-steel interface was inhibited by titled compounds. To get a preferable comprehension of the adsorption of compound species on the steel interface, a detailed modeling investigation was accomplished using Monte Carlo (MC) simulation and DFT calculations. QSAR model also investigated via multiple linear regression method. The current report delivers very significant outcomes in designing and fabricating sustainable inhibitors with high protection capacity.

Title	Model of Fractional Heat Conduction in a Thermoelastic Thin Slim Strip under Thermal Shock and Temperature-Dependent Thermal Conductivity
Authors	Bayones, F.S., Abo-Dahab, S.M., Abouelregal, A.E., (...), Abdel-Khalek, S., Khalil, E.M.
Journal	Computers, Materials and Continua, 67(3), pp. 2899-2913
Abstract	The present paper paper, we estimate the theory of thermoelasticity a thin slim strip under the variable thermal conductivity in the fractional-order form is solved. Thermal stress theory considering the equation of heat conduction based on the time-fractional derivative of Caputo of order α is applied to obtain a solution. We assumed that the strip surface is to be free from traction and impacted by a thermal shock. The transform of Laplace (LT) and numerical inversion techniques of Laplace were considered for solving the governing basic equations. The inverse of the LT was applied in a numerical manner considering the Fourier expansion technique. The numerical results for the physical variables were calculated numerically and displayed via graphs. The parameter of fractional order effect and variation of thermal conductivity on the displacement, stress, and temperature were investigated and compared with the results of previous studies. The results indicated the strong effect of the external parameters, especially the time-fractional derivative parameter on a thermoelastic thin slim strip phenomenon.

Title	Approximation of the fixed point for unified three-step iterative algorithm with convergence analysis in busemann spaces
Authors	Almusawa, H., Hammad, H.A., Sharma, N.
Journal	Axioms, 10(1),26, pp. 1-11
Abstract	In this manuscript, a new three-step iterative scheme to approximate fixed points in the setting of Busemann spaces is introduced. The proposed algorithms unify and extend most of the existing iterative schemes. Thereafter, by making consequent use of this method, strong and Δ-convergence results of mappings that satisfy the condition (Eμ) in the framework of uniformly convex Busemann space are obtained. Our results generalize several existing results in the same direction.

Title	Properties of Pancharatnam Phase and Entanglement of a Five-Level Atom Interacting with a Squeezed Field
Authors	Abdel-Khalek, S., Khalil, E.M., Alqannas, H.S.
Journal	Journal of Russian Laser Research, 42(2), pp. 146-153
Abstract	We introduce a quantum scheme where a single five-level atom interacts with a single-mode cavity field by a time-dependent coupling. During the interaction, the temporal behavior of the quantum entropy in the atomic basis is compared with that of the Mandel parameter used to quantify the nonclassical properties of the field. With the field prepared in a squeezed coherent state, the atomic quantum entropy is then used to quantify the entanglement or the nonlocal correlation of the five-level atom (5 LA) – field system. The influence of one- and two-photon transitions and the atomic motion on the degree of entanglement and the Pancharatnam phase is analyzed. The analysis emphasizes that both the time dependence and photon multiplicity play an important role in the evolution of the degree of entanglement, the Pancharatnam phase, and nonclassical properties. This insight may be very useful in various applications in quantum physics and quantum optics.

Title	Remote diagnostic and detection of coronavirus disease (COVID-19) system based on intelligent healthcare and internet of things
Authors	Elagan, S.K., Abdelwahab, S.F., Zanaty, E.A., (...), Alotaibi, H., Zanaty, M.E.A.
Journal	Results in Physics, 22,103910
Abstract	In this paper, we will propose a novel system for remote detecting COVID-19 patients based on artificial intelligence technology and internet of things (IoT) in order to stop the virus spreading at an early stage. In this work, we will focus on connecting several sensors to work together as a system that can discover people infected with the Coronavirus remotely, this will reduce the spread of the disease. The proposed system consists of several devices called smart medical sensors such as: pulse, thermal monitoring, and blood sensors. The system is working sequentially starting by pulse sensor and end by blood sensor including an algorithm to manage the data given from sensors. The pulse sensor is devoted to acquire a high quality data using a smartphone equipped by a mobile dermatoscope with 20× magnification. The processing is used RGB color system to perform moving window to segment regions of interest (ROIs) as inputs of the heart rate estimation algorithm. The heart rate (HR) estimation is then given by computing the dominant frequency by identifying the most prominent peak of the discrete Fourier transform (DFT) technique. The thermal monitoring is used for fever detection using a smart camera that can provide an optimum solution for fever detection. The infrared sensor can quickly measure surface temperature without making any contact with a person's skin. A blood sensor is used to measure percentages of white, red blood (WBCs, RBCs) volume and platelets non-invasively using the bioimpedance analysis and independent component analysis (ICA). The proposed sensor consists of two electrodes which can be used to send the current to the earlobe and measure the produced voltage. A mathematical model was modified to describe the impedance of earlobe in different frequencies (i.e., low, medium, and high). The COMSOL model is used to simulate blood electrical properties and frequencies to measure WBCs, RBCs and Platelets volume. These devices are collected to work automatically without user interaction for remote checking the coronavirus patients. The proposed system is experimented by six examples to prove its applicability and efficiency.

Title	Quaternion anti-synchronization of a novel realizable fractional chaotic model
Authors	Mahmoud, E.E., Higazy, M., Alotaibi, H., (...), Abdel-Khalek, S., Khalil, E.M.
Journal	Chaos, Solitons and Fractals, 144,110715
Abstract	The main aim of this work is to generalize the chaotic unified model using the quaternion mathematics and fractional derivatives. A novel 8.1-fractional order, 9-dimensions, quaternion unified chaotic system is constructed. The 8.1-fractional order electronic circuit that realize the novel system is designed. Using the graph theory tools, the complexity of the proposed novel 8.1-fractional order, 9-dimensions, quaternion unified chaotic system is calculated. In addition, the substantial contribution in this work appears in introducing an extraordinary type of quaternion synchronizations. We call this novel type “quaternion anti synchronization” (QAS). QAS has unusual properties and characteristics that distinguish it from all the types of synchronizations previously studied in the literature. The QAS of fractional unified model with quaternion variables is studied. The validity of the analytical results is confirmed in QAS of fractional unified system with effective numerical simulation.

Title	An efficient approach for fractional nonlinear chaotic model with Mittag-Leffler law
Authors	Veeresha, P., Prakasha, D.G., Abdel-Aty, A.-H., (...), Mahmoud, E.E., Kumar, S.
Journal	Journal of King Saud University - Science, 33(2),101347
Abstract	In this work, we exemplify the behaviour of the nonlinear model of arbitrary order differential equations by adopting q-homotopy analysis transform method (q-HATM). In the present study, the illustrated scheme is a graceful amalgamation of Laplace transform with q-homotopy analysis algorithm and we considered arbitrary order derivative using Atangana-Baleanu (AB) operator. The suggested nonlinear system exhibits chaotic behaviour in nature with respect to considered initial conditions. Fixed point hypothesis heard present the existence and uniqueness for the attained solution. We exemplified suggested arbitrary order system with to illustrate and confirm the efficiency of the projected solution procedure. Further, the numerical simulation is illustrated and also the chaotic behaviour of the obtained result captured with respect to arbitrary order in terms of plots. The obtained results confirm the projected scheme is highly methodical, easy to implement and very powerful to exemplify the nature of the dynamical system of arbitrary order.

Title	Synthesis of an optimized ZnS/Au/ZnS multilayer films for solar cell electrode applications
Authors	Ezzeldien, M., Alrowaili, Z.A., Hasaneen, M.F.
Journal	Optical Materials, 113,110814
Abstract	In this study, different film constructions (ZnS, ZnS/Au, and ZnS/Au/ZnS) were evaporated by thermal-evaporation. The study was conducted in order to identify the best film for solar cell applications. The study identifies ZnS (399.6 nm)/Au (18 nm) as the most appropriate film for further investigation because it shows a maximum optical band gap ≈ 3.43 eV and the minimum resistivity (0.46 × 10−3 Ω cm). It is noticed that the interference fringes disappeared due to the addition of the Au layer. The absorption edge was shifted towards a lower energy as the Au increased. The band gap Eg and resistivity ρRt were 3.49 eV and 0.12 × 10−3 Ωcm respectively. The refractive index increased up to the maximum value 6.2. The ZnS (399.6 nm)/Au (6 nm)/ZnS (399.6 nm) films exhibited amorphous structure, and with the increase of the Au thickness layer, the diffraction peaks related to FCC phase of the Au appeared. The film ZnS (399.6)/Au 18/ZnS (399.6) shows very promising parameters. The bandgap Eg is 3.38 eV, the sheet resistance is 1.53 × 10−3 Ω, the figure of merit equals 3.7 × 10−3 Ω−1 and the refractive index is 6.20. The results prove that the film ZnS (399.6)/Au 18/ZnS (399) is suitable for conductive electrodes in solar cells.

Title	Correlation between Raman spectra of $Sn_{1-x}Fe_xO_2$ nanoparticles and their electrical and magnetic properties
Authors	Abdel Hakeem, A.M., Saleh, S.A., Ibrahim, E.M.M.
Journal	Materials Science and Engineering B: Solid-State Materials for Advanced Technology, 265,115025
Abstract	Sn1−xFexO2 (x = 0.00, 0.1, 0.12, 0.16 and 0.18) nanoparticles have been synthesized by ball milling. Analyses of the Raman spectra exhibit a strong correlation between the internal structure of the nanoparticles and their electrical and magnetic properties. The blue shift in the peak position of the symmetric A1g (630 cm−1) mode as well as appearance of new two Eu modes (255 and 324 cm−1) with Fe doping indicate to a formation of bridge oxygen vacancies in the nanoparticles which has been explained by Kröger–Vink notation. Oxygen vacancies make as trapping centers of the free electrons leading to an increase in the electrical resistivity. Fe doping induces another new peak at 540 cm−1 assigned to vibrations related to the Fe2+ ions accompanied by oxygen vacancies. The strength of this Raman peak increases with increasing the concentration of Fe in a good correlation with the behavior of the magnetization of the nanoparticles.

Title	Effects of spark plasma sintering on enhancing the thermoelectric performance of Hf–Ti doped VFeSb half-Heusler alloys
Authors	El-Khouly, A., Adam, A.M., Novitskii, A., (...), Voronin, A., Khovaylo, V.
Journal	Journal of Physics and Chemistry of Solids 150,109848
Abstract	This work presents a study on the thermoelectric properties of ultrafine grained Hf–Ti dual-doped VFeSb half-Heusler (HH) alloys treated by spark plasma sintering (SPS) at different temperatures. The concerned alloys were successfully synthesized by arc/induction melting and mechanical alloying (MA). Thermoelectric (TE) properties of Fe(V0.8Hf0.2)1-xTixSb (x = 0.0, 0.2, 0.4) HH samples were studied over the temperature range from 100 to 900 K. Hf and Ti as heavy elements were used as dopants to create point defects aiming to reduce the material's thermal conductivity by enhancing the phonon scattering. Since the transport properties of HH alloys are sensitive to heat treatment, the effect of sintering temperature is studied as well. It was found that the power factor is significantly improved by increasing the sintering temperature. As a result, the figure of merit was enhanced by ~10% for the Fe(V0.8Hf0.2)0.8Ti0.2Sb sample and by ~30% for the Fe(V0.8Hf0.2)0.6Ti0.4Sb sample which were sintered at 1123 K, compared to those sintered at 1023 K. The maximum value was recorded at 0.33 for the sample Fe(V0.8Hf0.2)Sb. This value is higher than that of the singly doped FeV0.9Hf0.1Sb sample with a maximum zT value of 0.08. Also, it is higher than the reported value of the FeVSb doped with Ti which shows maximum ZT of 0.174 calculated for FeV0.7Ti0.3Sb at 658 K.

Title	Landslide susceptibility mapping using machine learning algorithms and comparison of their performance at Abha Basin, Asir Region, Saudi Arabia
Authors	Youssef, A.M., Pourghasemi, H.R.
Journal	Geoscience Frontiers 12(2), pp. 639-655
Abstract	The current study aimed at evaluating the capabilities of seven advanced machine learning techniques (MLTs), including, Support Vector Machine (SVM), Random Forest (RF), Multivariate Adaptive Regression Spline (MARS), Artificial Neural Network (ANN), Quadratic Discriminant Analysis (QDA), Linear Discriminant Analysis (LDA), and Naive Bayes (NB), for landslide susceptibility modeling and comparison of their performances. Coupling machine learning algorithms with spatial data types for landslide susceptibility mapping is a vitally important issue. This study was carried out using GIS and R open source software at Abha Basin, Asir Region, Saudi Arabia. First, a total of 243 landslide locations were identified at Abha Basin to prepare the landslide inventory map using different data sources. All the landslide areas were randomly separated into two groups with a ratio of 70% for training and 30% for validating purposes. Twelve landslide-variables were generated for landslide susceptibility modeling, which include altitude, lithology, distance to faults, normalized difference vegetation index (NDVI), landuse/landcover (LULC), distance to roads, slope angle, distance to streams, profile curvature, plan curvature, slope length (LS), and slope-aspect. The area under curve (AUC-ROC) approach has been applied to evaluate, validate, and compare the MLTs performance. The results indicated that AUC values for seven MLTs range from 89.0% for QDA to 95.1% for RF. Our findings showed that the RF (AUC = 95.1%) and LDA (AUC = 941.7%) have produced the best performances in comparison to other MLTs. The outcome of this study and the landslide susceptibility maps would be useful for environmental protection.

Title	Synthesis, structural and photophysical properties of mixed Zn:SnO_2 nanowires
Authors	Mohamed, S.H., Khan, M.T., Almohammedi, A., Awad, M.A.
Journal	Materials Science in Semiconductor Processing 123,105573
Abstract	The present work demonstrates the structural and photophysical properties of mixed zinc tin oxide (Zn:SnO2) nanowires (NWs) synthesized via vapor transport technique with Zn content of 10, 25 and 50 wt%. The XRD spectra reveals the tetragonal phase of SnO2 for 10 wt% Zn content, whereas a combination of tetragonal SnO2 and hexagonal ZnO phases were observed for higher Zn ratios. The SEM images reveals the formation of smooth NWs for low Zn content, whereas a combination of NWs along with spherical nanoparticles have been observed for 50 wt% Zn:SnO2 sample. The optical band gap was decreased from 3.21 eV (10% Zn:SnO2) to 2.84 eV (50% Zn:SnO2), whereas the corresponding Urbach energy increased from 971 meV to 1132 meV. The refractive index values increased from 2.28 to 2.64 when Zn content increased from 10 to 50 wt%. The absorption spectra showed a red shift and the appearance of new band with increasing Zn wt.%, signaling the formation of new electronic states below the conduction band. The fabricated films displayed a broad steady state emission with peak around 462 nm, which intensity decreased with the increasing of Zn ratio. The effective life time of charge carrier was decreased from 198 ps for 10 wt% Zn:SnO2 to 172 ps for 50 wt% Zn:SnO2.

Title	Optimizing quantum cloning circuit parameters based on adaptive guided differential evolution algorithm
Authors	Houssein, E.H., Mahdy, M.A., Eldin, M.G., (...), Mohamed, W.M., Abdel-Aty, M.
Journal	Journal of Advanced Research 29, pp. 147-157
Abstract	Introduction: Quantum cloning operation, started with no-go theorem which proved that there is no capability to perform a cloning operation on an unknown quantum state, however, a number of trials proved that we can make approximate quantum state cloning that is still with some errors. Objectives: To the best of our knowledge, this paper is the first of its kind to attempt using meta-heuristic algorithm such as Adaptive Guided Differential Evolution (AGDE), to tackle the problem of quantum cloning circuit parameters to enhance the cloning fidelity. Methods: To investigate the effectiveness of the AGDE, the extensive experiments have demonstrated that the AGDE can achieve outstanding performance compared to other well-known meta-heuristics including; Enhanced LSHADE-SPACMA Algorithm (ELSHADE-SPACMA), Enhanced Differential Evolution algorithm with novel control parameter adaptation (PaDE), Improved Multi-operator Differential Evolution Algorithm (IMODE), Parameters with adaptive learning mechanism (PALM), QUasi-Affine TRansformation Evolutionary algorithm (QUATRE), Particle Swarm Optimization (PSO), Gravitational Search Algorithm (GSA), Cuckoo Search (CS), Bat-inspired Algorithm (BA), Grey Wolf Optimizer (GWO), and Whale Optimization Algorithm (WOA). Results: In the present study, AGDE is applied to improve the fidelity of quantum cloning problem and the obtained parameter values minimize the cloning difference error value down to 10-8. Conclusion: Accordingly, the qualitative and quantitative measurements including average, standard deviation, convergence curves of the competitive algorithms over 30 independent runs, proved the superiority of AGDE to enhance the cloning fidelity.

Title	Preparation and thermoelectric power properties of highly doped p-type Sb_2Te_3 thin films
Authors	Adam, A.M., Elsehly, E.M., Ataalla, M., (...), Nafady, A., Diab, A.K.
Journal	Physica E: Low-Dimensional Systems and Nanostructures 127,114505
Abstract	In this study, we provide facile procedures for the growth of p-type Bi-doped Sb2Te3 thin films on ceramic substrates using vacuum thermal evaporation technique. Crystal structure and surface morphology of the prepared films were probed via powder X-ray diffraction (PXRD) and scanning electron microscope (SEM). The thermoelectric power properties were investigated, in terms of electrical conductivity and Seebeck coefficient measurements, over the temperature range from room temperature up to 473 K. The electrical conductivity behavior showed notable transition from metallic behavior to semiconducting as a function of temperature. In addition, Seebeck coefficient measurements confirmed this transition and supported the behavior of the electrical conductivity. Importantly, power factor was estimated based on both the electrical conductivity and Seebeck coefficient values. A maximum value of 227.6 μW/m.K2 was obtained for the Sb1.85Bi0.15Te3 thin film sample at 428 K.

Title	Analytic approximate solutions of diffusion equations arising in oil pollution
Authors	Ahmad, H., Khan, T.A., Durur, H., Ismail, G.M., Yokus, A.
Journal	Journal of Ocean Engineering and Science و6(1), pp. 62-69
Abstract	In this article, modified versions of variational iteration algorithms are presented for the numerical simulation of the diffusion of oil pollutions. Three numerical examples are given to demonstrate the applicability and validity of the proposed algorithms. The obtained results are compared with the existing solutions, which reveal that the proposed methods are very effective and can be used for other nonlinear initial value problems arising in science and engineering.

Title	Novel microwave-driven synthesis of hydrophilic polyvinylidene fluoride/polyacrylic acid (PVDF/PAA) membranes and decoration with nano zero-valent-iron (nZVI) for water treatment applications
Authors	Silva, L.L.S., Abdelraheem, W., Nadagouda, M.N., (...), Fonseca, F.V., Borges, C.P.
Journal	Journal of Membrane Science 620,118817
Abstract	A novel microwave (MW)-based method was developed for in-situ cross-linking/polymerization of polyacrylic acid (PAA) onto hydrophilic polyvinylidene fluoride (PVDF) membrane for preparation of PVDFMW catalytic-membrane system. Unlike traditional thermal techniques, the use of MW radiation provided faster PAA polymerization and synthesis of PVDFMW membranes with excellent mechanical stability and high permeability. Air cooling and the dose-wise application of MW were the most influential parameters on the quality of PAA grafting and on the physical properties of PVDFMW membranes. Detailed surface characterization of PVDFMW revealed pores of the upper surface were occupied with PAA molecules. Nano zero-valent-iron (nZVI)-decorated PVDFMW membranes (nZVI-PVDFMW) were prepared and their catalytic activities were tested for the degradation of bisphenol A (BPA) in a cross-flow system. The nZVI-PVDFMW system demonstrated 52% ± 0.5 of BPA removal under low permeate flux (50 L/m2. h) in the presence of 10 mM of H2O2. The current study demonstrated MW is an advantageous technique for the preparation of composite membranes with ultra-fine morphology and improved physical properties for use in water treatment applications.

Title	Alkaline fuel cells consisting of imidazolium-based graft-type anion exchange membranes: Optimization of fuel cell conditions to achieve high performance and durability
Authors	Mahmoud, A.M.A., Yoshimura, K., Maekawa, Y.
Journal	Journal of Membrane Science 620,118844
Abstract	Water management in alkaline fuel cells through the dew point optimization for a series of imidazolium-based graft-type anion exchange membranes (AEMs) consisting of an ethylene-tetrafuluoroethylene copolymer (ETFE) as a base film having three vinylimidazolium type and a styrylimidazolium type (StIm) anion-conducting units is compared with the standard vinylbenzyltrimethylammonium (BTMA)-based AEM. In the H2/O2 fuel cell tests at 60 °C, by optimizing dew points, the sterically hindered imidazolium containing StIm-based AEMs exhibited the highest power density (710 mW/cm2), which is one of the highest performances of imidazolium-type AEMs to date. Furthermore, it exhibited long-term durability in H2/O2 fuel cell at 60 °C, maintaining 0.52 V (56%) of initial voltage after 670 h of life time test, which is better than that of the standard BTMA-based AEM. The chemical characterization in post-durability characterization revealed that negligible degradation of conducting imidazolium groups in the 2MVIm-, 4VIm-, and StIm-based AEMs was observed. For the first time, the hydration level and DFT-based molecular calculations (LUMO energy) showed an acceptable correlation with the experimental in-situ durability results.

Title	Development of the electrochemical performance of zinc via alloying with indium as anode for alkaline batteries application
Authors	Elrouby, M., El –Shafy Shilkamy, H.A., Elsayed, A.
Journal	Journal of Alloys and Compounds 854,157285
Abstract	Zinc is one of the predominantly utilized metals in alkaline batteries. The addition of a trace amount of indium as an alloying element to zinc retards the rate of corrosion and promotes the sacrificial protection of zinc. The corrosion behavior of Zn and Zn–In alloy at various In content (0.5% and 1%, In/Zn mass fraction) in 6 M KOH solution was electrochemically studied. Tafel plots, electrochemical impedance spectroscopy (EIS), cyclic voltammetry (CV), and charge-discharge methods were all employed. The morphology, chemical composition, and phases of the corrosion layers formed on the surfaces of Zn and Zn–In alloys were thoroughly investigated utilizing scanning electron microscopy (SEM) equipped with an X-ray of dispersed energy (EADX) and X-ray diffraction (XRD), respectively. The polarization results revealed that the corrosion protection efficiency of the Zn–1%In alloy has the highest value of 97.3% at 45 °C. The steady-state of open circuit potential (Ecorr.) for the investigated alloys is shifted to a more negative value compared to that of zinc. This indicates that the alloying of zinc with indium has a positive effect on charge efficiency, suppression of hydrogen evolution reaction, and the capacitance. Moreover, the discharge time increases with the increase of the indium percentage in the bimetallic solid solution of Zn–In. The synthesized alloy is considered a promising material for long life alkaline batteries.

Title	Atomic Fisher information and entanglement forecasting for quantum system based on artificial neural network and time series model
Authors	Abdel-khalek, S., Alhag, A., Ragab, M., (...), Algarni, A., Ahmad, H.
Journal	International Journal of Quantum Chemistry 121(4),e26446
Abstract	In this article, we apply a statistical model for forecasting the quantum entanglement between a two-qubit and optical field in binomial distribution. We explore the link between the atomic Fisher information, quantum entropy, and the statistical properties of the field. The qubit-qubit entanglement is investigated through concurrence during the interaction time. The dynamics of the statistical quantities will be forecasted using the time series and neural network models. The effect of the field distribution parameter (number of successes) is examined by the time series models and artificial neural network. We compare the accuracy of both modes from the perspective of the dynamic of the quantum entropy and atomic Fisher information. A statistical description for the data has been obtained and is discussed to show the statistical technique analysis the data of statistical quantities. The results obtained have several applications and are related with quantum statistics and quantum information processing.

Title	New Insights Into Potential Benefits of Bioactive Compounds of Bee Products on COVID-19: A Review and Assessment of Recent Research
Authors	Elmahallawy, E.K., Mohamed, Y., Abdo, W., (...), Ahmed Awad Ali, S., Yanai, T.
Journal	Frontiers in Molecular Biosciences 7,618318
Abstract	The recent emergence of COVID-19 represents one of the biggest challenges facing the world today. Despite the recent attempts to understand the epidemiological pattern and pathogenesis of the disease, detailed data about the physiology and pathology of the disease is still out of reach. Moreover, the lack of a widespread vaccine prompts an urgent call for developing a proper intervention strategy against the virus. Importantly, identification of novel molecules that target replication of the virus represents one of the promising strategies for the control this pandemic crisis. Among others, honey bee products contain numerous bioactive compounds such as propolis and several phenolic compounds that possess a wide range of therapeutic properties for combating various pathological disorders and infectious agents. The intention of the present review is to highlight the stages of SARS-CoV-2 lifecycle, the molecular mechanisms explaining the health benefits of honey bee products on COVID-19 physiology and pathology and the possible limitations. Further future research is suggested to explore more about bee natural bioactive compounds as potential candidates against SARS-CoV-2.

Title	Dietary Chitosan Nanoparticles: Potential Role in Modulation of Rainbow Trout (Oncorhynchus mykiss) Antibacterial Defense and Intestinal Immunity against Enteric Redmouth Disease
Authors	Ahmed, F., Soliman, F.M., Adly, M.A., (...), El-Matbouli, M., Saleh, M.
Journal	Marine Drugs 19(2),72
Abstract	Bio-nanotechnology employing bio-sourced nanomaterial is an emerging avenue serving the field of fish medicine. Marine-sourced chitosan nanoparticles (CSNPs) is a well-known antimicrobial and immunomodulatory reagent with low or no harm side effects on fish or their human consumers. In this study, in vitro skin mucus and serum antibacterial activity assays along with intestinal histology, histochemical, and gene expression analyses were performed to evaluate the impact of dietary CSNPs (5 g kg−1 dry feed) on rainbow trout resistance against 'enteric redmouth' disease. Two treatment conditions were included; short-term prophylactic-regimen for 21 days before the bacterial challenge, and long-term therapeutic-regimen for 21 days before the challenge and extended for 28 days after the challenge. Our results revealed higher antibacterial defense ability and positive intestinal histochemical and molecular traits of rainbow trout after dietary CSNPs. The prophylactic-regimen improved trout health while the therapeutic regimen improved their disease resistance and lowered their morbidity. Therefore, it is anticipated that CSNPs is an effective antibacterial and immunomodulatory fish feed supplement against the infectious threats. However, the CSNPs seem to be more effective in the therapeutic application rather than being used for short-term prophylactic applications.

Title	A new one-parameter lifetime distribution and its regression model with applications
Authors	Eliwa, M.S., Altun, E., Alhussain, Z.A., (...), Ahmed, H.H., El-Morshedy, M.
Journal	PLoS ONE 16(2 February 2021),e0246969
Abstract	Lifetime distributions are an important statistical tools to model the different characteristics of lifetime data sets. The statistical literature contains very sophisticated distributions to analyze these kind of data sets. However, these distributions have many parameters which cause a problem in estimation step. To open a new opportunity in modeling these kind of data sets, we propose a new extension of half-logistic distribution by using the odd Lindley-G family of distributions. The proposed distribution has only one parameter and simple mathematical forms. The statistical properties of the proposed distributions, including complete and incomplete moments, quantile function and Rényi entropy, are studied in detail. The unknown model parameter is estimated by using the different estimation methods, namely, maximum likelihood, least square, weighted least square and Cramer-von Mises. The extensive simulation study is given to compare the finite sample performance of parameter estimation methods based on the complete and progressive Type-II censored samples. Additionally, a new log-location-scale regression model is introduced based on a new distribution. The residual analysis of a new regression model is given comprehensively. To convince the readers in favour of the proposed distribution, three real data sets are analyzed and compared with competitive models. Empirical findings show that the proposed one-parameter lifetime distribution produces better results than the other extensions of half-logistic distribution.

Title	Antitrypanosomal and antileishmanial activity of chalcones and flavanones from polygonum salicifolium
Authors	Zheoat, A.M., Alenezi, S., Elmahallawy, E.K., (...), de Koning, H.P., Ferro, V.A.
Journal	Pathogens 10(2),175, pp. 1-9
Abstract	Trypanosomiasis and leishmaniasis are a group of neglected parasitic diseases caused by several species of parasites belonging to the family Trypansomatida. The present study investigated the antitrypanosomal and antileishmanial activity of chalcones and flavanones from Polygonum salicifolium, which grows in the wetlands of Iraq. The phytochemical evaluation of the plant yielded two chalcones, 2′,4′-dimethoxy-6′-hydroxychalcone and 2′,5′-dimethoxy-4′,6′-dihydroxychalcone, and two flavanones, 5,7-dimethoxyflavanone and 5,8-dimethoxy-7-hydroxyflavanone. The chalcones showed a good antitrypanosomal and antileishmanial activity while the flavanones were inactive. The EC50 values for 2′,4′-dimethoxy-6′-hydroxychalcone against Trypanosoma brucei brucei (0.5 µg/mL), T. congolense (2.5 µg/mL), and Leishmania mexicana (5.2 µg/mL) indicated it was the most active of the compounds. None of the compounds displayed any toxicity against a human cell line, even at 100 µg/mL, or crossresistance with first line clinical trypanocides, such as diamidines and melaminophenyl arsenicals. Taken together, our study provides significant data in relation to the activity of chalcones and flavanones from P. salicifolium against both parasites in vitro. Further future research is suggested in order to investigate the mode of action of the extracted chalcones against the parasites.

Title	Optical solitons in birefringent fibers with quadratic-cubic nonlinearity using three integration architectures
Authors	Gómez-Aguilar, J.F., Osman, M.S., Raza, N., (...), Mahmoud, E.E., Abdel-Aty, A.-H.
Journal	AIP Advances11(2),025121
Abstract	In this work, the nonlinear Schrödinger's equation is studied for birefringent fibers incorporating four-wave mixing. The improved tanφ(ζ)2-expansion, first integral, and G′G2-expansion methods are used to extract a novel class of optical solitons in the quadratic-cubic nonlinear medium. The extracted solutions are dark, periodic, singular, and dark-singular, along with other soliton solutions. These solutions are listed with their respective existence criteria. The recommended computational methods here are uncomplicated, outspoken, and consistent and minimize the computational work size, which give it a wide range of applicability. A detailed comparison with the results that already exist is also presented.

Title	Novel green biosynthesis of 5-fluorouracil chromium nanoparticles using harpullia pendula extract for treatment of colorectal cancer
Authors	Saddik, M.S., Elsayed, M.M.A., Abdelkader, M.S.A., (...), Farghaly, H.S., Abou-Taleb, H.A.
Journal	Pharmaceutics 13(2),226, pp. 1-17
Abstract	Colorectal cancer (CRC) is the third highest major cause of morbidity and mortality worldwide. Hence, many strategies and approaches have been widely developed for cancer treatment. This work prepared and evaluated the antitumor activity of 5-Fluorouracil (5-Fu) loaded chromium nanoparticles (5-FuCrNPs). The green biosynthesis approach using Harpullia (H) pendula aqueous extract was used for CrNPs preparation, which was further loaded with 5-Fu. The prepared NPs were characterized for morphology using scanning and transmission electron microscopes (SEM and TEM). The results revealed the formation of uniform, mono-dispersive, and highly stable CrNPs with a mean size of 23 nm. Encapsulation of 5-Fu over CrNPs, with a higher drug loading efficiency, was successful with a mean size of 29 nm being produced. In addition, Fourier transform infrared (FTIR) and X-ray diffraction pattern (XRD) were also used for the investigation. The drug 5-Fu was adsorbed on the surface of biosynthesized CrNPs in order to overcome its clinical resistance and increase its activity against CRC cells. Box–Behnken Design (BBD) and response surface methodology (RSM) were used to characterize and optimize the formulation factors (5-Fu concentration, CrNP weight, and temperature). Furthermore, the antitumor activity of the prepared 5-FuCrNPs was tested against CRC cells (CACO-2). This in vitro antitumor study demonstrated that 5-Fu-loaded CrNPs markedly decreased the IC50 of 5-Fu and exerted more cytotoxicity at nearly all concentrations than 5-Fu alone. In conclusion, 5-FuCrNPs is a promising drug delivery system for the effective treatment of CRC.

Title	Non-classical computing problems: Toward novel type of quantum computing problems
Authors	Zidan, M., Eleuch, H., Abdel-Aty, M.
Journal	Results in Physics 21,103536
Abstract	Quantum teleportation draws our attention to propose a new type of problems which can not be solved using classical computers. In this paper, we propose one of these problems. Concretely, this paper extends the definition of Deutsch's problem to decide whether a black box Uf applied on a given unknown qubit $\alpha\|0\rangle+\beta\|1\rangle$, such that $\|\alpha\|>0, \|\beta\|>0$, and $\|\alpha\|\neq\|\beta\|$, is constant or balanced Boolean function, besides, estimation of $\|\alpha\|$ and $\|\beta\|$. Although, this problem is very simple but it can not be solved using classical computers, because qubit can not be implemented physically using classical computers. A novel quantum algorithm based on principle of entanglement measure is proposed to solve this problem. IBMs 5-qubit quantum computer (ibmqx4) is used to realize the proposed algorithm experimentally.

Title	Chaos control and analysis of fractional order neural network under electromagnetic radiation
Authors	Allehiany, F.M., Mahmoud, E.E., Jahanzaib, L.S., Trikha, P., Alotaibi, H.
Journal	Results in Physics 21,103786
Abstract	In the manuscript, fractional order neural network under electromagnetic radiation is introduced and its dynamics studied using Lyapunov exponents, stagnation points, symmetry, bifurcation diagrams etc. The dynamics for variable fractional order between 0.8 to 1 is also observed. The neural network model shows high sensitivity to external stimuli. The neural functioning shows improvement when exposed to the right amount of electromagnetic radiations. The chaos in the studied dynamical system is controlled about its unique stagnation point using SMC controllers in presence of uncertainties and disturbances, which are also estimated in this method. These results could bring vision into the occurrence of neuron related problems.

Title	Mathematical analysis of COVID-19 via new mathematical model
Authors	Abdullah, Ahmad, S., Owyed, S., (...), Shah, K., Alrabaiah, H.
Journal	Chaos, Solitons and Fractals 143,110585
Abstract	We develop a new mathematical model by including the resistive class together with quarantine class and use it to investigate the transmission dynamics of the novel corona virus disease (COVID-19). Our developed model consists of four compartments, namely the susceptible class, S(t), the healthy (resistive) class, H(t), the infected class, I(t) and the quarantine class, Q(t). We derive basic properties like, boundedness and positivity, of our proposed model in a biologically feasible region. To discuss the local as well as the global behaviour of the possible equilibria of the model, we compute the threshold quantity. The linearization and Lyapunov function theory are used to derive conditions for the stability analysis of the possible equilibrium states. We present numerical simulations to support our investigations. The simulations are compared with the available real data for Wuhan city in China, where the infection was initially originated.

Title	Quantum correlations and non-classical properties for two superconducting qubits interacting with a quantized field in the context of deformed Heisenberg algebra
Authors	Abdel-Khalek, S., Berrada, K., Aldaghfag, S.A.
Journal	Chaos, Solitons and Fractals 143,110466
Abstract	In the present work, we examine qualitatively the entanglement and parameter estimation in a two superconducting qubits (SC-qubits) coupled to a nonlinear field in the existence of time-varying coupling. We show the effects of the nonlinearity of the field and time-varying coupling on the evolution of such quantities of current interests by considering the von Neumann entropy, entanglement of formation and quantum Fisher information (QFI). Moreover, we explain the relationship between the information quantifiers during the dynamics. The obtained results can suggest new prospects to explore and understand the nonlinearity phenomena on the behaviour of the information quantifiers in SC-qubits.

Title	Acid rain induced leakage of Ca, Mg, Zn, Fe from plant photosynthetic organs – Testing for deciduous and dicotyledons
Authors	Diatta, J., Youssef, N., Tylman, O., (...), Mitko, K., Lejwoda, P.
Journal	Ecological Indicators 121,107210
Abstract	Simulated acid rains (AR), (pH 3.0, 3.5, 4.0, 4.5, 5.0, 5.5) were applied to green leaves of 13 deciduous trees (DT) and 10 species of dicotyledonous plants (DP). All were incubated at 23 °C within a growth chamber for 72 h. After the contact time, the leachates were analyzfor pH and next mineral elements: Ca, Mg, Fe, Zn. Total leaf concentrations of Ca and Mg have exhibited different relationships with Mg(DT) = 6.85Ca(DT)0.566, R2 = 0.64 and Mg(DP) = 0.079Ca(DP) + 318.8, R2 = 0.41. Leakage process revealed that intra-species variation for DT follows: Mg (107.3%) > Ca (106.0%) > Zn (90.3%) > Fe (59.8%), implying that the leaking effect was much more pronounced for alkaline elements (Ca, Mg). Dicotyledonous plants (DP), displayed a similar pattern but less varied: Mg (78.7%) > Ca (75.6%) > Zn (66.5%) > Fe (55.8%). The elaborated mineral photosynthetic index (MPI), [Mg/(Zn + Fe)] revealed that 77% of deciduous species represented very low to intermediate photosynthetic recovery, meaning that highly acid rain impacted trees will be surviving less or none. High DT survivors should be maple, linden and hornbeam. Dicotyledonous plants (DP) covered 70% of high to very high survival feature, where cucumber, cabbage and daisy prevailed. We stipulate that regreening of zones endangered by acid rains or planning green urban spaces should consider tree species with much more higher Ca concentrations in leaves. Both Ca2+ and Mg2+ intracellular hydrolysis appears as an efficient buffer inactivating acidity.

Title	A production inventory model with partial trade credit policy and reliability
Authors	Das, S., Al-Amin Khan, M., Mahmoud, E.E., (...), Abualnaja, K.M., Akbar Shaikh, A.
Journal	Alexandria Engineering Journal 60(1), pp. 1325-1338
Abstract	Reliability is one of the important factors in production inventory system as well as in the demand of the products. During a production process, the products which are more perfect with higher reliability increase the demand of the product whereas credit facility is also one of the popular business strategies. Combining these two concepts in together, we have described and analyzed mathematically a production inventory model with a partial credit facility and the reliability effect on the production system in which the customers' demand is dependent on the price of the products and deterioration rate is considered to be constant. In this proposed model, trade credit policy on both the manufacturer and customers is introduced by taking into account all the possible situations on the basis of allowed credit periods. Under these situations, taking all possible cases for the manufacturer credit period as well as customers' credit period, seven non-linear optimization problems for the proposed model are obtained. Since the corresponding optimization problems associated to this model are highly non-linear, we have found closed form optimal solution of the corresponding each of these objective functions by using Taylor's series approximation technique. The convexity of the objective function of each non-linear problem is also investigated graphically. Finally, to validate the proposed model a set of seven numerical examples have been simultaneously solved and a sensitivity analysis is executed to notice the behavior of the parameters on the optimal solution.

Title	On the dissipativity property of negative imaginary systems
Authors	Mabrok, M.A., Alyami, M.A., Mahmoud, E.E.
Journal	Alexandria Engineering Journal 60(1), pp. 1403-1410
Abstract	This paper extends the concept of dissipativity to a new class of dynamical systems known as negative imaginary systems. The paper also introduce a new definition for nonlinear negative imaginary systems to extend the existent definition. Two different quadratic dynamic supply rates are introduced to allow for extending the dissipativity concept to cover the negative imaginary systems. One of which is a differential operator and the other is an integral operator. Both supply rates are used in order to formulate the class of negative imaginary systems as dissipative systems. This extension allows for wider class of dynamical systems to be considered in the negative imaginary framework. We also show how the new definition extends the negative imaginary system to analyze a class of higher order evolutionary dynamics. In particular, we show that the second order replicator dynamics satisfy the negative imaginary property and hence we can conclude convergence with certain class of games. Also, a nonlinear negative imaginary lemma based on the above definitions is derived.

Title	Control and synchronization of the hyperchaotic attractor for a 5-D self-exciting homopolar disc dynamo
Authors	Mahmoud, E.E., Abualnaja, K.M.
Journal	Alexandria Engineering Journal 60(1), pp. 1173-1181
Abstract	The control of the novel five-dimensional hidden attractors hyperchaotic system is investigated. We suggest an approach to change the model of its hyperchaotic behavior to an unpredictable trivial fixed point employing the stability principle. We are also researching the synchronization of the same system, focusing on the stability theory. Numerical simulations show that effective control and synchronization results are obtained with the control method.

Title	A new Tetrahydrofuran sesquiterpene skeleton from Artemisia sieberi
Authors	Mohamed, T.A., Albadry, H.A., Elshamy, A.I., (...), Moustafa, M.F., Hegazy, M.-E.F.
Journal	Journal of the Chinese Chemical Society 68(2), pp. 338-342
Abstract	A new Tetrahydrofuran sesquiterpene 7,10-Epoxy-10-methy-dodeca-1,6(14)-diene-3,4-diol (1) along with three known Tetrahydrofuran sesquiterpene compounds 2,6,10-trimethyl-2,5:7,10-dioxido-dodeca-3,11-dien-5-ol (2), cis-hydroxydavanone (3), and davana acid (4). All isolated metabolites were tested against MCF-7, HCT-116, and HepG-2 cancer cell lines. Compound 2 showed potent activity against MCF-7 (IC50 = 26 ± 0.4 µg/ml), HCT-116 (IC50 = 30.4 ± 0.9 µg/ml), and HepG-2 (IC50 = 20.5 ± 0.3 µg/ml) cancer cells.

Title	Characterization of a spontaneous cyst-forming strain of Toxoplasma gondii isolated from Tokachi subprefecture in Japan
Authors	Salman, D., Mahmoud, M.E., Pumidonming, W., (...), Oohashi, E., Igarashi, M.
Journal	Parasitology International 80,102199
Abstract	Apicomplexan parasite Toxoplasma gondii has three distinct clonal lineages: high, medium and low virulent strains, type I, II and III, respectively. T. gondii avoids the immune response by transforming from fast multiplying tachyzoite to slow multiplying bradyzoite, and establishing a chronic infection. In the present study, we isolated a new strain of T. gondii from cat feces in the Tokachi subprefecture, Hokkaido, Japan and named it as TgCatJpObi1 (Obi1) strain. Genotyping analysis of 12 loci revealed atypical characters close to type II, genotype 4 according to ToxoDB classification. Phenotypically, Obi1 strain shows slow growth rate and the ability of spontaneous cyst formation in both human foreskin fibroblast (HFFs) and mouse peritoneal macrophages in vitro without bradyzoite induction. Parasite virulence was assessed by means of mouse survival upon infection with either Obi1 or ME49 strains. Obi1 strain displayed no mortalities in comparison to type II clonal lineage, ME49 at LD50 to LD100 range (1 × 103–106 tachyzoites). Although virulence of Obi1 strain is significantly lower than that of ME49, nucleotide sequences analyses revealed that genes of virulence factors such as Gra15, Rop5, 16, 17, and 18 in Obi1 strain were 100% identical to those in the type II strain. Thus, characterization of a newly isolated strain, Obi1, is crucial to clarify the development of toxoplasmosis in both humans and animals.

Title	Protective efficacy of thymoquinone or ebselen separately against arsenic-induced hepatotoxicity in rat
Authors	Al Aboud, D., Baty, R.S., Alsharif, K.F., (...), Abdel Moneim, A.E., Kassab, R.B.
Journal	Environmental Science and Pollution Research 28(5), pp. 6195-6206
Abstract	Arsenic (As) exposure is associated with adverse health outcomes to the living organisms. In the present study, the hepato-protective ability of thymoquinone (TQ), the active principle of Nigella sativa seed, or ebselen (Eb), an organoselenium compound, against As intoxication in female rats was investigated. For this purpose, animals were allocated randomly into control, As (20 mg/kg), TQ (10 mg/kg), Eb (5 mg/kg), As+TQ, and As+Eb groups that were orally administered for 28 consecutive days. Arsenic exposure resulted in hepatic oxidative damage which was evidenced by marked decreases in antioxidant parameters (superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione reductase (GR), and glutathione (GSH)) concomitant with high malondialdehyde (MDA) level. Furthermore, As toxicity induced significant elevations in liver accumulation of As, serum hepatic indices (aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), and total bilirubin (TB)), and apoptotic marker (B cell lymphoma 2(Bcl2), Bcl-2-associated X protein (Bax), and caspase 3) levels. Additionally, notable increments in hepatic fibrotic markers (epidermal growth factor (EFG) and transforming growth factor beta 1 (TGF-β1)) associated with high nitric oxide, interleukin 6 (IL-6), tumor necrosis factor alpha (TNF-α), and myeloperoxidase (MPO) levels were noticed following As intoxication. Biochemical findings were well-supported by hepatic histopathological screening. The co-treatment of As-exposed rats with TQ or Eb considerably improved liver function and antioxidant status together with lessened hepatic As content, inflammation, apoptosis, and fibrosis. The overall outcomes demonstrated that TQ or Eb ameliorates As-induced liver injury through their favorable antioxidant, anti-inflammatory, anti-apoptotic, and fibrolytic properties.

Title	Remote sensing-based geological mapping and petrogenesis of Wadi Khuda Precambrian rocks, South Eastern Desert of Egypt with emphasis on leucogranite
Authors	Asran, A.M., Hassan, S.M.
Journal	Egyptian Journal of Remote Sensing and Space Science 24(1), pp. 15-27
Abstract	The exposed Precambrian rocks along Wadi Khuda area, South Eastern Desert of Egypt, comprise gneisses, amphibolites and migmatites associations (infrastructural rocks) which are intruded by diorite, tonalite, syenogranite and leucogranite (LG). LG forms homogeneous boss like bodies, devoid to xenoliths, except along the outer margins. Chemically and mineralogically they are dissimilar to the surrounding gneisses. In the current study, band ratio and Decorrelation Stretch image processing algorithms were proposed and applied on Landsat-8, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) and Sentinel-2 remote sensing data to discriminate the widely exposed lithological units in the mapped area. Geochemically, I-type classification and volcanic arc environment were revealed. LG is peraluminous (ASI average of 1.09) with normative corundum up to 1.38 for LG. The LG displays limited major and trace element variations (SiO2 = 74.5–76.2%, AI203 = 13.4–14.4%), MgO = 0.03–0.19%, Na2O = 3.6–4.6%), and Rb = 55–85 ppm) probably due to textural and mineralogical homogeneity. The contents of REE in the leucogranite are low (∑REE = 21–37), but the REE patterns are [(La/Yb)n = 2.45–9.03], [(La/Sm)n = 1.09–2.6], with negative Eu anomaly, (Eu/Eu* = 0.19–0.78). The negative Eu anomaly and the low Sr content (16–92 ppm) may be attributed to the plagioclase feldspars fractionation. The leucogranites represent residual melt of syenogranite which forms Um Itly pluton at the southern flank of Wadi Khuda entrance.

Title	Targeting ctDNA binding and elaborated in-vitro assessments concerning novel Schiff base complexes: Synthesis, characterization, DFT and detailed in-silico confirmation
Authors	Abu-Dief, A.M., El-Metwaly, N.M., Alzahrani, S.O., (...), Shaaban, S., Adam, M.S.S.
Journal	Journal of Molecular Liquids 322,114977
Abstract	Two novel complexes for Zn2+ and VO2+ ions, were prepared from tridentate dibasic chelating Schiff base ligand. 1-((3,5-di-tert-butyl-2-hydroxybenzylidene)amino)naphthalen-2-ol-5-sodium sulfonate (DSHN), was the ligand used in this study. Alternative spectral tools were applied to elucidate structural composition of new compounds. Also, geometry optimization for all synthesizes was conducted by Gaussian09 program via DFT method, to obtain optimal structures and essential parameters. Moreover, the biochemical behavior for all synthesizes, was explored based on tested reactivity against various microbial strains and cancer cells (HCT-116, MCF-7, and HepG-2). The two complexes exhibited interestingly anti-proliferative potential against human cancer cell lines. The antioxidant behavior of the two complexes was studied by DPPH and SOD assays. Particularly, Zn(II) and VO(II) complexes presented more enhanced antimicrobial and anticancer features compared to the free ligand (DSHN), with superiority for VO(II) complex. The binding nature of two complexes with calf thymus DNA (ctDNA), was examined by various methods as, spectrophotometry, viscosity and gel electrophoresis. Their binding efficiency with ctDNA was proposed to be just intercalation or replacement mode. This in-vitro assay was confirmed by in-silico simulation versus 1cca, 1jnx, 1smp, 2 h80 and 5ajh as the co-crystals for selected pathogen-proteins, which attribute to microbes and cancer cells.

Title	Effects of transition metal element doping on the structural and thermoelectric properties of n-type $Bi_{2-x}Ag_xSe_3$ alloys
Authors	Adam, A.M., El-Khouly, A., Diab, A.K.
Journal	Journal of Alloys and Compounds 851,156887
Abstract	In this work, it is demonstrated that a higher electrical conductivity can be obtained when Ag atoms, as a transition metal, replaces Bi atoms in the n-type Bi2-xAgxSe3 system. As a result of differences in the atomic mass and size between Ag and Bi, larger Seebeck coefficient is obtained. The concerned Bi2-xAgxSe3 alloys were prepared by melting in high temperature. Identifications of the microstructure and surface morphology were carried out via X-ray diffraction (XRD) analysis and scanning electron microscope (SEM) attached with the energy dispersive x-ray (EDX) unit. All samples are polycrystalline. Seebeck coefficient, electrical and thermal conductivities were measured over the temperature range 300–473K. Notable enhancement in the electrical conductivity is obtained. The thermoelectric power factor is calculated showing its maximum value at 260 μW/mK2. High electrical conductivity and high Seebeck coefficient of some of the doped alloys resulted in a promising figure of merit (ZT). The largest ZT is calculated at 0.23 at 473K for the Bi1.8Ag0.20Se3 sample.

Title	Synthesis and antimicrobial activity of some novel 1,2-dihydro-[1,2,4]triazolo[1,5-: a] pyrimidines bearing amino acid moiety
Authors	Mohamed, M.A.A., Bekhit, A.A., Allah, O.A.A., (...), Amagase, K., El-Saghier, A.M.M.
Journal	RSC Advances 11(5), pp. 2905-2916
Abstract	A new series of [1,2,4]-triazole bearing amino acid derivatives 2a-d-9a-d were synthesized under green chemistry conditions via multicomponent reaction using lemon juice as an acidic catalyst. The obtained compounds were characterized by different spectral and elemental analyses. The obtained candidates showed promising antibacterial activity against some standard bacteria and multidrug resistant (MDR) clinical isolates. In contrast to the reference drugs cephalothin and chloramphenicol, the tested compounds showed substantial better MIC values towards the tested MDR strains. The most active compounds 3c, 8a and 9d against MDR bacteria were tested for MBC and MIC index, the results indicted the bacteriostatic activity of these compounds. The most active compounds 2c, 2d, 3c, 8a, 8b, 9a, 9b, 9c and 9d showed a high selectivity index towards antimicrobial activity against K. pneumoniae and MRSA1 compared to mammalian cells, suggesting a good safety profile. This journal is

Title	The intrinsic exchange bias effect in the $LaMnO_3$ and $LaFeO_3$ compounds
Authors	El-Moez A. Mohamed, A., Álvarez-Alonso, P., Hernando, B.
Journal	Journal of Alloys and Compounds 850,156713
Abstract	This work investigates the magnetic and the intrinsic exchange bias (EB) properties of the sol-gel synthesised LaMnO3 and LaFeO3 perovskite compounds. The x-ray diffraction (XRD) has proved the high homogeneity of both compounds, which are crystallised in the orthorhombic Pnma structure (as proved by Rietveld refinement). The field cooling-zero field cooling magnetisation dependent temperature (M(T)) indicates the antiferromagnetic (AFM) nature of these compounds. Nevertheless, an anomalous ferromagnetic (FM) behaviour is observed, which is more likely, arises from the spin canting effect in the Mn3+ and Fe3+ ions. The thermal variation of the magnetisation reciprocal (M−1) has confirmed the presence of this FM component below 110K in LaMnO3 and the Curie-Weiss behaviour above 160K. Also, the magnetic hysteresis loops below 110K are corresponding to the FM-like behaviour. The spin of the FM component couples with the AFM phase spins, leading to the EB effect in both compounds that show maximum values of −1124Oe and 2343 Oe for the LaMnO3 and LaFeO3 compounds, respectively. It is observed that the EB effect is suppressed with the partial substitution of La3+ by Ba2+ due to the dominance of the FM phase and the absence of the FM/AFM coupling. Also, the influence of the FM-AFM phases co-existence on the magnetocaloric(MCE) properties of the LaMnO3 compound were studied. Where the LaMnO3 compound shows a magnetic entropy change (ΔS) of 0.42 J/kg.K with an adiabatic temperature change (ΔTad) of 0.1k that is improved in the La0·8Ba0·2MnO3 compound to 1.3 J/kg.K and 0.4K, respectively.

Title	Terahertz soft mode in Ba-Pb M-type hexaferrite ceramics
Authors	Lukianov, M.Y., Ahmed, A.G., Bush, A.A., (...), Gorshunov, B.P., Alyabyeva, L.N.
Journal	International Conference on Infrared, Millimeter, and Terahertz Waves, IRMMW-THz 2021-August
Abstract	An unusual ferroelectric-like soft mode is discovered in terahertz spectra of dielectric permittivity of lead-substituted barium hexaferrite. The dynamics of the mode cannot be described either by Cochran or by Curie-Weiss equations. The obtained dependence of the soft mode parameters on lead concentration x(Pb) allows to suggest quantum phase transition at x(Pb)≈0.2.

Title	Broadband electrodynamics of single-crystalline lead-substituted barium hexaferrite
Authors	Alyabyeva, L.N., Vinnik, D.A., Ahmed, A.G., Dremov, V.V., Gorshunov, B.P.
Journal	International Conference on Infrared, Millimeter, and Terahertz Waves, IRMMW-THz 2021-August
Abstract	Broadband electrodynamic response of single-crystalline lead-substituted barium hexaferrite Ba1-xPbxFe12O19 is studied at temperatures from 5 to 300 K in the range of frequencies from 1 Hz to 240 THz. Discovered phenomena include relaxational radio-frequency dynamics of domains and domain walls, temperature-unstable terahertz excitations connected with electric dipoles induced by off-center displacements in the ab-plane of the lead ions, narrow terahertz excitations associated with electronic transitions between the fine-structure components of the Fe2+ground state, dielectric gigahertz resonances presumably of magneto-electric origin and polar lattice phonons.

Title	An Empirical Model to Predict the Diabetic Positive Using Stacked Ensemble Approach
Authors	R, S., M, S., Hasan, M.K., (...), Alsuhibany, S.A., Abdel-Khalek, S.
Journal	Frontiers in public health 9, pp. 792124
Abstract	oday, disease detection automation is widespread in healthcare systems. The diabetic disease is a significant problem that has spread widely all over the world. It is a genetic disease that causes trouble for human life throughout the lifespan. Every year the number of people with diabetes rises by millions, and this affects children too. The disease identification involves manual checking so far, and automation is a current trend in the medical field. Existing methods use a single algorithm for the prediction of diabetes. For complex problems, a single model is not enough because it may not be suitable for the input data or the parameters used in the approach. To solve complex problems, multiple algorithms are used. These multiple algorithms follow a homogeneous model or heterogeneous model. The homogeneous model means the same algorithm, but the model has been used multiple times. In the heterogeneous model, different algorithms are used. This paper adopts a heterogeneous ensemble model called the stacked ensemble model to predict whether a person has diabetes positively or negatively. This stacked ensemble model is advantageous in the prediction. Compared to other existing models such as logistic regression Naïve Bayes (72), (74.4), and LDA (81%), the proposed stacked ensemble model has achieved 93.1% accuracy in predicting blood sugar disease.

Title	On r -Generalized Fuzzy ℓ -Closed Sets: Properties and Applications
Authors	Taha, I.M.
Journal	Journal of Mathematics 2021,4483481
Abstract	In the present study, we introduce and characterize the class of r-generalized fuzzy ℓ-closed sets in a fuzzy ideal topological space X,τ,ℓ in Šostak sense. Also, we show that r-generalized fuzzy closed set by Kim and Park (2002) →r-generalized fuzzy ℓ-closed set, but the converse need not be true. Moreover, if we take ℓ=ℓ0, the r-generalized fuzzy ℓ-closed set and r-generalized fuzzy closed set are equivalent. After that, we define fuzzy upper (lower) generalized ℓ-continuous multifunctions, and some properties of these multifunctions along with their mutual relationships are studied with the help of examples. Finally, some separation axioms of r-generalized fuzzy ℓ-closed sets are introduced and studied. Also, the notion of r-fuzzy G∗-connected sets is defined and studied with help of r-generalized fuzzy ℓ-closed sets.

Title	Ensemble of Deep Learning Based Clinical Decision Support System for Chronic Kidney Disease Diagnosis in Medical Internet of Things Environment
Authors	Alsuhibany, S.A., Abdel-Khalek, S., Algarni, A., (...), Kumar, V., Mansour, R.F.
Journal	Computational Intelligence and Neuroscience 2021,4931450
Abstract	Recently, Internet of Things (IoT) and cloud computing environments become commonly employed in several healthcare applications by the integration of monitoring things such as sensors and medical gadgets for observing remote patients. For availing of improved healthcare services, the huge count of data generated by IoT gadgets from the medicinal field can be investigated in the CC environment rather than relying on limited processing and storage resources. At the same time, earlier identification of chronic kidney disease (CKD) becomes essential to reduce the mortality rate significantly. This study develops an ensemble of deep learning based clinical decision support systems (EDL-CDSS) for CKD diagnosis in the IoT environment. The goal of the EDL-CDSS technique is to detect and classify different stages of CKD using the medical data collected by IoT devices and benchmark repositories. In addition, the EDL-CDSS technique involves the design of Adaptive Synthetic (ADASYN) technique for outlier detection process. Moreover, an ensemble of three models, namely, deep belief network (DBN), kernel extreme learning machine (KELM), and convolutional neural network with gated recurrent unit (CNN-GRU), are performed. Finally, quasi-oppositional butterfly optimization algorithm (QOBOA) is used for the hyperparameter tuning of the DBN and CNN-GRU models. A wide range of simulations was carried out and the outcomes are studied in terms of distinct measures. A brief outcomes analysis highlighted the supremacy of the EDL-CDSS technique on exiting approaches.

Title	Statistical Inferences of Burr XII Lifetime Models under Joint Type-1 Competing Risks Samples
Authors	Abushal, T.A., Soliman, A.A., Abd-Elmougod, G.A.
Journal	Journal of Mathematics 2021,9553617
Abstract	The problem of statistical inference under joint censoring samples has received considerable attention in the past few years. In this paper, we adopted this problem when units under the test fail with different causes of failure which is known by the competing risks model. The model is formulated under consideration that only two independent causes of failure and the unit are collected from two lines of production and its life distributed with Burr XII lifetime distribution. So, under Type-I joint competing risks samples, we obtained the maximum likelihood (ML) and Bayes estimators. Interval estimation is discussed through asymptotic confidence interval, bootstrap confidence intervals, and Bayes credible interval. The numerical computations which described the quality of theoretical results are discussed in the forms of real data analyzed and Monte Carlo simulation study. Finally, numerical results are discussed and listed through some points as a brief comment.

Title	Corrigendum: On (L,M)-Fuzzy Convex Structures (Filomat, (2019) 33(13), (4151-4163), 10.2298/FIL1913151S)
Authors	Zhao, H., Song, Q.-L., Sayed, O.R., (...), Sayed, Y.H.R., Chen, G.-X.
Journal	Filomat 35(5), pp. 1687-1691
Abstract	In this paper, we point out that the proof of Theorem 2.4(5), Proposition 2.6(1) and Proposition 2.8(1) in the paper titled ”On (L, M)-fuzzy convex structures” (Filomat 33(13): 4151-4163, 2019) are not true in general. Then, we give three correct proofs of these results.

Title	Common Solutions to Variational Inequality Problem via Parallel and Cyclic Hybrid Inertial CQ-Subgradient Extragradient Algorithms in (HSs)
Authors	Hammad, H.A., Diallo, M.A.
Journal	Forum for Interdisciplinary Mathematics pp. 185-210
Abstract	The intent of this manuscript is to present new algorithms, so-called strongly convergent parallel and cyclic hybrid inertial CQ-subgradient extragradient (PCHICQ-SE) algorithms. Proposed algorithms are applied to find common solutions to the variational inequality problem (CSVIP) in the Hilbert spaces (HSs). Ultimately, numerical experiments are presented here to examine the efficiency of our algorithms.

Title	Mathematical model on a photothermal and voids in a semiconductor medium in the context of Lord-Shulman theory
Authors	Bouslimi, J., Omri, M., Kilany, A.A., Abo-Dahab, S.M., Hatem, A.
Journal	Waves in Random and Complex Media
Abstract	The current research presents a new model on a volume fraction branch of Knowledge and photothermal effect in a semiconductor generalized thermoelasticity medium according to the Lord-Shulman Theory. The governing equations are provided considering voids, photothermal, semiconducting, and the theory of generalized thermoelasticity. The authors make use of the normal mode examination to solve the order of the equations in this phenomenon under the boundary conditions. The achieved results demonstrate the effect of photothermal, voids, the process of semiconductor, and the thermic relaxation time. The compared physical fields are given analytically and displayed in graphs. The achieved results display the possibility of applying the combination of the photothermal and semiconductors medium in biophysical, industries, structures, engineering, and chemical products with consideration of the photothermal, semiconducting, and voids.

Title	Flow of mixed convection for radiative and magnetic hybrid nanofluid in a porous material with Joule heating
Authors	Abdelhafez, M.A., Awad, A.A., Nafe, M.A., Eisa, D.A.
Journal	Heat Transfer
Abstract	This paper analyzes the mixed convection flow and transport of heat in a hybrid nanofluid via an exponentially extending/contracting surface. Joule heating, magnetic field, permeability of a porous medium, thermal radiation, and slip condition are taken into consideration. Magnetite (Fe3O4) and copper (Cu) are used as a mixture of nanoparticles while ethylene glycol as a regular liquid. The paradigm is dissolved by utilizing the method of Runge–Kutta–Fehlberg with the shooting technique in MATLAB software. The effect of controlling parameters on the coefficient of drag force, heat transfer coefficient, and the distributions of temperature and velocity for physical parameters are discussed numerically, physically, and graphically. The outcomes ended up illustrating that the transport of heat is diminished by upsurging the Joule heating and magnetic field parameters for both contracting and extending states. For larger values of permeability parameter and parameter of mixed convection, the coefficient of local skin friction upsurges in extending situations.

Title	Wardowski's Contraction and Fixed Point Technique for Solving Systems of Functional and Integral Equations
Authors	Hammad, H.A., Bota, M.-F., Guran, L.
Journal	Journal of Function Spaces 2021,7017046
Abstract	In this manuscript, some tripled fixed point results are presented in the framework of complete metric spaces. Furthermore, Wardowski's contraction was mainly applied to discuss some theoretical results with and without a directed graph under suitable assertions. Moreover, some consequences and supportive examples are derived to strengthen the main results. In the last part of the paper, the obtained theoretical results are used to find a unique solution to a system of functional and integral equations.

Title	The anatomy and histology of the reproductive system of Aplysia oculifera (Mollusca: Heterobranchia: Aplsiida) from the Red Sea coastal waters
Authors	Moustafa, A.Y., El-Masry, S.
Journal	Invertebrate Reproduction and Development 65(4), pp. 288-306
Abstract	Aplysia oculifera is an endemic sea hare that inhabits the Egyptian coast of the Red Sea. We describe the reproductive system of this species for the first time. It is composed of an ovotestis, small hermaphroditic duct, nidamental glandular complex, large hermaphroditic duct, gametolytic gland, external seminal groove and cephalic penis. The follicles within the ovotestis contain spermatogenic and oogenic cells. A pre-ampulla, ampulla, and post-ampulla constitute the different regions of the small hermaphroditic duct. The nidamental complex consists of albumen, mucus, and membrane glands all confluent with the fertilization chamber. The nidamental glands consist of glandular cells alternating with supporting cells. The glandular cells have different histochemical characters concerning the production of acid and neutral mucopolysaccharides. The large hermaphroditic duct is attached to a seminal receptacle. The duct has two components; red and white hemiducts the secretory epithelia of which are distinguished internally. An atrial gland is present near the visceral genital opening. The gametolytic gland has four types of columnar cells. A seminal groove arises from the genital opening and extends anteriorly to the apex of an ear-like flap penis. The results suggest that some differences in certain reproductive characters may be of phylogenetic importance.

Title	Effect of biochar addition method on ammonia volatilization and quality of chicken manure compost | [Bioanglies įterpimo būdo įtaka amoniako išgaravimui ir vištų mėšlo komposto kokybei]
Authors	Abd El-Rahim, M.G.M., Dou, S., Xin, L., (...), Ali, G.A.M., Hamed, M.H.
Journal	Zemdirbyste 108(4), pp. 331-338
Abstract	Composting chicken manure causes negative impacts on environmental ecosystem by increasing ammonia (NH3) emissions. Split addition of maize straw-derived biochar (Bi) during composting of chicken manure may promote the composting process, increase the quality of produced compost and reduce NH3 volatilization. To build composting piles, fresh chicken manure and maize straw were mixed (2:1 w/w). Biochar (10% w/w) was applied to the compost piles in different addition modes: one-time applied biochar (OTABi), 10% at the beginning of the trial, and split-applied biochar (SABi), 2.5% at 0, 3, 7 and 15 days of the composting. In addition to the control (without biochar) treatment, measurements of NH3 emissions were performed in a bench-scale composting experiment. To evaluate the phytotoxicity and maturity of the compost, germination tests were performed in Petri dishes. Compared with the control and OTABi treatments, SABi had a great positive effect (by 40% and 33%) on the final general characteristics of the compost and reduced the cumulative NH3 emissions. Although OTABi treatment had faster degradation during composting, it did not enhance humification. In the mature compost, the humic substances of SABi treatment were 17% and 40% higher than control and OTABi treatments. In addition, in SABi, the values of humic acid carbon (HAC) and humification index (HI) were significantly higher than in other treatments. By the end of composting, both biochar application modes exhibited low water-extractable organic carbon and high seed germination index compared with the control treatment. This study suggests that during chicken manure composting split application of biochar is a crucial practice for reducing N loss, mitigating NH3 emissions and enhancing humification.

Title	A GL photo-thermal theory upon new hyperbolic two-temperatures in a semiconductor material
Authors	Hobiny, A., Abbas, I.A.
Journal	Waves in Random and Complex Media
Abstract	A novel GL model of a new hyperbolic two-temperatures theory is studied to investigate the propagation of the thermoelastic waves on semiconductor materials. The basic equations are studied during the photo-excitation processes in the context of the photo-thermo-elastic model. The outer surface of the semiconductor medium is illuminated by a laser pulse. By using Laplace transform with the eigenvalues scheme, the analytical solutions of all studying fields are presented. The carrier density variation, the variations of the thermodynamic and the conductive temperatures, the displacement and stress components in a semi-infinite semi-conductor material are estimated. The effects of the hyperbolic two-temperature parameter and the relaxation times on the distributions of wave propagation of physical fields for semiconductor silicon (Si) medium are shown graphically and discussed.

Title	Equipment Detection Based Inspection Robot for Industrial Plants
Authors	Heshmat, M., Gao, Y.
Journal	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 13054 LNAI, pp. 419-429
Abstract	Industries move toward the replacement of labours engaged in dangerous tasks with fully automated systems. The sixth sense technology aims at achieving that by integrating different technologies in such a way that enables monitoring of industrial plants and predicting any faults that could happen. One important module of the sixth sense technology is inspection robots. This paper aims at providing the inspection robots with equipment-detection capability, resembling the human inspectors performing the customised inspection for a variety of equipment. The types of equipment, used in this study, are reactor, boiler, pump, isolated pipes, meter gauge, and valves. Given the complexity of the industrial environment, we propose a real-time deep-learning-based equipment detection model. The results show that the mean average precision is above 90%, which ensure the significant performance of the proposed solution. This work validates the practicality of our equipment-detection model and shows its potential to be employed on our inspection robot.

Title	Antifungal Activity of Thyme and Carvacrol Nanoemulsions Against Aspergillus fumigatus Isolated from Different Types of Cheese
Authors	ShakEr, E.M., Farghaly, M.M.
Journal	Advances in Animal and Veterinary Sciences 9(11), pp. 1945-1950
Abstract	The control of fungal spoilage is a major concern for industrials and scientists that are looking for efficient solutions to prevent and/or limit the fungal spoilage in dairy products. Therefore, the aim of this study is controlling Aspergillus fumigatus isolated from cheese by safe, non-allergic and natural food preservative nano-emulsions. Two hundred cheese samples of four different types (50 each) were studied for the presence of A. fumigatus. The isolated strains were examined for their ability to growth under the effect of two natural nano-emulsion as thyme (TN) and carvacrol (CN) nanoemulsions using well diffusion method (WDM). The possible changes in the fungus structure were described by scanning electron microscope (SEM). The nanoemulsions were prepared and characterized by transmission electron microscope (TEM). The incidence of A. fumigatus in different types of cheese was detected with percentage of 24, 6 and 12 % in Kareish, Damietta and Processed cheeses, respectively and could not be detected in Cheddar cheese. Results show a significant inhibitory effect of CN than TN on A. fumigatus growth with distinctive destruction in its ultrastructure. Applications of CN in the dairy industry will be a market trend to improve cheese quality by their antifungal properties and enhancement their shelf life.

Title	Protective Effect of Fermented Camel Milk Containing Bifidobacterium longum BB536 on Blood Lipid Profile in Hypercholesterolemic Rats
Authors	El-Zahar, K.M., Hassan, M.F.Y., Al-Qaba, S.F.
Journal	Journal of Nutrition and Metabolism 2021,1557945
Abstract	The present study aimed to investigate synergistic health effects of camel milk and Bif. longum BB536 in rats with diet-induced obesity, impaired lipid profile, and hypercholesterolemia. Wistar rats received a high-fat (HF) diet plus 2 ml/day of either cow's milk fermented with yogurt culture (CT), camel milk fermented with yogurt culture (CAT), camel milk fermented with Bif. longum BB536 (CAP), mixed cow's and camel milk fermented with yogurt culture (CCAT), or cow's milk and camel milk fermented with Bif. longum (CCAP). All fermented milk products significantly reduced HDL, albumin, and total protein. The percentage change in body weight gain was between -40% (CAP) and -24% (CT) and in serum triglycerides between -54% (CCAP) and -37% (CT); for the other parameters, changes caused by CCAP/CT were -40%/-22% (total cholesterol), +29%/+8% (HDL), -73%/-54% (LDL), -54%/-37% (VLDL), -52%/-14% (AST), -53%/-31% (ALT), +43%/+25% (albumin), +37%/+25% (total protein), -48%/-27% (urea), and -34%/-16% (creatinine). Camel or cow's milk fermented with yogurt culture or Bif. longum significantly improved negative effects of the HF diet on body weight, blood lipid profile, serum proteins, liver and kidney markers, and severity of the metabolic syndrome. Milk and fermentation culture acted synergistically with camel milk and Bif. longum generally showed stronger positive effects./

Title	Sperm vitality and necrozoospermia: diagnosis, management, and results of a global survey of clinical practice
Authors	Agarwal, A., Sharma, R.K., Gupta, S., (...), Morimoto, Y., Shah, R.
Journal	World Journal of Men's Health 39,210149
Abstract	Sperm vitality testing is a basic semen examination that has been described in the World Health Organization (WHO) Laboratory Manual for the Examination and Processing of Human Semen from its primary edition, 40 years ago. Several methods can be used to test sperm vitality, such as the eosin-nigrosin (E-N) stain or the hypoosmotic swelling (HOS) test. In the 6th (2021) edition of the WHO Laboratory Manual, sperm vitality assessment is mainly recommended if the total motility is less than 40%. Hence, a motile spermatozoon is considered alive, however, in certain conditions an immotile spermatozoon can also be alive. Therefore, the differentiation between asthenozoospermia (pathological decrease in sperm motility) and necrozoospermia (pathological decrease in sperm vitality) is important in directing further investigation and management of infertile patients. The causes leading to necrozoospermia are diverse and can either be local or general, testicular or extra-testicular. The andrological management of necrozoospermia depends on its etiology. However, there is no standardized treatment available presently and practice varies among clinicians. In this study, we report the results of a global survey to understand current practices regarding the physician order of sperm vitality tests as well as the management practices for necrozoospermia. Laboratory and clinical scenarios are presented to guide the reader in the management of necrozoospermia with the overall objective of establishing a benchmark ranging from the diagnosis of necrozoospermia by sperm vitality testing to its clinical management.

Title	Fixed point results for multivalued mappings with applications
Authors	Khan, A., Sarwar, M., Khan, F., Alsamir, H., Hammad, H.A.
Journal	Journal of Function Spaces 2021,9921728
Abstract	In this manuscript, using the concept of multivalued contractions, some new Banach- and Caristi-type fixed point results are established in the context of metric spaces. For the reliability of the presented results, some examples and applications to Volterra integral type inclusion are also studied. The established results unify and generalize some existing results from the literature.

Title	Compactness on Fuzzy Soft r-Minimal Spaces
Authors	Taha, I.M.
Journal	International Journal of Fuzzy Logic and Intelligent Systems 21(3), pp. 251-258
Abstract	In this study, a new form of fuzzy r-minimal structure [28] called a fuzzy soft r-minimal structure, is defined, which is an extension of the fuzzy soft topology introduced by Aygunoglu et al. [26]. In addition, the concepts of fuzzy soft r-minimal continuity and fuzzy soft r-minimal compactness are introduced in fuzzy soft r-minimal spaces. Some interesting properties and characterizations are also discussed. Finally, several types of fuzzy soft r-minimal compactness are defined, and the relationships between them are characterized.

Title	Further Developments of Bessel Functions via Conformable Calculus with Applications
Authors	Abul-Ez, M., Zayed, M., Youssef, A.
Journal	Journal of Function Spaces 2021,6069201
Abstract	The theory of Bessel functions is a rich subject due to its essential role in providing solutions for differential equations associated with many applications. As fractional calculus has become an efficient and successful tool for analyzing various mathematical and physical problems, the so-called fractional Bessel functions were introduced and studied from different viewpoints. This paper is primarily devoted to the study of developing two aspects. The starting point is to present a fractional Laplace transform via conformable fractional-order Bessel functions (CFBFs). We establish several important formulas of the fractional Laplace Integral operator acting on the CFBFs of the first kind. With this in hand, we discuss the solutions of a generalized class of fractional kinetic equations associated with the CFBFs in view of our proposed fractional Laplace transform. Next, we derive an orthogonality relation of the CFBFs, which enables us to study an expansion of any analytic functions by means of CFBFs and to propose truncated CFBFs. A new approximate formula of conformable fractional derivative based on CFBFs is provided. Furthermore, we describe a useful scheme involving the collocation method to solve some conformable fractional linear (nonlinear) multiorder differential equations. Accordingly, several practical test problems are treated to illustrate the validity and utility of the proposed techniques and examine their approximate and exact solutions. The obtained solutions of some fractional differential equations improve the analog ones provided by various authors using different techniques. The provided algorithm may be beneficial to enrich the Bessel function theory via fractional calculus.

Title	A Novel Efficient Quantum Random Access Memory
Authors	Zidan, M., Abdel-Aty, A.-H., Khalil, A., Abdel-Aty, M., Eleuch, H.
Journal	IEEE Access 9, pp. 151775-151780
Abstract	Owing to the significant progress in manufacturing desktop quantum computers, the quest to achieve efficient quantum random access memory (QRAM) became inevitable. In this paper, we propose a novel efficient random access memory for quantum computers. The proposed QRAM has a fixed structure and can be used efficiently to store both known and unknown classical/quantum data. The storage capacity of the proposed QRAM is more efficient than that of the classical RAMs and can be used to store both classical and quantum information. Furthermore, the proposed model can access an arbitrary location in O(1) compared with other state-of-The-Art models.

Title	A Fixed Point Technique for Solving an Integro-Differential Equation Using Mixed-Monotone Mappings
Authors	Hammad, H.A., Rashwan, R.A., De La Sen, M.
Journal	Journal of Function Spaces 2021,9925073
Abstract	The objective of this manuscript is to present new tripled fixed point results for mixed-monotone mappings by a pivotal lemma in the setting of partially ordered complete metric spaces. Our outcomes sum up, enrich, and generalize several results in the current writing. Moreover, some examples have been discussed to strengthen and support our theoretical results. Finally, the theoretical results are applied to study the existence and uniqueness of the solution to an integro-differential equation.

Title	Taxonomic significances of seed morphology in some tribes of subfamily Malvoideae (Malvaceae) in Saudi Arabia
Authors	khalik, K.A., Al-Ruzayza, S., Farid, A.
Journal	Australian Journal of Crop Science 15(8), pp. 1204-1216
Abstract	In this study, we evaluated the taxonomic significance and seed macro and micromorphological characteristics of 28 species belong to eight genera of subfamily Malvoideae (Malvaceae) from Saudi Arabia. The genotypes were studied using light and scanning electron microscope (SEM). Macro- and micromorphological characters of the seeds are presented, including shape, color, size, hairs, surface pattern, epidermal cell shape, anticlinal boundaries, and periclinal cell wall. The taxonomic and phylogenetic implications of seed coat micromorphology were compared with those of the available gross morphological and molecular data (ISSR and SCOT). Seed character analysis offered useful data for evaluating the taxonomy of Malvoideae on both intrageneric and tribal levels. Monophyly of the genera Abutilon, Malva and Pavonia was supported. Moreover, these analyses supported previous phylogenetic data, indicating that distinct lines are present within the genus Hibiscus and Sida, indicating that these genera are not monophyletic. A key is provided for identifying the investigated taxa based on seed characters.

Title	The influence of heterogeneity and initial stress on the propagation of Love-type wave in a transversely isotropic layer subjected to rotation
Authors	Bayones, F.S., Hussein, N.S., Abd-Alla, A.M., Alharbi, A.M.
Journal	Science Progress 104(3)
Abstract	Introduction: In this paper, a mathematical model of Love-type wave propagation in a heterogeneous transversely isotropic elastic layer subjected to initial stress and rotation of the resting on a rigid foundation. Frequency equation of Love-type wave is obtained in closed form. The material constants and initial stress have been taken as space dependent and arbitrary functions of depth in the respective media. Objectives: The dispersion equation is determined to study the effect of different types of parameters such as inhomogeneity, initial stress, rotation, wave number, the phase velocity on the Love-type wave propagation. Methods: The analytical solution has been obtained, we have used the separation of variables, method and the numerical solution using the bisection method implemented in MATLAB. Results: We present a general dispersion relation to describe the impacts as the propagation of Love-type waves in the structures. Numerical results analyzing the dispersion equation are discussed and presented graphically. Moreover, the obtained dispersion relation is found in well agreement with the classical case in isotropic and transversely isotropic layer resting on a rigid foundation. Finally, some graphical presentations have been made to assess the effects of various parameters in the plane wave propagation in elastic media of different nature.

Title	A study on thermoelastic interactions in fiber-reinforced mediums containing spherical cavities
Authors	Hobiny, A., Abbas, I.
Journal	Waves in Random and Complex Media
Abstract	This research pertains to the evaluation of thermoelastic interactions in fiber-reinforced material with spherical cavities. In the context of Green–Naghdi model (GNIII), the numerical solutions are obtained with the use of the finite element scheme. The discretization of the structure is done by the finite element method where the element is quadratic. The internal surface of the spherical hole is loaded by a uniform step in temperature. The results are graphically presented to show the effects in the absence and presence of reinforcement.

Title	Solving singular coupled fractional differential equations with integral boundary constraints by coupled fixed point methodology
Authors	Hammad, H.A., Chaolamjiak, W.
Journal	AIMS Mathematics 6(12), pp. 13370-13391
Abstract	This manuscript was originally built to establish some coupled common fixed point results for rational contractive mapping in the framework of b-metric spaces. Thereafter, the existence and uniqueness of the boundary value problem for a singular coupled fractional differential equation of order v via coupled fixed point techniques are discussed. At the last, some supportive examples to illustrate the theoretical results are presented.

Title	Inferences for Joint Hybrid Progressive Censored Exponential Lifetimes under Competing Risk Model
Authors	Almarashi, A.M., Algarni, A., Daghistani, A.M., (...), Abdel-Khalek, S., Raqab, M.Z.
Journal	Mathematical Problems in Engineering 2021,3380467
Abstract	The aim of this paper is devoted to the problem of comparative life tests under joint censoring samples from an exponential distribution with competing risks model. This problem is considered under the consideration that only two causes of failure are occurring and the units come from two production lines such that the exponential failure time of units is censored under a hybrid progressive Type-I censoring scheme. Maximum likelihood estimation and different Bayes methods of estimation are discussed. The asymptotic confidence intervals as well as the Bayes credible intervals are established. A real data set representing time to failure on two groups of strain male mice receiving radiation is analyzed for illustrative purposes. All theoretical results are assessed and compared through the Monte Carlo study.

Title	Towards promising platform by using annular photonic crystals to simulate and design useful mask
Authors	Ameen, A.A., Elsayed, H.A., Alamri, S., (...), Al-Dossari, M., Aly, A.H.
Journal	Photonics 8(9),349
Abstract	Human masks are considered the mainstay in air filtration and purification technologies and against the spreading of bacterial and viral infections. This paper introduces a novel design of a human mask to increase the ultraviolet germicidal irradiation effect on pathogens. The proposed design consists of a tube with an annular photonic crystal (APC) attached to the mask's orifice, and a UV source is located in the tube's center. The main role of this study is the enhancement of UV doses based on the reflectivity of the proposed APC. Therefore, increasing pathogens' inactivation level in the incoming air to the mask's orifice could be investigated. The numerical investigations demonstrated that the proposed APC could provide a complete photonic bandgap with a high re-flectivity in the wavelength regime from 207 to 230 nm. In addition, we have considered the roles of the thickness of layers, inner core radius, and the azimuthal number. Meanwhile, the results showed the ability to use a wide range of core radius values without almost any variations in the optical properties of the proposed design. Such results could grant the advantage of using this design by the manufacturing of human masks with different sizes besides the inclusions in other ultraviolet germicidal irradiation applications.

Title	Thiazolidine-2,4-dione-linked ciprofloxacin derivatives with broad-spectrum antibacterial, MRSA and topoisomerase inhibitory activities
Authors	Aziz, H.A., El-Saghier, A.M.M., Badr, M., Abuo-Rahma, G.E.-D.A., Shoman, M.E.
Journal	Molecular Diversity
Abstract	A series of ciprofloxacin/thiazolidine-2,4-dione hybrids 3a-m were prepared and identified by IR, 1HNMR, 13CNMR and elemental analysis. The antibacterial activity results of the designed hybrids revealed a shift of spectrum toward Gram-positive bacteria. They exhibited excellent activity against S. aureus ATCC 6538, with the most potent compounds being 3a, 3e, 3g, 3i, 3k, 3l and 3m possessing MICs of 0.02, 2.03, 0.64, 0.35, 1.04, 0.22 and 0.36 µM, respectively, compared to their parent compound ciprofloxacin (MIC: 5.49 µM). They also showed interesting activity against MRSA AUMC 261 with 3a, 3e and 3l showing MIC values of 5 nM. Reduced activity was observed against Gram-negative bacteria with compound 3l exhibiting a slightly higher activity against K. pneumoniae ATCC10031 with a MIC value of 0. 08 µM. Mechanistically, the incorporation of thiazolidine-2,4-dione ring into ciprofloxacin retained its ability to inhibit DNA synthesis via inhibiting both topoisomerase IV and DNA gyrase of S. aureus. Compounds 3a, 3l and 3m were more potent than ciprofloxacin for topoisomerase IV (IC50 = 0.3–1.9 µM) and gyrase (IC50 = 0.22–0.31 µM) inhibition, which coincide with their antibacterial activity against S. aureus ATCC 6538. Docking against DNA gyrase active site confirmed the ability of the tested compounds to form stable complexes with the enzyme; like that of ciprofloxacin, 3a, 3i, 3k, 3m and 3l reconsidered promising broad-spectrum antibacterial agents targeting topoisomerase IV and gyrase enzymes and have good activity against MRSA. Graphic Abstract: [Figure not available: see fulltext.]

Title	Task scheduling optimization in cloud computing based on genetic algorithms
Authors	Hamed, A.Y., Alkinani, M.H.
Journal	Computers, Materials and Continua 69(3), pp. 3289-3301
Abstract	Task scheduling is the main problemin cloud computing that reduces systemperformance; it is an important way to arrange user needs and perform multiple goals. Cloud computing is the most popular technology nowadays and has many research potential in various areas like resource allocation, task scheduling, security, privacy, etc. To improve system performance, an efficient task-scheduling algorithm is required. Existing task-scheduling algorithms focus on task-resource requirements, CPU memory, execution time, and execution cost. In this paper, a task scheduling algorithm based on a Genetic Algorithm (GA) has been presented for assigning and executing different tasks. The proposed algorithm aims to minimize both the completion time and execution cost of tasks and maximize resource utilization. We evaluate our algorithm's performance by applying it to two examples with a different number of tasks and processors. The first example contains ten tasks and four processors; the computation costs are generated randomly. The last example has eight processors, and the number of tasks ranges from twenty to seventy; the computation cost of each task on different processors is generated randomly. The achieved results show that the proposed approach significantly succeeded in finding the optimal solutions for the three objectives; completion time, execution cost, and resource utilization.

Title	Intelligent IoT-Aided early sound detection of red palmWeevils
Authors	Karar, M.E., Reyad, O., Abdel-Aty, A.-H., Owyed, S., Hassan, M.F.
Journal	Computers, Materials and Continua 69(3), pp. 4095-4111
Abstract	Smart precision agriculture utilizes modern information and wireless communication technologies to achieve challenging agricultural processes. Therefore, Internet of Things (IoT) technology can be applied to monitor and detect harmful insect pests such as red palm weevils (RPWs) in the farms of date palm trees. In this paper, we propose a new IoT-based framework for early sound detection of RPWs using fine-tuned transfer learning classifier, namely InceptionResNet-V2. The sound sensors, namely TreeVibes devices are carefullymounted on each palm trunk to setup wireless sensor networks in the farm. Palm trees are labeled based on the sensor node number to identify the infested cases. Then, the acquired audio signals are sent to a cloud server for further on-line analysis by our fine-tuned deep transfer learning model, i.e., InceptionResNet-V2. The proposed infestation classifier has been successfully validated on the public TreeVibes database. It includes total short recordings of 1754 samples, such that the clean and infested signals are 1754 and 731 samples, respectively. Compared to other deep learning models in the literature, our proposed InceptionResNet-V2 classifier achieved the best performance on the public database of TreeVibes audio recordings. The resulted classification accuracy score was 97.18%. Using 10-fold cross validation, the fine-tuned InceptionResNet-V2 achieved the best average accuracy score and standard deviation of 94.53% and±1.69, respectively. Applying the proposed intelligent IoT-aided detection system of RPWs in date palm farms is the main prospect of this research work.

Title	Reservoir Formation Damage; Reasons and Mitigation: A Case Study of the Cambrian–Ordovician Nubian ‘C’ Sandstone Gas and Oil Reservoir from the Gulf of Suez Rift Basin
Authors	Radwan, A.E., Wood, D.A., Abudeif, A.M., (...), Kassem, A.A., Kania, M.
Journal	Arabian Journal for Science and Engineering
Abstract	Reservoir formation damage is a major problem that the oil and gas industry has to mitigate in order to maintain the oil and gas supply. A case study is presented that identifies the impacts of formation damage and their causes in the Nubian ‘C’ hydrocarbon reservoir within Sidki field located in the Southern Gulf of Suez, Egypt. In addition, a formation damage mitigation program was designed and implemented involving an effective stimulation treatment for each well experiencing reservoir damage. The data available for this study include core analysis to provide rock mineralogy and lithology; analysis of production fluid data; water chemistry; drilling fluid composition; perforations and well completion details; workover operations; and stimulation history. The diagnosis of formation damage based on the integrated assessment of the available data is associated with several benefits, (1) The integration of the data available helps provide a robust analysis of formation damage causes and in establishing suitable remediation actions, (2) Workover fluid is confirmed as the primary cause of reservoir damage in the studied well, (3) Several reservoir damage mechanisms were identified including water blockage, solids and filtrate invasion, fluid/rock interaction (deflocculation of kaolinite clay), salinity shock and/or high-sulfate content of the invaded fluid, (4) Irrespective of the potential causes of formation damage, the primary objective of a gas production company is to mitigate its effects and the integrated dataset helps to design appropriate and effective stimulation treatments to overcome formation damage, and (5) In gas reservoirs, especially low permeability ones, extra precautions are necessary to avoid potential reservoir damage due to workover fluid invasion.

Title	ON THE CURVATURE FUNCTIONS OF TUBE-LIKE SURFACES IN THE GALILEAN SPACE
Authors	Abdel-Aziz, H.E.S., Sorour, A.H.
Journal	Communications of the Korean Mathematical Society 36(3), pp. 609-622
Abstract	In the Galilean space G3, we study a special kind of tube surfaces, called tube-like surfaces. They are defined by sweeping a space curve along another central space curve. In this setting, we investigate some equations in terms of Gaussian and mean curvatures, showing some relevant theorems. Our theoretical results are illustrated with some plotted examples.

Title	A Thermoelastic Piezoelectric Fixed Rod Exposed to an Axial Moving Heat Source via a Dual-Phase-Lag Model
Authors	Ragab, M., Abo-Dahab, S.M., Abouelregal, A.E., Kilany, A.A.
Journal	Complexity 2021,5547566
Abstract	Piezoelectric ceramics are used more in the active control of noise and vibration with sensors and actuators. As a result, a one-dimensional homogeneous thermoelastic fixed piezoelectric rod subjected to a moving heat flow has been considered. The heating rod is affected by three fields, namely, thermal, mechanical, and electric potential. In order to design a reliable smart structure, this study is necessary and the thermopiezoelectric behavior of piezoelectric ceramics must be understood clearly. The Laplace transform method is applied to acquire the distributions of stress, deformation, and temperature fields. The effect of heat source velocity and phase lag parameters on the considered physical fields is displayed graphically, and the results are compared with other models of thermoelasticity. The present findings could find possible applications for designing receiving portions of transformers of Rosen type for voltage magnification.

Title	A Fixed Point Technique for Set-Valued Contractions with Supportive Applications
Authors	Hammad, H.A., De La Sen, M.
Journal	Advances in Mathematical Physics 2021,6880478
Abstract	In this manuscript, exciting fixed point results for a pair of multivalued mappings justifying rational Gupta-Saxena type Ω-contractions in the setting of extended b-metric-like spaces are established. The theoretical results have also been strengthened by some nontrivial examples. Finally, the theoretical results are used to study the existence of the solution of Fredholm integral equation which arises from the damped harmonic oscillator, to study initial value problem which arises from Newton's law of cooling and to study infinite systems of fractional ordinary differential equations (ODEs).

Title	Synthesis of Neonicotinoid analogues and study their toxicological aspects on Spodoptera littoralis and Schizaphis graminum
Authors	Khodery, A., Mansour, E.S., Elhady, O.M., Drar, A.M.
Journal	International Journal of Pest Management
Abstract	Various Neonicotinoid guanidine/amidine analogues 1–3 were synthesized by the reaction of cyanoguanidine with acetylpyrimidines or diacetylpyridine. Their spectral analyses identified the synthesized compounds 1–3. The preliminary bioassays showed that all synthesized compounds showed moderate insecticidal activities against cotton leafworm Spodoptera littoralis (Boisd.) and Wheat Aphid (Schizaphis graminum). Supplemental data for this article is available online at here.

Title	Biologically active organic compounds as insect growth regulators (IGRs): Introduction, mode of action, and some synthetic methods
Authors	Gad, M.A., Aref, S.A., Abdelhamid, A.A., Elwassimy, M.M., Abdel-Raheem, S.A.A.
Journal	Current Chemistry Letters 10(4), pp. 393-412
Abstract	Biologically active organic compounds continue to attract great interest due to the wide variety of interesting applications observed for these compounds. This review results from the literature survey containing the organic compounds that are used as insect growth regulators with a focus on their mode of action and some synthetic routes.

Title	Novel N-cyanoguanidyl derivatives: Synthesis and studying their toxicological activity against Spodoptera littoralis andschizaphisgraminum
Authors	Khodairy, A., Mansour, E.S., Elhady, O.M., Drar, A.M.
Journal	Current Chemistry Letters 10(4), pp. 363-370
Abstract	Reaction of N-cyanoguanidine with acid chlorides and aroylisothiocyanates gave the respective; N-(N-cyanocarbamimidoyl)aryl-2-carboxamides 1-5 and N-[(N-cyanocarbamimidoyl)carbamothioyl]benzamides 6-10,which have a Neonictinoid insecticide's active group moiety (=N–CN). They have more toxicological activity against wheat Aphid (Schizaphisgraminum) than Spodoptera littoralis.

Title	Preparation and biological activity evaluation of some benzoylthiourea and benzoylurea compounds
Authors	Abdelhamid, A.A., Elsaghier, A.M.M., Aref, S.A., (...), Ahmed, N.A., Abdel-Raheem, S.A.A.
Journal	Current Chemistry Letters 10(4), pp. 371-376
Abstract	Due to the complicated problems coming from excessive applications of insecticides, searching for safe substitutes to these insecticides has become a necessity. Thus, the insect growth regulators are candidates to be used in such concern. Comparative studies of the effects of three compounds, 2-benzoyl-N-phenylhydrazine-1-carbothioamide (1), 2-(cyanoacetyl)-N-phenylhydrazine-1-carboxamide (2) and N-(2-(2-cyanoacetyl)hydrazinecarbonothioyl)furan-2-carboxamide (3) (an insect growth regulator inhibiting chitin synthesis), were conducted on Spodoptera littoralis (Boisduval, 1833). The compounds, orally administered, caused larval mortality proportional to the concentrations in the food source. larvae were unable to complete the molting process and died in the old larval cuticle. Larvae contaminated by sublethal doses completed their development to adulthood. N-(2-(2-cyanoacetyl)hydrazinecarbonothioyl)furan-2-carboxamide (3) is more active than the other compounds have LC50 17.082 ppm for 2nd instar larvae and 60.832 ppm for 4th instar larvae.

Title	Lightweight transfer learning models for ultrasound-guided classification of covid-19 patients
Authors	Karar, M.E., Reyad, O., Abd-Elnaby, M., Abdel-Aty, A.-H., Shouman, M.A.
Journal	Computers, Materials and Continua 69(2), pp. 2295-2312
Abstract	Lightweight deep convolutional neural networks (CNNs) present a good solution to achieve fast and accurate image-guided diagnostic procedures of COVID-19 patients. Recently, advantages of portable Ultrasound (US) imaging such as simplicity and safe procedures have attracted many radiologists for scanning suspected COVID-19 cases. In this paper, a new framework of lightweight deep learning classifiers, namely COVID-LWNet is proposed to identify COVID-19 and pneumonia abnormalities in US images. Compared to traditional deep learning models, lightweight CNNs showed significant performance of real-time vision applications by usingmobile devices with limited hardware resources. Four main lightweight deep learning models, namely MobileNets, ShuffleNets, MENet and MnasNet have been proposed to identify the health status of lungs using US images. Public image dataset (POCUS) was used to validate our proposed COVID-LWNet framework successfully. Three classes of infectious COVID-19, bacterial pneumonia, and the healthy lungwere investigated in this study. The results showed that the performance of our proposedMnasNet classifier achieved the best accuracy score and shortest training time of 99.0% and 647.0 s, respectively. This paper demonstrates the feasibility of using our proposed COVID-LWNet framework as a new mobilebased radiological tool for clinical diagnosis of COVID-19 and other lung diseases.

Title	Taxonomic significance of the leaf geometric and micrometric attributes in the discrimination of some cultivars of mangifera indica l. (anacardiaceae)
Authors	El-Banhawy, A., Elkordy, A., Farag, R., (...), Faried, A., Ellmouni, F.Y.
Journal	Egyptian Journal of Botany 61(1), pp. 255-269
Abstract	THE GENUS Mangifera L. belongs to the family Anacardiaceae, order Sapindales with 69 known species. Mangifera indica is an essential major tropical crop in the globe economy. This study aims to portray the significance of the usage of geometric and micrometric leaf traits to characterize Mango cultivars. Thirty-three morphological and anatomical leaf traits of 41 Mango accessions belong to six cultivars were investigated. The data were analyzed using statistical packages under R environment. Results showed that geometric and micrometric leaf traits such as the leaf length, width, petiole length, leaf blade shape, the shape of upper and lower epidermal cells, the outline of the vascular cylinder, and the number of phloem resin canals were of significance value in the characterization of Mango cultivars. Taxonomic diagnostic key based on some of those traits was constructed. ANOVAs, MANOVA, correlation, and Principal Component Analysis (PCA) retrieved the significance of applying those leaf traits as cultivar identifiers. The present investigation estimate that the attributes of the Mango leaf could be useful and straightforward cultivar identifiers that could be followed by Mango breeders to save time, efforts and money in terms of being unhindered by long juvenile stage of the tree.

Title	Further study on the conformable fractional gauss hypergeometric function
Authors	Abul-Ez, M., Zayed, M., Youssef, A.
Journal	AIMS Mathematics 6(9), pp. 10130-10163
Abstract	This article presents an exhaustive study on the conformable fractional Gauss hypergeometric function (CFGHF). We start by solving the conformable fractional Gauss hypergeometric differential equation (CFGHDE) about the fractional regular singular points $x = 1$ and $x = \infty$. Next, various generating functions of the CFGHF are established. We also develop some differential forms for the CFGHF. Subsequently, differential operators and contiguous relations are reported. Furthermore, we introduce the conformable fractional integral representation and the fractional Laplace transform of CFGHF. As an application, and after making a suitable change of the independent variable, we provide general solutions of some known conformable fractional differential equations, which could be written by means of the CFGHF.

Title	Generalized thermoelastic interaction in a two-dimensional orthotropic material caused by a pulse heat flux
Authors	Hobiny, A., Abbas, I.
Journal	Waves in Random and Complex Media
Abstract	This work is carried out using the generalized thermoelastic model to study the variation of temperature, the stresses, and displacement components in a two-dimensional orthotropic elastic material. The Fourier–Laplace integral transforms to get the analytical solution of the problem, the basic formulations of the two-dimensional problem are expressed as matrix-vector forms, which are then solved by the eigenvalue technique. Numerical techniques are used for the inverse process of the Laplace and Fourier transform. The results of all the variables considered are implemented and represented graphically. The outcomes of the current model are compared with those of the existent model of thermoelasticity.

Title	Effect of Heat and Mass Transfer and Magnetic Field on Peristaltic Flow of a Fractional Maxwell Fluid in a Tube
Authors	Bayones, F.S., Abd-Alla, A.M., Thabet, E.N.
Journal	Complexity 2021,9911820
Abstract	Magnetic field and the fractional Maxwell fluids' impacts on peristaltic flows within a circular cylinder tube with heat and mass transfer were evaluated while assuming that they are preset with a low Reynolds number and a long wavelength. The analytical solution was deduced for temperature, concentration, axial velocity, tangential stress, and coefficient of heat transfer. Many emerging parameters and their effects on the aspects of the flow were illustrated, and the outcomes were expressed via graphs. Finally, some graphical presentations were made to assess the impacts of various parameters in a peristaltic motion of the fractional fluid in a tube of different nature. The present investigation is essential in many medical applications, such as the description of the gastric juice movement of the small intestine in inserting an endoscope.

Title	Utility of [4-(3-methoxyphenyl)pyrimidin-2-yl]cyanamide in synthesis of some heterocyclic compounds
Authors	Hussein, B.R.M., Khodairy, A.
Journal	Journal of Heterocyclic Chemistry 58(10), pp. 1983-1991
Abstract	N-[4-(3-Methoxyphenyl)pyrimidin-2-yl]cyanamide (1) was reacted with morpholine and respective binuclephilic reagents namely: ethylenediamine, o-phenylenediamine, o-aminothiophenol, or o-aminophenol to give the corresponding carboximidamide 2, imidazolidine 3, and benzazoles 4–6. While its reaction with hydrazides in DMF at 90°C, gave the corresponding 1,2,4-triazols 7–11. Also, treatment of cyanamide 1 with heterocycles having both nucleophilic and electrophilic groups (─NH2/─COOEt) in iso-propanol in presence of catalytic amount of Conc. HCl, gave the corresponding thieno[2,3-d]pyrimidinone 12 and unexpected thieno[3,2-d]pyrimidine 13 instead of bis-thieno[3,2-d]pyrimidine 14, respectively. While, its reaction with ethyl 5-amino-1,3-thiazole-4-carboxylate yielded the unexpected N-(pyrimidin-2-yl)urea 15 rather than the corresponding thiazolo[5,4-d]pyrimidine 16. Unexpected N-(pyrimidin-2-yl)thiourea 17 was obtained, when cyanamide 1 reacted with potassium thiolates in iso-propanol with catalytic amount of Conc. HCl.

Title	The devastating flood in the arid region a consequence of rainfall and dam failure: Case study, al-lith flood on 23th November 2018, Kingdom of Saudi Arabia
Authors	Youssef, A.M., Abu-Abdullah, M.M., Abu Alfadail, E., Skilodimou, H.D., Bathrellos, G.D.
Journal	Zeitschrift fur Geomorphologie 63(1), pp. 115-136
Abstract	On November 23, 2018, cascading rainfall events that occurred in the upstream section of wadi Al-Lith, which is located in the western part of the Kingdom of Saudi Arabia, caused a failure in the Al-Lith earthen dam. This event was followed by a large-scale devastating flood that inundated the area downstream of the dam, damaging infrastructure and property. The main scope of this work was to identify the causes of catastrophic flooding and ways to prevent and mitigate the potential consequences of a future flood occurrence in the study area. For this purpose, remote sensing images, DEM, field observations, and rainfall data were used. A geospatial integrated approach using a GIS, remote sensing, hydromorphological analysis, and rainfall-runoff modeling was utilized to provide a better understanding of the hydrology of the wadi Al-Lith catchment. Various methods were used for rainfall frequency analyses; supervised classification was applied on Landsat (OLI), in which land-use types were classified to identify the curve number values. Rainfall-runoff modeling was conducted using the catchment characteristics and rainfall analysis to calculate flood volumes and peak discharges. Peak discharge results at the flood event on November 23, 2018, and at 5-and 100-year return periods were used for the prediction of flood extent using the 2D HEC-RAS model. Water inundated depth and velocity were mapped. The result of the 5-year return period simulated model showed a good correlation with the flood extent of the event on November 23, 2018 that extracted from the sentinel-2 image. This model was validated using field observation data and remote sensing interpretation at the real flood event of November 2018. The flood model indicated that a dam failure with the substantial release of an enormous amount of water in a short period created exacerbates the problem. Also, the simulated model of the 100-year return period showed high-risk of the whole floodplain area of Wadi Al-Lith and the urbanized zone, where utterly devastation could be occurred. Finally, the results showed that a new dam proposal is urgently required to prevent the area from future flood events to replace the failed dam with a 45 m high dam. In this case, the reservoir capacity is estimated to be ~147.4 million m3, which is above the runoff volume for a 200-year return period.

Title	Pollen morphology of Malvaceae genera from Saudi Arabia and its taxonomic significance
Authors	khalik, K.A., Al-Ruzayza, S., Assiri, A., Elkordy, A.
Journal	Australian Journal of Crop Science 15(5), pp. 725-742
Abstract	Pollen morphology of 20 species belong to seven genera (Abutilon, Althaea, Hibiscus, Malva, Pavonia, Senra and Sida) of Malvaceae from Saudi Arabia were studied by using light microscope (LM) and scanning electron microscope (SEM). Quantitative and qualitative pollen morphological characters which vary among investigated taxa are found in the pollen polarity, symmetry, size, shape, polar axis, equatorial diameter, P/E ratio, average height and width of spine, aperature character and spine index. The pollen grains vary from spheroidal, prolate spheroidal, oblate spheroidal to suboblate. All taxa were characterized by relatively large to medium sized pollen grains, numerous pores scattered irregularly all over the grain, and echinate sculpturing. Sida ovata is the largest size pollen grain (138.95) nm. On the other hand, Malva parviflora showed the smallest pollen size (52.28 nm). The average height and width of spine varied greatly among studied taxa. The highest spines (20.65^m) found in Sida ovata, while the shortest (3.19 nm) was found in Abutilon pannosum. Results of the pollen shape, size, and exine sculpture characters offered useful data for evaluating the taxonomy of Malvaceae both on subgeneric and sectional levels. A key for the identification of the investigated taxa based on pollen grains characters is also provided.

Title	Accelerated modified inertial mann and viscosity algorithms to find a fixed point of α−inverse strongly monotone operators
Authors	Hammad, H.A., Ur Rehman, H., De la Sen, M.
Journal	AIMS Mathematics 6(8), pp. 9000-9019
Abstract	In this paper, strong convergence results for α−inverse strongly monotone operators under new algorithms in the framework of Hilbert spaces are discussed. Our algorithms are the combination of the inertial Mann forward-backward method with the CQ-shrinking projection method and viscosity algorithm. Our methods lead to an acceleration of modified inertial Mann Halpern and viscosity algorithms. Later on, numerical examples to illustrate the applications, performance, and effectiveness of our algorithms are presented.

Title	Initial Stress and Gravity on P-Wave Reflection from Electromagneto-Thermo-Microstretch Medium in the Context of Three-Phase Lag Model
Authors	Bayones, F.S., Abo-Dahab, S.M., Abd-Alla, A.M., (...), Kilany, A.A., Elsagheer, M.
Journal	Complexity 2021,5560900
Abstract	The present paper studied the reflection of thermo-microstretch waves under the generalized thermoelasticity theory which is employed to study the reflection of plane harmonic waves from a semi-infinite elastic solid under the effect of the electromagnetic field, initial stress, and gravity. The formulation is applied under the thermoelasticity theory with three-phase lag, and the reflection coefficient ratio variations with the angle of incidence under different conditions are obtained. Numerical results obtained from the present study are presented graphically and discussed. It is observed that the initial stress, gravitation, and electromagnetic field exert some influence in the thermo-microstretch medium due to reflection of P-waves.

Title	The algebraic theory of matrix of matrices polynomials
Authors	Kishka, Z., Saleem, M., Elrawy, A.
Journal	Analele Stiintifice ale Universitatii Al I Cuza din Iasi - Matematica 67(1), pp. 71-84
Abstract	In this paper, we introduce some important basic notions and operations of a matrix of matrices (for shorting, MMs) polynomials. We use these notions to motivate the definitions of the division of MMs polynomial and to illustrate their properties. Also, we study the generalized Bezoute theorem and the Cayley-Hamilton theorem over MMs. The block companion MMs is established. Furthermore, this paper is concerned with the construction of the right and left solvents of an MMs polynomial from latent roots and vectors.

Title	Optimization of culture conditions for kojic acid production in surface fermentation by aspergillus oryzae isolated from wheat grains
Authors	Rasmey, A.-H.M., Abdel-Kareem, M.
Journal	Bulletin of Pharmaceutical Sciences. Assiut 44(1), pp. 201-211
Abstract	Kojic acid is a natural organic acid synthesized during aerobic fermentation of carbohydrates as a secondary metabolite by some species of Aspergillus and has been used commercially in several industrial applications. The current investigation aims to optimize the culture conditions for kojic acid production from starch as a carbon source by the novel isolate Aspergillus oryzae 1034. Seventy-five isolates representing 11 species of Aspergillus were isolated from stored wheat grains and screened for kojic acid biosynthesis. Amongst, A. oryzae 1034 was selected as the most potent kojic acid producer from starch. This strain was subjected to different fermentation conditions to maximize the kojic acid production from starch versus glucose. The results concluded that glucose and starch substrates in concentrations 60 and 80 g/l, respectively were the optima for kojic acid production. The optimum phosphorus concentration was 0.5 and 2.0 g/l KH2PO4 in glucose and starch media, respectively. The maximum kojic acid yield was attained at 28ºC for 11 days of incubation in both glucose and starch media with pH 4.5 and 5.0, respectively. Supplementation of Pb+2 to glucose medium and Zn+2 to starch medium stimulated the biosynthesis of kojic acid to 79.3 and 68.8 g/l, respectively. Alternatively, kojic acid biosynthesis was decreased by supplementation of amino acids in the fermentation medium. These findings suggest the possibility of using A. oryzae 1034 as a promising.

Title	Rotational effect on the propagation of waves in a magneto-micropolar thermoelastic medium
Authors	Abd-Alla, A.M., Abo-Dahab, S.M., Abdelhafez, M.A., Farhan, A.M.
Journal	Computers, Materials and Continua 69(1), pp. 205-220
Abstract	The present paper aims to explore how the magnetic field, ramp parameter, and rotation affect a generalized micropolar thermoelastic medium that is standardized isotropic within the half-space. By employing normal mode analysis and Lame's potential theory, the authors could express analytically the components of displacement, stress, couple stress, and temperature field in the physical domain. They calculated such manners of expression numerically and plotted the matching graphs to highlight and make comparisons with theoretical findings. The highlights of the paper cover the impacts of various parameters on the rotating micropolar thermoelastic half-space. Nevertheless, the non-dimensional temperature is not affected by the rotation and the magnetic field. Specific attention is paid to studying the impact of the magnetic field, rotation, and ramp parameter of the distribution of temperature, displacement, stress, and couple stress. The study highlighted the significant impact of the rotation, magnetic field, and ramp parameter on the micropolar thermoelastic medium. In conclusion, graphical presentations were provided to evaluate the impacts of different parameters on the propagation of plane waves in thermoelastic media of different nature. The study may help the designers and engineers develop a structural control system in several applied fields.

Title	Effects of heat transfer and the endoscope on Jeffrey fluid peristaltic flow in tubes
Authors	Abd-Alla, A.M., Abo-Dahab, S.M., Abdelhafez, M.A., Thabet, E.N.
Journal	Multidiscipline Modeling in Materials and Structures 17(5), pp. 895-914
Abstract	Purpose: This article aims to describe the effect of an endoscope and heat transfer on the peristaltic flow of a Jeffrey fluid through the gap between concentric uniform tubes. Design/methodology/approach: The mathematical model of the present problem is carried out under long wavelength and low Reynolds number approximations. Analytical solutions for the velocity, temperature profiles, pressure gradient and volume flow rate are obtained. Findings: The results indicate that the effect of the wave amplitude, radius ratio, Grashof number, the ratio of relaxation to retardation times and the radius are very pronounced in the phenomena. Also, a comparison of obtaining an analytical solution against previous literatures shows satisfactory agreement. Originality/value: Analytical solutions for the velocity, temperature profiles, pressure gradient and volume flow rate are obtained. Numerical integration is performed to analyze the pressure rise and frictional forces on the inner and outer tubes.

Title	A Study of Photo-Thermoelastic Wave in Semiconductor Materials with Spherical Holes Using Analytical-Numerical Methods
Authors	Alzahrani, F.S., Abbas, I.A.
Journal	Silicon
Abstract	Analytical and numerical solutions are two basic tools in the study of photothermal interaction problems in semiconductor medium. In this paper, we compare the analytical solutions with the numerical solutions for thermal interaction in semiconductor mediums containing spherical cavities. The governing equations are given in the domain of Laplace transforms and the eigenvalues approaches are used to obtained the analytical solution. The numerical solutions are obtained by applying the implicit finite difference method (IFDM). A comparison between the numerical solutions and analytical solution are presented. It is found that the implicit finite difference method (IFDM) is applicable, simple and efficient for such problems.

Title	Mapping the effect of drugs on ACE2 as a novel target site for COVID-19 therapy
Authors	Hetta, H.F., Muhammad, K., Algammal, A.M., (...), Munawar, N., Farghaly, H.S.M.
Journal	European Review for Medical and Pharmacological Sciences 25(10), pp. 3923-3932
Abstract	Angiotensin converting enzyme 2 (ACE2) has potentially conflicting roles in health and disease. COVID-19 coronavirus binds to human cells via ACE2 receptor, which is expressed on almost all body organs. Boosting the ACE2 receptor levels on heart and lung cells may provide more cellular enter to virus thereby worsening the infection. Therefore, among the drug targets, ACE2 is suggested as a vital target of COVID-19 therapy. This hypothesis is based on the protective role of the drugs acting on ACE2. Therefore, this review discusses the impact and challenges of using ACE2 as a target in the current therapy of COVID-19.

Title	Statistical Analysis of Joint Type-I Generalized Hybrid Censoring Data from Burr XII Lifetime Distributions
Authors	Ragab, M., Fayomi, A., Algarni, A., (...), Abo-Dahab, S.M., Abdel-Khalek, S.
Journal	Complexity 2021,5543187
Abstract	The quality of the products coming from different lines of production requires some tests called comparative life tests. For lines having the same facility, the lifetime of the product is distributed by Burr XII, the lifetime distribution, and units are tested under type-I generalized hybrid censoring scheme. The observed censoring data are used under maximum likelihood and the Bayes method to estimate the model parameters. The theoretical results are discussed and assessed through data analysis and Monte Carlo simulation study. Finally, we reported some brief comments obtained from numerical computation.

Title	Performance analysis of 3D video transmission over deep-learning-based multi-coded n-ary orbital angular momentum FSO system
Authors	El-Meadawy, S.A., Shalaby, H.M.H., Ismail, N.A., (...), Abd-Elnaby, M., El-Shafai, W.
Journal	IEEE Access 9,9440406, pp. 110116-110136
Abstract	Orbital angular momentum-shift keying (OAM-SK), which is the rapid switching of OAM modes, is vital but seriously impeded by the deficiency of OAM demodulation techniques, particularly when videos are transmitted over the system. Thus, in this paper, 3D chaotic interleaved multi-coded video frames (VFs) are conveyed via an N-OAM-SK free-space optical (FSO) communication system to enhance the reliability and efficiency of video communication. To tackle the defects of the OAM-SK-FSO mechanism, two efficient deep learning (DL) techniques, namely convolution recurrent neural network (CRNN) and 3D convolution neural network (3DCNN) are used to decode OAM modes with a low bit error rate (BER). Moreover, a graphics processing unit (GPU) is used to accelerate the training process with slight power consumption. The utilized datasets for OAM states are generated by applying different scenarios using a trial-and-error method. The simulation results imply that LDPC-coded VFs achieve the largest peak signal-to-noise ratios (PSNRs) and the lowest BERs using the 16-OAM-SK model. Both 3DCNN and CRNN techniques have nearly the same performance, but this performance deteriorates in the case of larger dataset classes. Moreover, the GPU accelerates the performance by almost 67.6% and 36.9% for the CRNN and 3DCNN techniques, respectively. These two DL techniques are more effective in evaluating the classification accuracy than the other traditional techniques by almost 10 − 20%.

Title	Electrodeposition and growth of iron from an ethylene glycol solution
Authors	Majidzade, V.A., Aliyev, A.S., Elrouby, M., Babanly, D.M., Tagiyev, D.B.
Journal	Acta Chimica Slovenica 68(1), pp. 185-192
Abstract	The electrochemical reduction of iron (III) ions into zero-valent iron from a solution of ethylene glycol was accomplished. The kinetics and mechanism of the electroreduction process were investigated by cyclic and linear polarization techniques. The influence of temperature, potential sweep rate, and concentration of iron (III) ions on the electroreduction process was also studied. The observed values of effective activation energy revealed that the investigated electroreduction process is accompanied by mixed kinetics control. Moreover, the results of SEM and X-ray diffraction analysis confirmed the deposition of thin Fe films under the optimized conditions.

Title	Martensitic transformation, magnetic and magnetocaloric properties of Ni-Mn-Fe-Sn Heusler ribbons
Authors	Deltell, A., Mohamed, A.E.-M.A., Álvarez-Alonso, P., (...), Suñol, J.J., López Antón, R.
Journal	Journal of Materials Research and Technology12, pp. 1091-1103
Abstract	Melt-spun ribbons of nominal composition Ni50Mn36-xFexSn14(x = 0, 2, and 3) were prepared by melt-spinning. The alloys undergo a martensitic transformation from L21austenite to an orthorhombic 4O martensite on cooling, as determined by X-ray powder diffraction analysis. Replacement of Mn by Fe linearly reduces the characteristic temperatures of the martensitic transformation (the equilibrium temperature decreases from 328 to 285 K) and reduces the Curie temperature of the austenite phase (from 336 to 300 K), whereas the effect of the applied magnetic field on the martensite transition temperatures is negligible. Magnetic measurements (zero-field cooled, ZFC, and field cooled, FC, curves, AC susceptibility measurements) hint the coexistence of two different ferromagnetic martensitic magnetic phases. Moreover, the AC susceptibility measurements and the irreversibility of the ZFC and FC curves point towards the presence of antiferromagnetic and ferromagnetic interactions in the martensitic phase. All samples exhibit spontaneous exchange bias at 2 K, with double-shifted loops, whereas the evolution of the conventional exchange bias with the temperature agrees quite well with the behavior of ferromagnetic regions surrounded by spin-glass regions or with the coexistence of ferromagnetic-antiferromagnetic interactions. Ni50Mn36-xFexSn14ribbons present a moderate inverse magnetocaloric effect (with a maximum of the magnetic entropy change of 5.7 Jkg-1K-1for μ0H = 3 T for x = 3). It is worth to note that these materials feature a significant reservoir (up to 44 Jkg-1K-1for x = 2) of magnetic entropy change, linked to the proximity of the austenitic ferromagnetic transition to the martensitic transformation.

Title	Novel chalcone/aryl carboximidamide hybrids as potent anti-inflammatory via inhibition of prostaglandin E2 and inducible NO synthase activities: design, synthesis, molecular docking studies and ADMET prediction
Authors	Ibrahim, T.S., Moustafa, A.H., Almalki, A.J., (...), Md, S., Mohamed, M.F.A.
Journal	Journal of Enzyme Inhibition and Medicinal Chemistry 36(1), pp. 1067-1078
Abstract	Two series of chalcone/aryl carboximidamide hybrids 4a–f and 6a–f were synthesised and evaluated for their inhibitory activity against iNOS and PGE2. The most potent derivatives were further checked for their in vivo anti-inflammatory activity utilising carrageenan-induced rat paw oedema model. Compounds 4c, 4d, 6c and 6d were proved to be the most effective inhibitors of PGE2, LPS-induced NO production, iNOS activity. Moreover, 4c, 4d, 6c and 6d showed significant oedema inhibition ranging from 62.21% to 78.51%, compared to indomethacin (56.27 ± 2.14%) and celecoxib (12.32%). Additionally, 4c, 6a and 6e displayed good COX2 inhibitory activity while 4c, 6a and 6c exhibited the highest 5LOX inhibitory activity. Compounds 4c, 4d, 6c and 6d fit nicely into the pocket of iNOS protein (PDB ID: 1r35) via the important amino acid residues. Prediction of physicochemical parameters exhibited that 4c, 4d, 6c and 6d had acceptable physicochemical parameters and drug-likeness. The results indicated that chalcone/aryl carboximidamides 4c, 4d, 6c and 6d, in particular 4d and 6d, could be used as promising lead candidates as potent anti-inflammatory agents.

Title	Analytical solutions of photo-thermal interaction in a semiconductor medium upon the new hyperbolic two-temperature theory
Authors	Abbas, I.
Journal	Waves in Random and Complex Media
Abstract	This paper studies the photo-thermoelasticity interactions in an infinite semiconductor medium with cavities. A new hyperbolic two-temperature photo-thermoelasticity theory with one thermal delay time is used to investigate this problem. The eigenvalue approach under the Laplace transform method is used to get the analytical solutions of physical field variations. Also, the thermoelasticity properties are considered without neglecting the coupling between the thermo-elastic and the plasma wave. Finally, the numerical results are graphically presented to display the difference between the generalized hyperbolic two-temperature theory and the generalized classical two-temperature theory.

Title	Time-dependent viscous flow of higher-order reactive MHD Maxwell nanofluid with Joule heating in a porous regime
Authors	Abdelhafez, M.A., Awad, A.A., Nafe, M.A., Eisa, D.A.
Journal	Waves in Random and Complex Media
Abstract	One of the most significant techniques of heat exchange in manufacturing appliances is convective heat transfer which can be enhanced by porous media and magnetic fields in various applications such as improving dramatically the different thermal equipment performance. This study investigates magnetohydrodynamic Maxwell nanofluid saturated in a porous medium towards convectively heated extending cylinder with higher-order chemical reactions. The ordinary differential equations resolved by using the optimal homotopy analysis method. The impact of various relevant factors on the schemes of velocity, energy, and concentration is drawn via diagrams and discussed physically through graphs, and discussions. The correlation between current and previously published findings is noted for accuracy. It is found that the heat transfer enhances when the Biot number and order of chemical reaction increase. When, the parameter of reaction, magnetic field, permeability and Eckert number increase, the heat transfer diminishes. The rising values of Joule heating, chemical reaction and Biot number rises the mass transfer, but in the opposite direction the mass transfer is reduced as the magnetic parameter, permeability and the order of chemical reaction grow. This study will be helpful in studying the movement of water or oil and gas through the cylindrical tanks.

Title	The effect of rotation on the free vibrations in a non-homogeneous orthotropic magneto-elastic hollow sphere
Authors	Bayones, F.S., Abd-Alla, A.-E.M., Yahya, G.A., Farhan, A.M.
Journal	Mechanics Based Design of Structures and Machines
Abstract	This article examines the free vibrations of spherical orthotropic within an elastic medium according to the one-dimensional (1D) elastic model. According to the linear elasticity model, rotation, magnetic field, and inhomogeneity effects on wave propagation in the orthotropic material are analyzed. The 1D magneto-elastodynamics equation is resolved concerning radial displacement. We consider three boundaries: free, fixed, and mixed orthotropic materials. Concerning harmonic vibrations, the eigenvalues of the natural frequency of the radial vibrations concerning various boundary settings are determined. For each case, the numerical results are provided, illustrated in graphs, and compared with those without rotation, magnetic field, and non-homogeneity. An increase in the rotation and non-homogeneity parameters is observed, similar to the findings of the classical sphere theory. The findings show that rotation, magnetic field, and non-homogeneity have a strong impact on wave propagation in orthotropic material. Increasing the rotation, magnetic field, and inhomogeneity parameters make the findings closer to the findings of the classical sphere model. Moreover, the present article applies to the design and optimal use of nanoplates and microplates. The findings show that the impacts of the magnetic field, rotation, and inhomogeneity parameter are very pronounced.

Title	MHD Mixed Convection Nanofluid Flow over Convectively Heated Nonlinear due to an Extending Surface with Soret Effect
Authors	Bouslimi, J., Abdelhafez, M.A., Abd-Alla, A.M., Abo-Dahab, S.M., Mahmoud, K.H.
Journal	Complexity 2021,5592024
Abstract	The aim of this paper is to investigate the flow of MHD mixed convection nanofluid flow under nonlinear heated due to an extending surface. The transfer of heat in nanofluid subject to a magnetic field and boundary conditions of convective is studied to obtain the physical meaning of the convection phenomenon. The governing partial differential equations (PDEs) of the boundary layer are reduced to ordinary differential equations (ODEs) considering a technique of the transformation of similarity. The transformed equations are solved numerically considering the technique of an efficient numerical shooting applying the Runge-Kutta technique scheme from the fourth-fifth order. The results corresponding to the dimensionless speed, temperature, concentration profiles, and the Nusselt number reduced, and the Sherwood numbers are presented by figures to display the physical meaning of the phenomena. A comparison has been made between the obtained results with the previous results obtained by others and agrees with them if the new parameters vanish. The results obtained indicate the impacts of the nondimensional governing parameters, namely, magnetic field parameter M, Soret number Sr, heat source , thermal buoyancy parameterT, and solutal buoyancy parameterC on the flow, temperature, and concentration profiles being discussed and presented graphically.

Title	Numerical solution of a problem of thermal stresses of a magnetothermoelastic cylinder with rotation by finite-difference method
Authors	Bayones, F.S., Abd-Alla, A.M., Farhan, A.M.
Journal	Computers, Materials and Continua 68(3), pp. 3339-3352
Abstract	The present article deals with the investigation thermal stress of a magnetothermoelastic cylinder subjected to rotation, open or closed circuit, thermal and mechanical boundary conditions. The outer and inner surfaces of the cylinder are subjected to both mechanical and thermal boundary conditions. A The transient coupled thermoelasticity in an infinite cylinder with its base abruptly exposed to a heat flux of a decaying exponential function of time is devised solve by the finite-difference method. The fundamental equations' system is solved by utilizing an implicit finite-difference method. This current method is a second-order accurate in time and space; it is also unconditionally stable. To illustrate the present model's efficiency, we consider a suitable material and acquire the numerical solution of temperature, displacement components, and the components of stresses with time t and through the radial of an infinite cylinder. The results indicate that the effect of coupled thermoelasticity, magnetic field, and rotation on the temperature, stresses, and displacement is quite pronounced. In order to illustrate and verify the analytical developments, the numerical solution of partial differential equations, stress components, displacement components and temperature is carried out and computer simulated results are presented graphically. This study is helpful in the development of piezoelectric devices.

Title	On separation axioms in (L, M)-fuzzy convex structures
Authors	Zhao, H., Sayed, O.R., El-Sanousy, E., Ragheb Sayed, Y.H., Chen, G.-X.
Journal	Journal of Intelligent and Fuzzy Systems 40(5), pp. 8765-8773
Abstract	Different from the separation axioms in the framework of (L, M)-fuzzy convex spaces defined by Liang et al.(2019). In this paper, we give some new investigations on separation axioms in (L, M)-fuzzy convex structures by L-fuzzy hull operators and r-L-fuzzy biconvex. We introduce the concepts of r-LFSi spaces where i = {0, 1, 2, 3, 4}, and obtain various properties. In particular, we discuss the invariance of these separation properties under subspace and product.

Title	Optoelectronic characteristics of as-deposited, annealed and I_2 – Treated thin films of newly synthesized organic dye based on pyrrolo[2,3-b]pyrrole
Authors	Shokr, E.K., Kamel, M.S., Abdel-Ghany, H., El-Remaily, M.A.E.A.A.A.
Journal	Current Research in Green and Sustainable Chemistry 4,100090
Abstract	Novel heterocyclic dyes were synthesized by attaching different electron-rich aromatics to the pyrrolo[2,3-b]pyrrole system by microwave irradiation system provided with condensation unit. The final push-pull conjugated dyes were yielded by azo coupling of PPY with aniline, 1-naphthylamine and N,N-dimethylaniline. Thin films of compound 3 have been chosen and prepared using thermal evaporation technique and investigated by FTIR and UV – VIS – NIR spectroscopy. Annealing out of PPY films at relatively low temperature (≤100 °C) for 3–6 min has been proved to notably reduce the energy gap and enhance both absorption and refractive indices. They manifested a fast response and high sensitivity toward iodine vapor with a low recovery time indicating a reversibility of iodine adsorption process.

Title	Effect of moving heat source on a magneto-thermoelastic rod in the context of Eringen's nonlocal theory under three-phase lag with a memory dependent derivative
Authors	Bayones, F.S., Mondal, S., Abo-Dahab, S.M., Kilany, A.A.
Journal	Mechanics Based Design of Structures and Machines
Abstract	Enlightened by the memory dependent derivative, the present study deals with a novel mathematical model of generalized thermoelasticity to investigate the transient phenomena due to the influence of the magnetic field and moving heat source in a rod in the context of three-phase lag theory of thermoelasticity based on Eringen's nonlocal elasticity. Both ends of the rod were fixed, and heat is insulated. Employing Laplace transform as a tool, the problem was transformed into the space-domain and solved analytically. Finally, solutions in the real-time domain was obtained by applying the inverse Laplace transform. Numerical calculation for temperature, displacement and stress within the rod was carried out and displayed graphically. The effect of the moving heat source speed, time instance, memory dependent derivative, magnetic field and nonlocality on temperature, displacement, and stress was studied. Finally, three animated were added for easy understanding of the effect of moving the heat source on the studied fields. As per authors concern, the concept of the animated has been presented for the first time in this kinds of literature till now.

Title	Classification of evolutoids and pedaloids in Minkowski space-time plane
Authors	Abdel-Salam, A.A., Khalifa Saad, M.
Journal	WSEAS Transactions on Mathematics 20, pp. 97-105
Abstract	In this paper, we study the families of relatives of pedals and evolutes in the Minkowski space-time plane R21. We obtain some relationships between these families which turn out to be different from Euclidean plane. Also, we classify and generalize these notions to the category of frontal curves in R21. Finally, some computational examples in support of our main results are given and plotted.

Title	Efficient and Secure Bit-Level Chaos Security Algorithm for Orbital Angular Momentum Modulation in Free-Space Optical Communications
Authors	El-Meadawy, S.A., Farghal, A.E.A., Shalaby, H.M.H., (...), Abd-Elnaby, M., El-Shafai, W.
Journal	IEEE Access 9,9410529, pp. 74817-74835
Abstract	Currently, secure multimedia applications are becoming a very hot research topic, specifically over the Internet and wireless communication networks due to their rapid progress. Several researchers have implemented various chaotic image and video encryption algorithms to achieve data stability and communication security. This paper presents a novel bit-level video frame cryptosystem that is dependent on the piecewise linear chaotic maps (PWLCMs). It is implemented for orbital angular momentum (OAM) modulation over different turbulence channels. Firstly, the mathematical model for the bit error rate (BER) of OAM modulation is derived over the gamma-gamma turbulence channel. After that, a comparison between the theoretical results from Mathematica and the simulation results from MATLAB for different turbulence strengths, signal-to-noise ratios (SNRs), and propagation distance values is presented to assure that there is a perfect match. The proposed video cryptosystem is checked using entropy analysis, histogram testing, attack analysis, time analysis, correlation testing, differential analysis, and other quality and security evaluation metrics. The simulation results and the performance analysis confirm that the proposed cryptosystem is reliable and secure for video frame encryption, and communication with different turbulence conditions in free space.

Title	Thermoelastic medium in the context of four theories subjected to gravity field and laser pulse
Authors	Bayones, F.S., Abd-Alla, A.M., Abo-Dahab, S.M., Alqarni, A.J., Saad, A.
Journal	Waves in Random and Complex Media
Abstract	The paper aims at studying the impact of gravity and laser pulse on the overall structure of the generalized thermoelasticity equations concerning a standardized elastic isotropic half-space. Using four generalized thermoelasticity theories, i.e. the Green-Naghdi (GN) theory, Green-Lindsay (GL) theory, Lord-Schulman (LS) theory, and Coupled Theory (CT), the authors applied the formulation. In the physical sphere, they attained the analytical expressions for the (Mechanical and Maxwell's) stresses distribution, displacement components, and temperature through utilizing the normal mode analysis. Moreover, they calculated these expressions numerically and plotted the conforming graphs to demonstrate and make comparisons between theoretical findings. The paper concludes that the impact of gravity and laser pulse field is highly significant.

Title	Solving a Split Feasibility Problem by the Strong Convergence of Two Projection Algorithms in Hilbert Spaces
Authors	Hammad, H.A., Rehman, H.U., Gaba, Y.U.
Journal	Journal of Function Spaces 2021,5562694
Abstract	The goal of this manuscript is to establish strong convergence theorems for inertial shrinking projection and CQ algorithms to solve a split convex feasibility problem in real Hilbert spaces. Finally, numerical examples were obtained to discuss the performance and effectiveness of our algorithms and compare the proposed algorithms with the previous shrinking projection, hybrid projection, and inertial forward-backward methods.

Title	Multilevel segmentation of medical images in the framework of quantum and classical techniques
Authors	Tariq Jamal, A., Abdel-Khalek, S., Ben Ishak, A.
Journal	Multimedia Tools and Applications
Abstract	Nowadays, the numerical segmentation is an important step in the processing and interpretation of medical images. The segmentation consists in extracting, from the image, one or more objects forming the regions of interest. Image thresholding is one of the simplest and effective techniques of image segmentation. In this work, we propose and compare multilevel segmentation approaches based on classical and quantum techniques. The Classical Rényi (CR) and the Quantum Rényi (QR) entropies are used to quantify the information contained in the image. Within the quantum framework, the digital image is expressed as a quantum system by means of the Flexible Representation of Quantum Images (FRQI). Generally, the multilevel thresholding formulation leads to a complex optimization problem. The Classical Genetic Algorithm (CGA) and the Quantum Genetic Algorithm (QGA) are employed to efficiently determine the optimal thresholding values by maximizing the entropy-based fitness functions. The segmentation performances of the proposed methods are assessed and compared using some prevailing criteria. The achieved results on a sample of medical images demonstrated that the QGA-QR method outperforms significantly the other combinations for this thresholding exercise.

Title	Genetic K-Means Adaption Algorithm for Clustering Stakeholders in System Requirements
Authors	Reyad, O., Dukhan, W.H., Marghny, M.H., Zanaty, E.A.
Journal	Advances in Intelligent Systems and Computing1339, pp. 195-204
Abstract	The clustering stakeholder problem for system requirements selection and prioritization is considered inheritance in the area of requirements engineering. This paper utilized a method for clustering analysis approaches used in the marketing segmentation process for an appropriate number of stakeholders groups. An adapted genetic K-means algorithm for clustering stakeholders for software requirement engineering (GKA-RE) is introduced in this study. The algorithm is capable of generating the optimal number of clusters for stakeholders automatically. Thus, it is providing more quality clustering solution by allowing the initial seeds to be readjusted as needed. The proposed method is experimented on two datasets for system requirements known as RALIC datasets using a number of evaluation metrics and comparing GKA-RE with the K-means approach. The experimental results indicate the superiority of GKA-RE over K-means approach in obtaining higher values of evaluation metrics.

Title	Influence of TiO_2/GO weight ratio on the structure, mechanical, and electrical properties of SiO_2–Al_2O_3 glass–ceramics
Authors	Abdelwahab, S.A., Ali, A., Abdelwahed, K., Ahmed, I., Ali, A.I.
Journal	Journal of Materials Science: Materials in Electronics
Abstract	Glass–ceramics of the SiO2–Al2O3–TiO2-GO quaternary system was successfully prepared by sol–gel technique. The effects of TiO2/GO weight ratios on the structure and physical properties of glass–ceramics have been extensively examined. X-ray powder diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), and scanning electron microscopy (SEM) have been used to characterize and identify the structural phase as well as the surface morphology of all samples. The crystalline phases of all prepared samples exhibited anatase phase of titania (Tetragonal: TiO2). But with increasing the amount of Graphite the phase of GO appeared. The thermal properties of the samples have been studied using thermal analysis, differential scanning calorimetry (DSC) and thermo-gravimetric analysis (TGA) technique. The electrical properties have been enhanced with increased TiO2/GO weight ratios up to 1.25, and its electrical conductivity and dielectric constant were 6 × 10–10 S/cm and 9.95, respectively, at frequency 1 MHz. In addition, mechanical properties including density, hardness, and wear rates were measured. The experimental data depicted that, the micro-hardness reached a maximum value of approximately 14 GPa at 2.50 GO wt. %. While the wear rate has a value of nearly 53 × 10–5 mm3/Nm, this is very small paralleled to other glass–ceramics. Besides, good machinability index (m = 0.23) can be a good candidate for machinability applications.

Title	Zinc oxide nanoparticles prevent multidrug resistant Staphylococcus-induced footpad dermatitis in broilers
Authors	Mahmoud, U.T., Darwish, M.H.A., Ali, F.A.Z., (...), Abushahba, M.F.N., El Shoukary, R.D.
Journal	Avian Pathology 50(3), pp. 214-226
Abstract	The current experiment was designed to evaluate the effects of dietary supplementations of zinc oxide nanoparticles (ZONPs) on some behavioural, performance, welfare and histopathological changes in broilers exposed to multidrug resistant Staphylococcus aureus (MRSA)-induced footpad dermatitis (FPD). Eighty-four male Indian River (IR) broilers were randomly allotted to six different dietary treatments as follows: C−ve, C+ve, 10, 20, 30 and 40 ppm ZONPs from 7 to 49d of age. At day 28, broilers (n = 70) were sub-cutaneously injected with 0.5 ml of saline containing 5.3 × 107CFU/ml of S. aureus (MRSA) in each metatarsal foot pad. Control (non-infected) broilers were given 0.5 ml of saline (n = 14). Results clarified that non-infected birds and ZONPs-fed birds had significantly higher standing and feeding activities and lower resting activities in comparison with the infected group. Also, the S. aureus infected group had significantly lower body weight gain (BWG) and higher feed conversion ratio (FCR) than the non-infected group. In addition, the non-infected birds and ZONPs groups had significantly lower object crossing and tonic immobility times (TI) and gait scores (GS) in comparison with the S. aureus group. Only ZONPs 30, 40 ppm and non-infected groups had a significantly higher latency to lie time (LLT) and lower serum cortisol level in comparison with the S. aureus group. Moreover, there were significant changes in the gross lesion score and histopathological lesions between the different groups. In conclusion, the dietary supplementation of ZONPs can reduce S. aureus-induced negative effects of FPD in broilers.

Title	Geometric Phase of a Moving Four-Level Lambda-Type Atom in a Dissipative Cavity
Authors	Korashy, S.T., Saleem, M.A., El Shahat, T.M.
Journal	Applied Mathematics and Information Sciences 15(2), pp. 153-163
Abstract	In this paper, we investigate some properties through four-level λ-type atom interacting with a single-mode quantized field with multi-photon transitions. We study this system in the presence of detuning parameter, Kerr nonlinearity, and intensity-dependent atom-field coupling in a dissipative cavity (i.e. the field is suffering decay rate). Also, the coupling parameter modulated to be time dependent. The exact solution of this model is given using the Schr˝odinger equation when the atom and the field are initially prepared in superposition state and coherent state, respectively. We employed the results to calculate some aspects such as atomic population inversion, geometric phase and Husimi Q-function. It is emphasized that the system can be used as a quantum memory.

Title	Identification and phylogenetic study of Arabis alpina L. from the Kingdom of Saudi Arabia
Authors	Al-Juhani, W.S., Khalik, K.N.A.
Journal	Pakistan Journal of Botany 53(3), pp. 1057-1064
Abstract	The purpose of the current study was to determine the phylogenetic relationships between the Arabis alpina L. growing naturally in Afro-Alpina Mountains at south western regions of the Kingdom of Saudi Arabia (KSA) and its closely related species. A case study approach was applied to DNA barcode, secondary internal transcribed spacer (ITS2), chloroplast maturase-K (matK), ribulose-1,5-bisphosphate carboxylase/oxygenase (rbcL) for the identification and determination phylogenetic relationship. An analysis of barcode data was conducted using the basic local alignment search tool (BLAST), pairwise genetic distances and the maximum likelihood (ML) methods. The results showed the clear superiority of the nuclear ITS2 loci and chloroplast matK gene with a 100% success rate found for DNA amplification, sequencing, and 100% species resolution. A maximum likelihood ML tree of ITS2 and matK strongly supported the presence of variations between A. alpina of Saudi Arabia and specimens of A. alpina of different geographical origins. This study represented the first inspection to A. alpina in KSA, and is useful in species identification, conservation and evolutionary studies. More studies are needed to verify if the A. Alpina of the KSA can be considered a subspecies.

Title	Anti anticipate synchronization of chaotic complex non-linear structures with secure communication applications
Authors	Mahmoud, E.E., Eshmawi, A.A., Alarfaj, E.A.
Journal	Journal of Information Science and Engineering 37(1), pp. 41-53
Abstract	Through this article we portray the anti anticipate synchronization (AAS) for pair similar non-linear chaotic complex structures. A plan is intended to realize AAS of chaotic conduct from these structures based on the Lyapunov function. To confirm the viability of the constructed scheme, the AAS of pair similar complex Lü structures is drawn as an example. Numerical calculations are determined to show the usefulness of the controller's theoretical explanations. A basic implementation of secure communication is accomplished depending on the results of AAS.

Title	Medical image compression based on wavelets with particle swarm optimization
Authors	Alkinani, M.H., Zanaty, E.A., Ibrahim, S.M.
Journal	Computers, Materials and Continua 67(2), pp. 1577-1593
Abstract	This paper presents a novel method utilizing wavelets with particle swarm optimization (PSO) for medical image compression. Our method utilizes PSO to overcome the wavelets discontinuity which occurs when compressing images using thresholding. It transfers images into subband details and approximations using a modified Haar wavelet (MHW), and then applies a threshold. PSO is applied for selecting a particle assigned to the threshold values for the subbands. Nine positions assigned to particles values are used to represent population. Every particle updates its position depending on the global best position (gbest) (for all details subband) and local best position (pbest) (for a subband). The fitness value is developed to terminate PSO when the difference between two local best (pbest) successors is smaller than a prescribe value. The experiments are applied on five different medical image types, i.e.,MRI, CT, and X-ray. Results show that the proposed algorithm can be more preferably to compress medical images than other existing wavelets techniques frompeak signal to noise ratio (PSNR) and compression ratio (CR) points of views.

Title	L-proline catalyzed green synthesis and anticancer evaluation of novel bioactive benzil bis-hydrazones under grinding technique
Authors	Sayed, A.R., Gomha, S.M., Abd El-lateef, H.M., Abolibda, T.Z.
Journal	Green Chemistry Letters and Reviews14(2), pp. 179-188
Abstract	L-Proline organocatalyst was investigated as an efficient and environmentally benign catalyst for synthesis of some novel bioactive benzil bis(2-cyano-3-aryl-2-propenoylhydrazone) derivatives from reaction of the benzil bis(cyanoacetylhydrazone) with the respective aldehydes. The reusability of the L-proline was tested and the results revealed that the recovered catalyst can be reused at least three additional times in subsequent reactions without significant decrease in product yield. The current protocol is very efficient as it provides mild reaction, cleaner reaction profiles, effortless work phase with outstanding purity, and with short reaction time, high performance of the desired products. IR, 1H-NMR and MS and alternative methods, whenever available, have verified the chemical structures of the newly prepared compounds. Compared to the Doxorubicin reference drug using the MTT assay, the in vitro growth inhibitory activity of ten new compounds was investigated against the liver carcinoma cell line (HepG-2) and the findings revealed promising activities of six derivatives.

Title	Recent Fixed-Point Results for θ - Contraction Mappings in Rectangular M- Metric Spaces with Supportive Application
Authors	Mudhesh, M., Hammad, H.A., Alsamir, H., Arshad, M., Ameer, E.
Journal	Journal of Mathematics 2021,5564248
Abstract	The goal of this manuscript is to present a new fixed-point theorem on θ-contraction mappings in the setting of rectangular M-metric spaces (RMMSs). Also, a nontrivial example to illustrate our main result has been given. Moreover, some related sequences with θ-contraction mappings have been discussed. Ultimately, our theoretical result has been implicated to study the existence and uniqueness of the solution to a nonlinear integral equation (NIE).

Title	Solutions of Fractional Differential Type Equations by Fixed Point Techniques for Multivalued Contractions
Authors	Hammad, H.A., Aydi, H., De La Sen, M.
Journal	Complexity 2021,5730853
Abstract	This paper involves extended b-metric versions of a fractional differential equation, a system of fractional differential equations and two-dimensional (2D) linear Fredholm integral equations. By various given hypotheses, exciting results are established in the setting of an extended b-metric space. Thereafter, by making consequent use of the fixed point technique, short and simple proofs are obtained for solutions of a fractional differential equation, a system of fractional differential equations and a two-dimensional linear Fredholm integral equation.

Title	Second-Order Neutral Differential Equations: Improved Criteria for Testing the Oscillation
Authors	Moaaz, O., Muhib, A., Owyed, S., Mahmoud, E.E., Abdelnaser, A.
Journal	Journal of Mathematics 2021,6665103
Abstract	The main purpose of this study is to establish new improved conditions for testing the oscillation of solutions of second-order neutral differential equation rlu′lγ′+qlxβσl=0, where l≥l0 and ul≔xl+pxϱl. By optimizing the commonly used relationship x>1-pu, we obtain new criteria that give sharper results for oscillation than the previous related results. Moreover, we obtain criteria of an iterative nature. Our new results are illustrated by an example.

Title	Comparison of some meat and liver quality traits in Muscovy and Pekin ducks
Authors	Kokoszyński, D., Wilkanowska, A., Saleh, M., Fik, M., Bigorowski, B.
Journal	Journal of Applied Animal Research 49(1), pp. 118-124
Abstract	The objective of the study was to compare Muscovy and Pekin ducks for proximate analysis, colour attributes, tenderness, meat microstructure, and content of some minerals in meat and liver. The material of the study was sexed 51 Muscovy ducks and 47 Pekin ducks. At the end of the rearing period, 40 birds were selected for dissection. Duck genotype influenced the content of water, protein, fat, collagen, zinc, iron, haematin, and redness, chroma, hue angle, WB shear force, muscle fibre diameter and density of the breast muscle, and also protein, fat, magnesium, iron, haematin content, WB shear force and lightness of the leg muscle. The sex of ducks had an impact on the content of water, protein, fat, potassium, copper, on redness, chroma and muscle fibre diameter of breast muscle, and on water, protein, fat, sodium, potassium, magnesium and copper in liver content of the leg muscle. The genotype-sex interaction was significant for water, protein and sodium content, redness, chroma of breast muscles; for water, protein, sodium, magnesium and haematin content, redness and chroma of leg muscles; and for phosphorus content in the liver. Muscovy ducks had more favourable chemical composition and poorer tenderness and microstructural characteristics compared to the meat of Pekin ducks.

Title	Analytical Solution for Differential and Nonlinear Integral Equations via Fϖe -Suzuki Contractions in Modified ϖe -Metric-Like Spaces
Authors	Hammad, H.A., De La Sen, M., Aydi, H.
Journal	Journal of Function Spaces 2021,6128586
Abstract	The aim of this manuscript is to present a new space, namely, a modified ϖe-metric-like space, and we establish some related fixed point results using extended Fϖe-Suzuki and generalized Fϖe-Suzuki contractions on the mentioned space. Here, we support our theoretical consequences in two ways: the first one consists of presenting illustrative examples and the second one consists of finding analytical solutions for some integral and differential equations in the context of the mentioned space.

Title	Occurrence and geographical distribution of mangrove fungi
Authors	Devadatha, B., Jones, E.B.G., Pang, K.L., (...), Sutreong, S., Zhang, S.N.
Journal	Fungal Diversity 106(1), pp. 137-227
Abstract	This is a multidimensional review of mangrove fungi occurring as saprobes, pathogens and endophytes of a wide range of host substrates and those isolated from the water columns and sediments in mangroves. Eight-hundred and fifty taxa including 658 that are supported by both morphology and molecular data and 192 with only morphological data are listed. These constitute Ascomycota, the dominant group with 773 species, and 58 Basidiomycota, one Blastocladiomycota, five Chytridiomycota, and 13 Mucoromycota. This study also includes data on mangrove yeasts 103 Ascomycota, 39 Basidiomycota and 193 taxa isolated from sediments. Endophytes isolated from submerged parts of mangrove plants total 38. The most specious orders of mangrove fungi are Pleosporales 133, Saccharomycetales 102, Microascales 101, Eurotiales 87, Hypocreales 60 and Xylariales 54. Speciose genera include Candida 39, Aspergillus 53, Penicillium 17 and Corollospora 16. The highest number of mangrove fungi have been recorded from the Pacific Ocean 553, which is the largest ocean, followed by Indian 408 and Atlantic Oceans 259. Geographical distribution of mangrove fungi varied from ocean to ocean with only 109 taxa common to the Atlantic, Indian and Pacific Oceans. Of the various countries reported for mangrove fungi, India accommodates the highest number (339) followed by Thailand 303, Malaysia 171, Florida Everglades, USA 134 and Brunei 134. A total of 60 different mangrove plants and their associates have been surveyed for mangrove fungi. These results are discussed and compared with previous studies.

Title	Exciting Fixed Point Results on a Novel Space with Supportive Applications
Authors	Hammad, H.A., Aydi, H., Gaba, Y.U.
Journal	Journal of Function Spaces 2021,6613774
Abstract	The goal of this paper is to present a new space, a complex valued controlled rectangular b-metric space (for short, u$\mathbb{C}$-metric space). Some examples and topological properties of u$\mathbb{C}$-metric spaces are given. Also, some related common fixed point results are discussed. Our results generalize a lot of works in this direction. Moreover, we apply the theoretical results to find a unique solution of a complex valued Atangana-Baleanu fractional integral operator and a system of complex linear equations. Finally, a numerical example to find the current that passes through the RLC circuit is illustrated.

Title	Probing the reaction of N,N-dimethyformamide dimethyl acetal with p-tert-butylthiacalix[4]arene tetrahydrazides: A facile approach for the synthesis and application of novel metal receptors
Authors	Omran, O.A., Nafady, A.
Journal	Heterocycles 102(1), pp. 81-91
Abstract	Recent developments in the field of sensing and recognition revealed that artificial receptors based on calix[4]arenes with π-conjugated fluorophoric or chromophoric moieties are efficient in enhancing selectivity/sensitivity as well as the binding affinity for ionic or molecular recognition. Herein, via studying the reaction of dimethylformamide dimethyl acetal (DMF-DMA) with p-tert-butylthiacalix[4]arene tetrahydrazides in three different conformers (i.e., cone, partial-cone, and 1,3-alternate), the formation of novel lower rim p-tert-butylthiacalix[4]arene derivative (cone, partial-cone, and 1,3-alternate) conformers in high yields (80, 95, and 85%, respectively) was achieved. The structure of isolated products was confirmed using different spectroscopic and analytical techniques such as FT-IR, 1H NMR, 13C NMR, and elemental analysis. Importantly, the synthesized receptors showed preferential uptakes of alkali (Na+, K+ and Cs+), heavy (Pb2+, Cd2+, Hg2+, and Ag+) and transition (Ni2+, Co2+, and Cu2+) metal ions via liquid-liquid extraction method. The finding of this work adds new compounds to the growing family of thiacalix[4]arenes and validates their high sensitivity and selectivity in detection of heavy metal ions.

Title	Radial vibrations on an elastic medium subjected to rotation and magnetic field
Authors	Yahya, G.A., Abd-Alla, A.M., El-Bendary, S.
Journal	Mechanics Based Design of Structures and Machines
Abstract	Based on the one-dimensional elastic theory, the radial vibrations of cylindrical isotropic embedded in an elastic medium are studied in the paper. The effect of the magnetic field of the radial vibrations of an elastic hollow cylinder with rotation is researched as well. The one-dimensional equation of elastodynamic is solved in terms of radial displacement. The frequency equation is obtained when the boundaries are free and fixed; the mixed boundary condition is numerically examined. The determination is concerned with the eigenvalues of the natural frequency of the radial vibrations in the case of harmonic vibrations. The effect of the magnetic field and rotation on the natural frequencies were explored. It was shown that the dispersion curves of guided waves were significantly influenced by the magnetic field and rotation of the elastic cylinder. Numerical results are given and graphically illustrated in each considered case. The natural frequencies and mode shapes are calculated numerically, and the effects of rotating, magnetic field, and variable thickness are discussed. It is observed that an increase of the magnetic parameter, as well as the rotation parameters, brings results closer to the classical cylinder theory results. Furthermore, the current study can be applied to the design of microplates and nanoplates and their optimal usage. The results indicate that the effects of the magnetic field and rotation are very pronounced.

Title	Modeling of diffusive patterns in predator–prey system using turing instability and amplitude equations
Authors	Singh, T., Dubey, R., Mishra, V.N., Abdel-Aty, M.
Journal	Information Sciences Letters 10(1), pp. 5-16
Abstract	In this work, we have investigated the evolution of diffusive pattern formation in a predator–prey model under type-III functional response. Using stability analysis, we receive the significant specifications for Turing instability (diffusive-driven instability), and with the help of these conditions, recognize the corresponding realm in the region of interest. Moreover, we present a qualitative analysis of growth and development actions that involves species distribution and their interplay of the spatially distributed populace with diffusion and obtain the conditions for spatial patterns like spots, spot-stripe, and stripes. Using weakly nonlinear analysis, we derive the equations of amplitude for slow modulation near the Turing boundary. By the series of numerical simulations, we receive intricate spatial patterns, particularly spot, stripe, and spot-stripe in the Turing realm. The consequences of this paper are general in the real world and can be used to investigate the impact of self-diffusion on other predator–prey systems. It will improve our understanding to understand the dynamical behavior of realistic models..

Title	The digital transformation effects in distance education in light of the epidemics (COVID-19) in Egypt
Authors	Abd-Elhafiez, W.M., Amin, H.H.
Journal	Information Sciences Letters 10(1), pp. 141-152
Abstract	On the relatively rare occasions when disaster forces schools and universities to close for a prolonged period of time, e-learning has helped fill the gap in instruction. In this paper, we study the role of digital transformation in e-learning systems in light of the global conditions resulting from the epidemics (COVID-19) in Egypt. Therefore, we focus on the importance of distance education at several factors, trying to assess the staff's response and students to new education methods and assess the distance education experience in Egyptian universities. Where the study set that various staff excited to utilize this method, unlike some of the students, who did not to accept because of their knowledge lacking.

Title	A pilot study of smart agricultural irrigation using unmanned aerial vehicles and IoT-based cloud system
Authors	Karar, M.E., Alotaibi, F., Al Rasheed, A., Reyad, O.
Journal	Information Sciences Letters 10(1), pp. 131-140
Abstract	This article introduces a new mobile-based application of modern information and communication technology in agriculture based on Internet of Things (IoT), embedded systems and an unmanned aerial vehicle (UAV). The proposed agricultural monitoring system was designed and implemented using Arduino microcontroller boards, Wi-Fi modules, water pumps and electronic environmental sensors, namely temperature, humidity and soil moisture. The role of UAV in this study is to collect these environmental data from different regions of the farm. Then, the quantity of water irrigation is automatically computed for each region in the cloud. Moreover, the developed system can monitor the farm conditions including the water requirements remotely on Android mobile application to guide the farmers. The results of this study demonstrated that our proposed IoT-based embedded system can be effective to avoid unnecessary and wasted water irrigation within the framework of smart agriculture.

Title	Pancharatnam phase of non-hermitian hamiltonian
Authors	Salah, R., Anwer, M.M., Abdel-Aty, M.
Journal	Information Sciences Letters 10(1), pp. 25-32
Abstract	The considered system is two-level atoms interacting with a single mode electromagnetic field (EMF) in dissipative cavity, taking into account the coupling function between atoms and field to be time-dependent, Stark shift effect and Kerr-like medium parameter. The system's corresponding state function is obtained when the two atoms are initially made in superposition of states and the field is in the coherent state. The results show that, the evolution of atomic inversion, Pancharatnam phase, Von Neumann entropy and phase properties are decaying in the presence of damping. We show the the long-life behavior for Pancharatnam phase. This result indicates that quantum correlations quantified by the phase can be protected effectively. Using the effect of the field decay parameter Γ, the entropy quickly reaches the non-entangled state (death of entanglement). On contrast, the atomic decay parameter γ, the entropy is very weak.

Title	A Deep Neural Approach for Real-Time Malignant Melanoma Detection
Authors	Bakheet, S., El-Nagar, A.
Journal	Applied Mathematics and Information Sciences 15(1), pp. 89-96
Abstract	Recently, several potentially useful computer-aided diagnosis (CAD) systems have become feasible and are now used widely to help physicians in automated cancer detection and grading from dermoscopy images. In this paper, we present a real-time CAD framework using a deep neural network (DNN) for fine-grained classification and grading in dermoscopic skin cancer images. The input skin image is first preprocessed for removing the noise and enhancing the image quality. An adaptive segmentation scheme based on the well-established Otsu thresholding method is performed to accurately extract suspected skin lesion regions from the enhanced input image. Then, a reduced set of visual features is extracted based on both color and typical geometric properties of skin lesions. Finally, the selected lesion features are fed as inputs into a rapid DNN classifier for classifying each lesion in a given dermoscopic image as a benign or melanoma lesion. On the publicly available PH2 dermoscopy imaging dataset, the proposed method is successfully tested and validated, achieving 97.5%, 96.67% and 100.0% for average diagnostic accuracy, sensitivity and specificity, respectively. These results compare quite favorably with those obtained from more sophisticated state-of-the-art approaches.

Title	Effect of a magnetic field and initial stress on the P-waves in a photothermal semiconducting medium with an internal heat source
Authors	Bayones, F.S., Abd-Alla, A.M., Abo-Dahab, S.M., Ahmed, S.M., Rashid, M.M.
Journal	Mechanics Based Design of Structures and Machines
Abstract	The present research paper handles a 2D deformation in a homogeneous thermoelastic photothermal semiconducting medium subjected to a magnetic field and initial stress with an internal heat source. The problem is framed in the dimensionless form and resolved utilizing the normal mode analysis method. Based on a numerical study using the parameters of silicon as a target, the physical data were attained and tested. They presented the magnetic field and initial stress. It is observed that the magnetic field and initial stress exert some influence in the P-waves in a photothermal semiconducting medium due to internal heat source. The distribution of these quantities was represented graphically with and without the internal heat source, as well as the magnetic field and the initial stress.

Title	Dynamics and Robust Control of a New Realizable Chaotic Nonlinear Model
Authors	Higazy, M., Mahmoud, E.E., Khalil, E.M., (...), Abo-Dahab, S.M., Alotaibi, H.
Journal	Complexity 2021,6692369
Abstract	We present a new viable nonlinear chaotic paradigm. This paradigm has four nonlinear terms. The essential features of the new paradigm have been investigated. Our new system is confirmed to have chaotic behaviors by calculating its Lyapunov exponents. The relations of the system states are displayed by a suggested new signal flow graph (SFG). The proposed SFG is discussed via some graph theory tools, and some of its hidden features are calculated. In addition, the system is realized via constructing its electronic circuit which helps in the real applications. Also, a robust controller for the system is designed with the aid of a genetic algorithm.

Title	On fuzzy upper and lower α -ℓ-continuity and their decomposition
Authors	Taha, I.M.
Journal	Journal of Mathematical and Computational Science 11(1), pp. 427-441
Abstract	The main purpose of this paper is to introduce and study the concepts of fuzzy upper and lower α- ℓ -continuous (resp. β-ℓ-continuous, semi-ℓ-continuous and pre--continuous) multifunctions via fuzzy ideals. Several properties of these multifunctions along with their mutual relationships are established with the help of examples. Also, we give the decomposition of fuzzy upper (resp. lower) α-ℓ-continuity and the decomposition of fuzzy upper (resp. lower) ℓ-continuity [15]. Later, we introduce new types of r-fuzzy compactness in a fuzzy ideal topological space (X, τ, ℓ) based on the sense of Šostak.

Title	The effect of fractional time derivative on two-dimension porous materials due to pulse heat flux
Authors	Saeed, T., Abbas, I.A.
Journal	Mathematics 9(3),207, pp. 1-14
Abstract	In the present article, the generalized thermoelastic wave model with and without energy dissipation under fractional time derivative is used to study the physical field in porous two-dimensional media. By applying the Fourier-Laplace transforms and eigenvalues scheme, the physical quantities are presented analytically. The surface is shocked by heating (pulsed heat flow problem) and application of free traction on its outer surface (mechanical conditions) by the process of temperature transport (diffusion) to observe the full analytical solutions of the main physical fields. The magnesium (Mg) material is used to make the simulations and obtain numerical outcomes. The basic physical field quantities are graphed and discussed. Comparisons are made in the results obtained under the strong (SC), the weak (WC) and the normal (NC) conductivities.

Title	Quantum features of atom–field systems in the framework of deformed fields
Authors	Abdel-Khalek, S., Berrada, K., Altowyan, A.S.
Journal	Applied Sciences (Switzerland) 11(1),408, pp. 1-12
Abstract	We propose a new kind of Schrödinger cat state introduced as a superposition of spin coherent states in the framework of noncommutative spaces. We analyze the nonclassical features for these noncommutative deformed states in terms of the main physical parameters. The physical importance of deformed states is that they provide a convenient description of a large set of laser systems. As an application, we develop the Jaynes–Cummings model by considering the interaction among atoms and cat state fields associated to deformed spin algebras. In this context, we show the dynamical behavior of the nonlocal correlation and nonclassical properties in these quantum systems.

Title	Tripled fixed point techniques for solving system of tripled-fractional differential equations
Authors	Hammad, H.A., De la Sen, M.
Journal	AIMS Mathematics 6(3), pp. 2330-2343
Abstract	The intended goal of this manuscript is to discuss the existence of the solution to the below system of tripled-fractional differential equations (TFDEs, for short): where is RL-fractional derivative of order are functions taken under appropriate hypotheses. The method of the proof depends on a manner of a tripled fixed point (TFP), which generalize a fixed point theorem of Burton [1]. At last, a non-trivial example to strong our results is illustrated.

Title	Catalytic and biological reactivities of mononuclear copper (II) and vanadyl (II) complexes of naphthalenylimino-phenolate sodium sulfonate
Authors	Adam, M.S.S., Makhlouf, M.M., Ullah, F., Mohamad, A.D.M.
Journal	Journal of the Taiwan Institute of Chemical Engineers 118, pp. 12-28
Abstract	Two novel water-soluble mononuclear Cu(II) and VO(II)-complexes (CuSL and VOSL, respectively) were synthesized from easily accessible 2-((naphthalen-1-ylimino)methyl)phenolate sodium sulfonate as a Schiff base ligand (HSL). HSL, CuSL and VOSL were characterized by various spectral tools. Their catalytic potential was investigated and compared in 1,2-cyclohexene epoxidation using H2O2 or tBuOOH as an oxidizing agent, and in C—C cross-coupling protocols, including Suzuki-Miyaura and Sonogashira reactions, under homogeneous reaction conditions. Both complexes exhibited good catalytic potential in the epoxidation reaction. VOSL complex with the high oxidation state metal ion (VIV) exhibited slightly better performance in the epoxidation reaction, provided 93, 77 and 89% yield in acetonitrile, water and under solvent free condition. In contrast CuSL complex provided 89, 71 and 79% yield under the same reaction condition. While in Suzuki-Miyaura and Sonogashira C—C reactions using phenylboronic acid or phenylacetylene with aryl halides, CuSL afforded better catalytic potential (89% for Suzuki-Miyaura and 77% yield for Sonogashira C—C products) than VOSL catalyst (73% and 51% yield respectively). DFT studies were also carried to understand the catalytic behavior of CuSL and VOSL catalysts in their catalytic processes. Additionally HSL, CuSL and VOSL were also explored for their biological potential against some pathogens strains, as antimicrobial, antioxidant and anticancer agents. Both complexes (CuSL and VOSL) showed better inhibiting potential than their free ligand. The complex ctDNA-interaction was examined by UV–vis. spectrophotometry, viscosity measurements and gel electrophoresis to determine the nature of binding. Additionally, molecular docking was also carried out for better understanding.

Title	Some characterizations of dual curves in dual 3-space d^3
Authors	Abdel-Baky, R., Saad, M.K.
Journal	AIMS Mathematics 6(4), pp. 3339-3351
Abstract	In this work, we prove that the ratio of torsion and curvature of any dual rectifying curve is a non-constant linear function of its dual arc length parameter. Thereafter, a dual differential equation of third order is constructed for every dual curve. Then, several well-known characterizations of dual spherical, normal and rectifying curves are consequences of this differential equation. Finally, we prove a simple new characterization of dual spherical curves in terms of the Darboux vector.

Title	Analysis and control of a fractional chaotic tumour growth and decay model
Authors	Mahmoud, E.E., Jahanzaib, L.S., Trikha, P., Abualnaja, K.M.
Journal	Results in Physics 20,103677
Abstract	In the manuscript fractional tumour growth and decay model is studied extensively using various dynamic analysis methods such as Lyapunov exponents, bifurcation and fixed point analysis, solution and so on. The model dynamics is observed by changing order between 0.8 and 1. Chaos has been observed in this fractional tumour growth and decay model. The model is also stabilized about its equilibrium points by chaos control technique using adaptive sliding mode control scheme. Numerical simulations are carried out to validate the theoretical results. These observations may prove fruitful and provide insight to deal with the disease.

Title	Theoretical and numerical analysis of novel COVID-19 via fractional order mathematical model
Authors	Ali, A., Khan, M.Y., Sinan, M., (...), Abdel-Aty, A.-H., Ali, G.
Journal	Results in Physics 20,103676
Abstract	In the work, author's presents a very significant and important issues related to the health of mankind's. Which is extremely important to realize the complex dynamic of inflected disease. With the help of Caputo fractional derivative, We capture the epidemiological system for the transmission of Novel Coronavirus-19 Infectious Disease (nCOVID-19). We constructed the model in four compartments susceptible, exposed, infected and recovered. We obtained the conditions for existence and Ulam's type stability for proposed system by using the tools of non-linear analysis. The author's thoroughly discussed the local and global asymptotical stabilities of underling model upon the disease free, endemic equilibrium and reproductive number. We used the techniques of Laplace Adomian decomposition method for the approximate solution of consider system. Furthermore, author's interpret the dynamics of proposed system graphically via Mathematica, from which we observed that disease can be either controlled to a large extent or eliminate, if transmission rate is reduced and increase the rate of treatment.

Title	Effect of date palm pollen supplementation on the egg production, ovarian follicles development, hematological variables and hormonal profile of laying hens
Authors	Saleh, M., Kokoszyński, D., Abd-Allah Mousa, M., Abdel-Kareem Abuoghaba, A.
Journal	Animals 11(1),69, pp. 1-13
Abstract	This experiment studied the effect of DPP supplementation in the laying hens' diet on the ovarian follicle development, hematological variables and hormonal profile of laying hens. Eighty-four, 78-week-old, Lohman LSL hybrids layers were equally divided into four groups (4 groups × 7 replicates × 3 hens); hens in the 1st group were fed a basal diet (control), while those in the 2nd, 3rd and 4th groups, were fed on the same diet and supplemented with 1.25, 2.5 and 5.0 g DPP/kg diet. The results showed that the egg weight, egg mass and laying rate of laying hens treated with DPP levels were significantly increased compared to those of the hens in the control group. Egg weight, egg surface area, albumen quality and percentage of the yolk in treated hens significantly increased compared with controls. The increased DPP levels in laying hens'diet significantly ($p < 0.05$) increased WBC, Hb and TAC, while heterophil/lymphocyte (H/L ratio) significantly decreased. Additionally, the concentrations of FSH and LH and the weights of ovary and oviduct in the treated hens significantly ($p < 0.05$) increased compared with the control. In conclusion, the DPP supplementation in the hen diet significantly improved egg production, EW, H/L ratio, ovarian follicles, FSH and LH hormones concentrations.

Title	Entanglement and entropy squeezing for moving two two-level atoms interaction with a radiation field
Authors	Abdel-Khalek, S., Khalil, E.M., Alsubei, B., Al-Barakaty, A., Dahab, S.M.A.
Journal	Computers, Materials and Continua 66(3), pp. 2445-2456
Abstract	In this paper, we analyzed squeezing in the information entropy, quantum state fidelity, and qubit-qubit entanglement in a time-dependent system. The proposed model consists of two qubits that interact with a two-mode electromagnetic field under the dissipation effect. An analytical solution is calculated by considering the constants for the equations of motion. The effect of the general form of the time-dependent for qubit-field coupling and the dissipation term on the temporal behavior of the qubit-qubit entanglement, quantum state fidelity, entropy, and variance squeezing are examined. It is shown that the intervals of entanglement caused more squeezing for the case of considering the time-dependent parameters. Additionally, the entanglement between the qubits became more substantial for the case of time dependence. Fidelity and negativity rapidly reached the minimum values by increasing the effect of the dissipation parameter. Moreover, the amount of variance squeezing and the amplitude of the oscillations decreased considerably when the time dependence increased, but the fluctuations increased substantially. We show the relation between entropy and variance squeezing in the presence and absence of the dissipation parameter during the interaction period. This result enables new parameters to control the degree of entanglement and squeezing, especially in quantum communication.

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Title	Cytogenetic and molecular studies on two faba bean cultivars revealed their difference in their aluminum tolerance | [Citogenetske in molekularne raziskave dveh sort boba so odkrile njuno različno toleranco na aluminij]
Authors	Hassanein, A.M., Mohamed, A.H., Abd Allah, H.A.A., Zaki, H.
Journal	Acta Agriculturae Slovenica 116(2), pp. 273-285
Abstract	Two cultivars of faba bean (Vicia faba 'Giza 843' and 'Nobaria 3') that differ in aluminum (Al) tolerance were used to study cytogenetic and genomic alterations under the influence of Al Cl3(5, 15, and 25 mmol AlCl3) for different periods (6, 12 and 24 h). Under Al treatments, mitotic index in both cultivars decreased and total chromosomal abnormalities increased. The frequencies of micronuclei and chromosomal abnormalities (C-anaphase, metaphase-star chromosomes, breaks, sticky and disturbed chromosomes during metaphase or anaphase) in 'Giza 843' were lower than in 'Nabaria 3'. Increase of the registered cytogenetic events under the influence of Al stress led to increase the detected polymorphism using RAPD and ISSR markers. Application of RAPD primers gave the same value of polymorphism in both faba bean cultivars under Al stress. Polymorphism average of nine ISSR primers of 'Giza 843' (65.36 %) was lower than that of 'Nobaria 3' (71.59 %). Molecular markers, cytogenetic characteristics and seedling growth data indicate that Al tolerance of 'Giza 843' was higher than of 'Nobaria 3'. This work shows that cytogenetic and ISSR techniques could be used efficiently to distinguish between the ability of two faba bean cultivars to tolerate toxic effects of Al.

Title	Fatty acid production of thraustochytrids from Saudi Arabian mangroves
Authors	Abdel-Wahab, M.A., El-Samawaty, A.E.-R.M.A., Elgorban, A.M., Bahkali, A.H.
Journal	Saudi Journal of Biological Sciences 28(1), pp. 855-864
Abstract	This is the first report of thraustochytrids from Saudi Arabia. A total of 108 isolates of thraustochytrid were cultured from Syhat mangroves, Arabian Gulf, Saudi Arabia. Isolated thraustochytrids belonged to five genera: Aplanochytrium, Aurantiochytrium, Schizochytrium, Thraustochytrium and Ulkenia. Cultured thraustochytrids isolated from decaying leaves of Avicennia marina (77 isolates), sediment (15), seawater (10) and decaying thalli of Sargassum (6). Of the 108 isolates, three strains (SY25, SY38 and SY52) were selected based on their high biomass productivity and high percentages of PUFAs. Phylogenetic analyses based on 18S rDNA placed the three strains within the Aurantiochytrium clade with high statistical support. Species of Aurantiochytrium formed six separate clades, the two strains (SY38 and SY52) formed a separate clade that is a sister clade to the one that contains the type species A. limacinum, while SY25 grouped with Aurantiochytrium sp. TA4, that is also isolated from mangroves in Iran, Arabian Gulf. The strains (SY38 and SY52) shared the phylogenetic placement, their morphology and fatty acid profile. The strain SY25 have different shape of sporangia that divide to give zoospores directly, sporogenous cells are surrounded by thick gelatinous sheath and produce high levels of Linoleic and Oleic essential unsaturated fatty acids. The three studied strain produced high levels of Palmitic acid (ranged between 31.1 and 65.3 % of total fatty acids) that can be further optimized for biofuel production.

Title	Analytic approximations to non-linear third order jerk equations via modified global error minimization method
Authors	Ismail, G.M., Abu-Zinadah, H.
Journal	Journal of King Saud University - Science 33(1),101219
Abstract	In this paper, a modified version of the global error minimization method (GEMM) is presented for solving non-linear third order jerk equations by obtaining the unknown parameters up to third order. Two illustrative examples are given to demonstrate the implementation and validity of the present method. The obtained analytical results are compared and simulated with the known solutions and the exact numerical one, which reveal that the current method are very effective and provides an efficient alternative to the known previously existing methods and can be used for other nonlinear applications arising in engineering and sciences. The analytical and numerical results are presented through Tables and graphs.

Title	The optimal estimation state of one-axis twisting model
Authors	Alhashash, A., Zidan, N., Metwally, N.
Journal	Optik 226,165934
Abstract	The possibility of estimating parameters and describing the optimal states induced from the one-axis twisting model on the thermal state was examined. The quantum Fisher information matrix be used as an estimator for multiple parameters. We demonstrate that concurrent estimation reduces estimation of parameter variance, and therefore the precision of estimating parameters simultaneously is much better than estimating them individually. Saturation is imaged at significant temperatures, although it increases the minimum variations in reaction force. It is shown that each parameter can be used as a control parameter to reduce the minimum variances for other parameters.

Title	Synthesis, antimicrobial studies, and molecular docking of some new dihydro-1,3,4-thiadiazole and pyrazole derivatives derived from dithiocarbazates
Authors	Moustafa, A.H., Ahmed, D.H., El-Wassimy, M.T.M., Mohamed, M.F.A.
Journal	Synthetic Communications 51(4), pp. 570-584
Abstract	A series of 3-acetyl-2-aryl-5-methylthio-2,3-dihydro-1,3,4-thiadiazoles 3a–g,N- (4-acetyl-5-aryl-4,5-dihydro-1,3,4-thiadiazol-2-yl) acetamide derivatives 5a–e and spiro-compound 7 was prepared from starting material dithiocarbazates using N-methylpyrrolidone (NMP) /acetic anhydride mixture. Furthermore, a new series of 5-amino-3- (methylthio) -1-substituted-1H-pyrazole-4-carbonitrile derivatives 12a–d was prepared using two synthetic routes: (i) via reaction of bis (methylthio) methylene malononitrile 8 with carbothiohydrazides 11a–d, or (ii) via reaction of methyl 5-amino-4-cyano-3- (methylthio) -1H-pyrazole-1-carbodithioate 9a with primary/secondary amines. The antimicrobial screening of newly synthesized compounds revealed that compounds 3b, 7, and 12d are the most potent against the Gram-positive (S. aureus) and the Gram-negative (E. coli) bacteria compared to ciprofloxacin as reference drug. Mechanistically, the theoretical docking results of 3b, 7 and 12d suggested that they may act as potent inhibitors of theDNA gyrase.

Title	Bures and trace-distance correlations of quantum wells in open microcavities linked by an optical waveguide
Authors	Mohamed, A.-B.A., Abdel-Aty, M., Eleuch, H.
Journal	Optik 225,165744
Abstract	We explore the two quantum-wells correlations in two microcavities linked by a waveguide and leaking its photons to the external environment. Each microcavity contains quantum well (QW) and filled by a linear optical medium. We examine the effects of the physical parameters on the generation and robustness of the Bures-norm entanglement and the trace-norm measurement-induced non-locality correlation. The generations and the robustness of the Bures and trace-distance correlations depend crucially on the cavity-QW and fiber cavity couplings as well as on the optical linear medium density. The optical susceptibility, the spontaneous emission and the microcavity dissipation rates, in addition to the couplings of cavity-QW and the fiber-cavity control the regularity, amplitudes, and frequencies of the Bures and trace-distance correlations.

Title	Pharmacological Evaluation of Novel Organoiron Dendrimers as Antimicrobial and Anti-Inflammatory Agents
Authors	Abd-El-Aziz, A.S., Abdelghani, A.A., El-Ghezlani, E.G., Abou El-ezz, D., Abdel-Rahman, L.H.
Journal	Macromolecular Bioscience 21(1),2000242
Abstract	The synthesis of a novel and attractive class of nonsteroidal anti-inflammatory and antimicrobial organoiron dendrimers attached to the well-known drug ibuprofen is achieved. The structures of these dendrimers are established by spectroscopic and analytical techniques. The antimicrobial activity of these dendrimers is investigated and tested against five human pathogenic Gram-positive and Gram-negative bacteria, and minimum inhibitory concentrations are reported. Some of these synthesized dendrimers exhibit higher inhibitory activity against methicillin-resistant Staphylococcus aureus, vancomycin-resistant Enterococcus faecium, and Staphylococcus warneri compare to the reference drugs. As well, the in vitro and in vivo anti-inflammatory activities of these dendrimers are evaluated. The results of in vivo anti-inflammatory activity and histopathology of inflamed paws show that all dendrimers display considerable anti-inflammatory activity; however, second-generation dendrimer (G2-D6) shows the best anti-inflammatory activity, which is more potent than the commercial drug ibuprofen at the same tested dose. Results of the toxicity study reveal that G2-D6 is the safest drug on biological tissues.

Title	Study the effect of type of substrates on the microstructure and optical properties of CdTe Thin Films
Authors	Hakeem, A.M.A., Ali, H.M., El-Raheem, M.M.A., Hasaneen, M.F.
Journal	Optik 225,165390
Abstract	Cadmium telluride (CdTe) thin films are deposited on an ultrasonically cleaned substrate of different types by using thermal evaporation technique under pressure 2 × 10-5 mbar. The structural and morphological studies of all the films are accomplished using the X-ray diffraction method (XRD) and field emission scanning electron microscope (FE-SEM). CdTe found to has a polycrystalline structure. The grains were very uneven and the grain shape was irregular. A Jasco V-570 UV-visible - NIR spectrometer has been used to measure the optical properties in the range of wavelength from 200 to 2500 nm at normal incidence. The optical energy gap (Eg) is determined by using the Tauc's equation. The optical parameters such as; refractive index (n), static refractive index (no), infinite dielectric constant (ε∞), dispersion energy (Ed), single oscillating energy (E0), static dielectric constant (εs), free carrier concentration (N), plasma frequency (ωp), relaxation time (τ), oscillator wavelength (λo), oscillator strength (S0) and electronic polarizability (αp) respectively are calculated. The optical measurements for CdTe films deposited on FTO substrate were property used as absorber material for solar cell applications. Inversely, CdTe films deposited on a glass substrate is more suitable for a window in solar cell applications.

Title	Plant biodiversity and soils in the Jebel Marra region of Darfur, Sudan
Authors	Hegazy, A.K., Hosni, H.A., El-Sheikh, M.A.R., (...), Badawi, E.-S.M., Lovett-Doust, L.
Journal	Arid Land Research and Management 35(2), pp. 127-161
Abstract	Jebel Marra, a volcanic complex in western Sudan, is an important site of early settled agriculture, with high plant diversity, supported by orographic rainfall. Vegetation types were examined in relation to habitat, altitude, soils, and land management. In 52 sites, 274 species, predominantly Fabaceae and Poaceae, were recorded (with 17 new records). Sites were clustered using TWINSPAN, and Detrended Correspondence Analysis (DCA), generating eight vegetation types, six new since the 1970s. Changes in the dominant species show that the savanna has become sparser, with annuals displacing perennials. Soils were mostly “sandy clay loams,” so vegetation types did not directly correspond to soil types, although Type VIII vegetation grew in soils with a higher clay content. The sand fraction that predominated in soils of all other vegetation types was, mainly (87%) “soft” or aeolian sand. Canonical Correspondence Analysis (CCA) separated communities and species along a first axis, associated with finer soil textures, higher Fe, and lower elevations. The second axis was positively associated with elevated phosphorus, and negatively with sandy loams. CCA showed that rainfall alone was less pertinent than soil texture, which determines plant-available water capacity. The region’s vegetation was not uniformly diverse; instead, a mosaic of patches of diverse terrain, associated with different vegetation “types,” collectively generates a diverse flora. Besides climate change, overgrazing and increasing human pressures due to conflict, local population growth and an influx of refugees place these (already stressed) plant resources at risk. Our survey provides a baseline to track changes and develop adaptive management strategies.

Title	Changes in the morphological traits and the essential oil content of sweet basil (Ocimum basilicum L.) as induced by cadmium and lead treatments
Authors	Youssef, N.A.
Journal	International Journal of Phytoremediation 23(3), pp. 291-299
Abstract	The purpose of this study was to inspect the suitability of sweet basil (Ocimum basilicum L.) for phytoremediation of heavy metal contaminated areas in urban areas of Egypt through study the impact of the most common pollutants in Egypt: cadmium (Cd) and lead (Pb) on morphological traits, and essential oil (EOs) content of sweet basil. The experiment was done under greenhouse conditions. The applied treatments tested in this experiment for Cd concentrations were 5, 10, 15, 20, 25 ppm and for Pb: 100, 350, 750, 1,000, 1,500 ppm. The composition and amount of EOs had been determined using gas chromatography-mass spectrometry (GC-MS). The results indicated that the contaminated soil had a negative impact on morphological traits development of basil (e.g., the decline in fresh and dry weight). The increase in Cd and Pb concentrations enhanced the EOs yield of sweet basil. In general, basil cultivation in the Cd and Pb contaminated soils could cause undesirable impacts on morphological traits; however, the presence of these metals has a major influence on the EOs yield, composition, and phytoremediation of the soil.

Title	Flood susceptibility prediction using four machine learning techniques and comparison of their performance at Wadi Qena Basin, Egypt
Authors	El-Haddad, B.A., Youssef, A.M., Pourghasemi, H.R., (...), El-Shater, A.-H., El-Khashab, M.H.
Journal	Natural Hazards 105(1), pp. 83-114
Abstract	Floods represent catastrophic environmental hazards that have a significant impact on the environment and human life and their activities. Environmental and water management in many countries require modeling of flood susceptibility to help in reducing the damages and impact of floods. The objective of the current work is to employ four data mining/machine learning models to generate flood susceptibility maps, namely boosted regression tree (BRT), functional data analysis (FDA), general linear model (GLM), and multivariate discriminant analysis (MDA). This study was done in Wadi Qena Basin in Egypt. Flood inundated locations were determined and extracted from the interpretation of different datasets, including high-resolution satellite images (sentinel-2 and Astro digital) (after flood events), historical records, and intensive field works. In total, 342 flood inundated locations were mapped using ArcGIS 10.5, which separated into two groups; training (has 239 flood locations represents 70%) and validating (has 103 flood locations represents 30%), respectively. Nine themes of flood-influencing factors were prepared, including slope-angle, slope length, altitude, distance from main wadis, landuse/landcover, lithological units, curvature, slope-aspect, and topographic wetness index. The relationships between the flood-influencing factors and the flood inventory map were evaluated using the mentioned models (BRT, FDA, GLM, and MDA). The results were compared with flood inundating locations (validating flood sites), which were not used in constructing the models. The accuracy of the models was calculated through the success (training data) and prediction (validation data) rate curves according to the receiver operating characteristics (ROC) and the area under the curve (AUC). The results showed that the AUC for success and prediction rates are 0.783, 0.958, 0.816, 0.821 and 0.812, 0.856, 0.862, 0.769 for BRT, FDA, GLM, and MDA models, respectively. Subsequently, flood susceptibility maps were divided into five classes, including very low, low, moderate, high, and very high susceptibility. The results revealed that the BRT, FDA, GLM, and MDA models provide reasonable accuracy in flood susceptibility mapping. The produced susceptibility maps might be vitally important for future development activities in the area, especially in choosing new urban areas, infrastructural activities, and flood mitigation areas.

Title	Effect of surfactant concentration on the morphology and thermoelectric power factor of PbTe nanostructures prepared by a hydrothermal route
Authors	Ibrahim, E.M.M., Ahmed, G.A., Khavrus, V., (...), Hampel, S., Adam, A.M.
Journal	Physica E: Low-Dimensional Systems and Nanostructures 125,114396
Abstract	Hydrothermal method as a facile bottom-up synthesis technique has many advantages for manufacturing various nanomaterials with controlled properties. In this work, lead telluride nanostructures were synthesized via a simple hydrothermal method at different surfactant concentrations. It was observed that the surfactant concentration has considerable effect on the morphology, and size of the synthesized nanostructures and thus the thermoelectric performance. In the present work, several techniques were used to characterize the structure, morphology, composition and optical properties of the synthesized PbTe nanostructures including XRD, TEM, EDS as well as PL and Raman spectroscopy. The electrical and thermoelectric properties were studied in the temperature range from 300 to 550 K. The results demonstrate that increasing the surfactant concentration improves the power factor due to a significant enhancement in the Seebeck coefficient.

Title	Time-of-flight secondary ion mass spectrometry and gas chromatography–mass spectrometry studies of alkanethiol self-assembled monolayers on nanoporous gold surfaces
Authors	Hafez, A.M., Hua, Q.T., Adam, M.S.S.
Journal	Surface and Interface Analysis 53(1), pp. 21-30
Abstract	The dimerization of alkanethiol mixtures (hexanethiol, octanethiol, and dodecanethiol) to form self-assembled monolayers (SAMs) from headspace on nanoporous gold surfaces was studied for the first time using gas chromatography (GC/MS) and time-of-flight secondary ion mass spectrometry (TOF-SIMS). The nanoporous gold surfaces were obtained by an acidic etching of a 585-gold alloy. Field emission scanning electron microscopy (FE-SEM) was utilized to study the change of the surface geometry and porosity of the gold surfaces before and after etching. Alkanethiols were deposited from the vapor phase above the thiol solutions (headspace) on nanoporous gold plates and nanoporous gold solid-phase vmicroextraction (SPME) fibers. The nanoporous gold substrates were analyzed by TOF-SIMS and GC/MS, respectively. The TOF-SIMS spectra exhibited various gold–sulfur ion clusters and specific peaks related to the adsorption of thiols such as deprotonated monomers, thiolate–Au, dimers (e.g., dialkyl sulfides–Au and dialkyl disulfides–Au). The GC/MS analysis of headspace extractions of alkanethiol mixtures by nanoporous gold SPME fibers showed a high extraction efficiency of alkanethiol, dialkyl sulfide, and dialkyl disulfide when compared with the commercial SPME fibers (DVB-CAR-PDMS and CAR-PDMS). Different GC/MS optimization factors were studied including the extraction time and desorption temperature.

Title	Facile synthesis and characterization of novel Gd_2O_3–CdO binary mixed oxide nanocomposites of highly photocatalytic activity for wastewater remediation under solar illumination
Authors	Abu-Dief, A.M., Essawy, A.A., Diab, A.K., Mohamed, W.S.
Journal	Journal of Physics and Chemistry of Solids 148,109666
Abstract	In this study, pure cadmium oxide (CdO) nanoparticles and mixed gadolinium oxide (Gd2O3)–CdO nanocomposites with different Gd2O3 contents (0–15%) were synthesized by a facile precipitation technique followed by calcined treatment. The X-ray diffraction analysis illustrated that all samples had high cubic-phase purity and a good crystallinity. Further support for the formation of highly pure CdO and Gd2O3 phases was obtained via infrared spectroscopy. The morphologies of pure CdO and mixed Gd2O3–CdO nanoparticles were probed by scanning electron and transmission electron microscopy, which demonstrated that the collected samples consisted of individual semi-spherical shaped entities of different particle sizes (23–31 nm). The optical band gap of the developed samples was computed based on the Tauc equation and showed a decrease from 3.41 to 2.75 eV upon increasing the Gd2O3 content. The 3D fluorescence analysis showed that the quenching in the emission peak intensity with increasing Gd2O3 content was due to the high separation efficiency of photogenerated electron–hole pairs. Moreover, the Gd2O3(15%)–CdO nanocomposite showed superior photodegradation efficiency (89.1%) of methylene blue compared to 44.4% for pure CdO. At pH 11.5, >3-fold enhancement in degradation rate (0.044 min −1) was obtained compared to natural pH 9.6. Reusability study showed stability of the Gd2O3–CdO photocatalyst in four cycles of methylene blue degradation. Trapping experiment of holes and electrons revealed extensive contribution of holes rather than electrons in producing active oxidizing species.

Title	Analytical solutions of fractional bioheat model in a spherical tissue
Authors	Hobiny, A., Abbas, I.
Journal	Mechanics Based Design of Structures and Machines 49(3), pp. 430-439
Abstract	In this paper, the bio-heat model with fractional derivative is established to study the variations of temperature and the thermal damage in spherical tissues during thermal therapy. Easily, the exact solution in the domain of Laplace are obtained. The effects of a fractional parameter, the blood perfusion and the laser exposure time on the temperature of living tissue and the resulting of thermal damages are studied. The results display that bio-heat model with the fractional derivative is reduced to parabolic and the hyperbolic bio-heat models when the thermal relaxation time is equal to zero and the fractional parameter is equivalent to one respectively. The numerical outcomes of thermal damage and temperatures are graphically introduced.

Title	Analytical solutions of thermal damage in living tissues due to laser irradiation
Authors	Alzahrani, F.S., Abbas, I.A.
Journal	Waves in Random and Complex Media 31(6), pp. 1443-1456
Abstract	In this article, the analytical solutions of dual-phase-lag (DPL) bioheat equation with various boundary conditions have been constructed for curative therapy of cancerous cells. The volumetric thermal source components in the model of DPL bioheat transfer, such as the metabolic heat generation and the rate of blood perfusion, are considered. The analytical solutions in the Laplace domain are obtained. The thermal injuries to the tissue are assessed by the denatured protein range, using the formulation of Arrhenius. Numerical outcomes for temperatures are graphically introduced. A parametric analysis is devoted to the identification of an appropriate procedure for selecting important design variables in order to predict more accurate to reach effective heating in hyperthermia treatment.

Title	New antimicrobial metabolites from the medicinal herb Artemisia herba-Alba
Authors	Mohamed, T.A., Abd El Aty, A.A., Shahat, A.A., (...), El-Toumy, S.A., Hegazy, M.-E.F.
Journal	Natural Product Research 35(12), pp. 1959-1967
Abstract	Artemisia herba-alba is widely used in traditional medicines for the treatment of several diseases. From the aerial parts organic extract of A. herba-alba, two new compounds, 1,3,8-trihydroxyeudesm-4-en-7α,11βH-12,6α-olide (1) and 5-β-D-glucopyranosyloxy-7-methoxy-6H-benzopyran-2-one (2), respectively, together with five known metabolites: 3α,8β-dihydroxygermacr-4(15),9(10)-dien-7β,11αH,12,6α-olide (3), 1β,8α-dihydroxy-11α,13-dihydrobalchanin (4), 11-epiartapshin (5), tomenin (6) and benzoic acid, p-(β-D-glucopyranosyloxy)-methyl ester (7), were isolated and identified. The chemical structures were proven depending upon spectroscopic analysis, including 1 D/2D NMR as and ESI-MS. Compound 1 inhibited Gram-positive bacteria Bacillus subtilis and Staphylococcus aureus. Compounds 2 and 3 exhibited antibacterial activity against both gram-positive and gram-negative bacteria.

Title	Effect of magnetic field and three-phase-lag in a rotating micropolar thermo-viscoelastic half-space homogeneous isotropic material
Authors	Abo-Dahab, S.M., Abd-Alla, A.M., Ahmed, S.M., Rashid, M.M.
Journal	Waves in Random and Complex Media 31(3), pp. 435-458
Abstract	This paper is devoted to three-phase-lag theory of thermo-elasticity to study the effects of rotation, ramp parameter and magnetic field in a micropolar generalized thermo-viscoelastic medium. By employing normal mode analysis and Lame's potential theory, the analytical expressions for the displacement components, stresses components, couple stress and temperature field are obtained in the physical domain. Numerical examples are displayed to illustrate the effects of magnetic field, rotation and ramp parameter on the results. When there is no phase-lag effects, the results of the current paper are reduced to exactly the same results available in the literature. However, the magnetic field and rotation have no effect on the non-dimensional temperature. The results indicate that the effect of magnetic field, rotation, ramp parameter, viscous and Phase-lag on the micropolar thermo-viscoelastic medium are very pronounced.

Title	Problem of p- and SV-waves reflection and transmission during two media under three thermoelastic theories and electromagnetic field with and without gravity
Authors	Abo-Dahab, S.M., Mahmoud, E.E.
Journal	Waves in Random and Complex Media 31(1), pp. 1-24
Abstract	In this paper, we investigated the primary wave (p-wave) and shear (SV-wave) reflection and refraction during solid–liquid media under three thermoelastic theories and electromagnetic field with and without initial stress and gravity. We will deal the problem of reflection and refraction of thermoelastic waves at interface between two different media in the presence of initial stress and magnetic field in the context of three thermoelastic theories: CT (Classical theory), GL (Green–Lindsay) and DPL (Dual-Phase-Lag). Boundary conditions at the interface between the two media concern: (i) continuity of the displacement, (ii) neglecting the tangential displacement, (iii) continuity of normal force per unit initial area, (iv) neglecting the tangential stress and continuity of the temperature have been considered. The reflection and refraction coefficients for the incident p- and SV-waves have been obtained as functions of angle of incidence, initial stress, electromagnetic field, and gravity. Special cases for presence or absence of gravity or initial stress are investigated. The magnitudes of reflection and refraction coefficients ratios for the incident waves have been computed numerically and displayed in graphs to show the physical meaning of the phenomenon.