



الخطة الوطنية للعلوم والتقنية والإبتكار

The National Plan for Science, Technology and Innovation

List of Accepted Proposals by NSTIP-KACST for September 2013 Submission

تقنية المواد المتقدمة
ADV Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|--|
| 1 | 12-ADV2688-02-R | Performance improvement of drill bits used to drill through medium-hard to hard formations for the production of natural gas. |
| 2 | 13-ADV1845-02 | An advanced polymeric system and a computational platform for the management of bone fractures |
| 3 | 13-ADV2022-02 | Development of ultra durable and ductile fiber reinforced cement based composite using ultrafines under local hot environmental conditions |
| 4 | 13-ADV2160-02 | Development of Ultra-high performance MgB ₂ superconducting wires through cost-effective, scalable, and high-pressure process". |
| 5 | 13-ADV2167-02 | Effect of Composite Aging on the Performance of Patch Repair of Cracked Aircraft structures |
| 6 | 13-ADV2179-02 | Corrosion and Wear Resistant Nickel–Phosphorus based Nanocoatings for Oil and Petrochemical Applications |
| 7 | 13-ADV2381-02 | Versatile high aspect ratio natural products based nano/micro composite scaffolds via electrospinning for diverse biomedical applications. |



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| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|---|
| 1 | 12-AGR2901-02-R | Applying some new integrated agronomic techniques for sustainable agriculture under water scarcity conditions |
| 2 | 13-AGR1819-02 | Biodiversity and Conservation of Desert Truffles in Saudi Arabia to reduce the desertification |
| 3 | 13-AGR1925-02 | Diversity of Spider Mites (Prostigmata: Tetranychidae) based on morphology and genetic variations in the Kingdom of Saudi Arabia |
| 4 | 13-AGR1926-02 | Simulation and Modeling of Engineering Properties of Dried Dates Pastes Using Solar Energy |
| 5 | 13-AGR1985-02 | Novel technologies for extending the shelf life of Barhi at the khalal stage of maturity |
| 6 | 13-AGR2016-02 | Dietary Sex preselection of Sheep Embryos |
| 7 | 13-AGR2072-02 | Biodiversity and Conservation of Desert Truffles in Saudi Arabia to reduce the desertification |
| 8 | 13-AGR2118-02 | Analysing factors contributing for natural bee forage resource base degradation and their restoration potentials in the valleys of southwest Saudi Arabia |
| 9 | 13-AGR2172-02 | Potential of high throughput precision phenotyping techniques for improving salt tolerance of spring wheat under field conditions |

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التقنيات الحيوية

BIO Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|---|
| 1 | 11-BIO2111-02-R | Malnutrition during pregnancy and the susceptibility to develop infertility and ovarian cancer in females of new generations: morphological, histological and molecular investigations. |
| 2 | 12-BIO2526-02-R | Functional analysis of salt responsive genes from saltbush |
| 3 | 12-BIO2570-02-R | Utilization of Organic Wastes in the Production of Microbial Enzymes for Industrial Applications |
| 4 | 12-BIO2839-02-R | Towards Domestication of Wild Olive (Oleasters) in south-western Saudi Arabia |
| 5 | 12-BIO2842-02-R | Investigations into Rift Valley fever virus NSs protein interactions with host cell signalling and transcription |
| 6 | 12-BIO2861-02-R | Comparative Transcriptome and Metabolome Analysis of Bitter Apple (Citrullus colocynthis) under Drought Stress |
| 7 | 13-BIO1912-02 | Development of an in vitro model of HIV and HBV co-infection of liver, and to study the mechanism(s) of hepatopathogenesis |
| 8 | 13-BIO1986-02 | Folate receptor targeted anticancer drug delivery potential of nanoparticles in cancer cells |
| 9 | 13-BIO2009-02 | Assessment of Advanced Tomato Breeding Lines under Drought Stress: Agronomic, Genetic and Epigenetic Changes |
| 10 | 13-BIO2050-02 | Shotgun De novo sequencing and draft genome assembly of the C4 halophyte grass Aeluropus litoralis : towards the cloning of the halophyte-specific genes and their promoters |
| 11 | 13-BIO2129-02 | Preventing the Toxicity Induced by Gold Nanoparticles and Optimizing a New Therapeutic Cancer Agent |
| 12 | 13-BIO2138-02 | Investigation of novel actinomycetes for antimicrobial activities and its active principles |
| 13 | 13-BIO2159-02 | Development and validation of surface-modified biogenic-silica based 3D tumor spheroid models for application in anticancer drug discovery |
| 14 | 13-BIO2178-02 | Application of Arbuscular Mycorrhizal Fungi (AMF) in phytoremediation and toxicity monitoring of heavy metals in wastewater contaminated soils in Saudi Arabia |
| 15 | 13-BIO2290-02 | Genetic characterization and antimicrobial profiling of marine fungi of Saudi Arabia |
| 16 | 13-BIO2392-02 | The impact of Vitamin D on disease activity in Crohn's disease |
| 17 | 13-BIO2462-02 | Improving of the reproductive efficiency of Najdi sheep using artificial insemination |

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| Serial Number | Proposal Code | Proposal Title |
|---------------|---------------|---|
| 1 | 13-BUI1866-02 | Development of a new class of corrosion inhibitor for steel reinforcement bars in concrete exposed to harsh environment of Saudi Arabia |
| 2 | 13-BUI1944-02 | Influence of longitudinal FRP strengthening on the shear behavior of reinforced concrete beams |

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تقنية الإلكترونيات

ELE Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|---------------|---|
| 1 | 13-ELE2040-02 | 23 GHz Antenna for Point-to-Point fixed Radio System for Next Generation High Speed Gbps Mobile Cellular Communications |
| 2 | 13-ELE2095-02 | Development and Characterization of Ultrafast Chirped Pulse Amplification (CPA) Laser System |
| 3 | 13-ELE2101-02 | Development of a Wideband System for Hyperthermia Treatment of Head and Neck Cancer |
| 4 | 13-ELE2417-02 | Smart Data Transmission and Resource Allocation Techniques for Cognitive Radio Networks |
| 5 | 13-ELE2429-02 | Efficient cooperative relaying scheme for Wireless Sensor Networks |

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تقنية الطاقة ENE Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|---|
| 1 | 11-ENE1934-02-R | Developing of Advanced Hybrid Renewable Energy Storage Techniques |
| 2 | 12-ENE2927-02-R | Fuel Cell Metal Foam Humidifier |
| 3 | 13-ENE1946-02 | A Hierarchical Multi-agent Architecture for Automatic Restoration of Smart Grids |
| 4 | 13-ENE2021-02 | Fabrication and Development of High-Efficiency TiO ₂ -Based Multilayer Thin-Film Solar Cells |
| 5 | 13-ENE2030-02 | Efficient Utilization of Kingdom's Industrial Waste (Sulfur) For the Design and Synthesis of Layered Metal Sulfides Nanostructures for Energy Storage Devices |
| 6 | 13-ENE2034-02 | Engineering of ZnO nanowire-based perovskite solar cells |
| 7 | 13-ENE2087-02 | Assessment of wind power and design of wind rotor for Riyadh conditions |
| 8 | 13-ENE2200-02 | Development of Solvothermal and Sonochemical Routes for Chalcogenide based Thin Film Solar Cells |
| 9 | 13-ENE2210-02 | Design and Implementation of Smart Grid for Hybrid Renewable Energy System in KSA |
| 10 | 13-ENE2219-02 | TOWARDS GREEN COST-EFFECTIVE DYE-SENITIZED SOLAR CELLS FOR COMMERCIALIZATION |
| 11 | 13-ENE2229-02 | Fabrication of ultra thin (~1 μm) CdTe solar cells with CdS:O wideband gap window layers on flexible substrates for versatile applications |
| 12 | 13-ENE2432-02 | Solid Dielectrics for Energy Storage Applications |

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| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|---|
| 1 | 12-ENV2824-02-R | Probable effects of persistent organic pollutants on fertility in Saudi population |
| 2 | 12-ENV3120-02-R | Synthesis of Carbon Microspheres and Hydrochar from Date Palm (Phoenix dactylifera) Biomass Wastes and Its Application for Wastewater Treatment |
| 3 | 13-ENV1859-02 | The Preparation of Activated Carbon from Local Agricultural Solid Waste and the Application of Activated Carbon for the Removal of Toxic Metals from Water and Liquid Waste Water |
| 4 | 13-ENV2085-02 | Development of pulsed fluidized bed technology for enhanced carbon dioxide capture efficiency efficiency |
| 5 | 13-ENV2116-02 | Toxicogenomic Investigation on Hazards of Organophosphorous Flame Retardants (OPFRs): Connections Among Genome Function, Cell Death and Carcinogenesis |
| 6 | 13-ENV2233-02 | Anthropogenic and natural organic matter in surface sediments from the Red Sea coast of Saudi Arabia: Multi-biomarker and geochemical applications. |
| 7 | 13-ENV2350-02 | Assessment of Heavy Metal (HM) Pollution in Aquatic Environment Using Fish Behavior |



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تقنية المعلومات

INF Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|---|
| 1 | 12-INF2884-02-R | Cloud Computing and Integration of National Electronic Health Record |
| 2 | 13-INF1907-02 | Design of Smart wireless Camera-sensor for Low-Power Application in Wireless Multimedia Sensor Network: Image – based Object Detection, Tracking and QoS-aware Image Transmission |
| 3 | 13-INF1962-02 | Developing Information Assurance Governance Model, Information Assurance Assessment Framework and Toolkit |
| 4 | 13-INF2010-02 | Automatic Image Visualization Methodologies Using Multimodal Magnetic Resonance Imaging (MRI) For Human Heart Failure Detection and Treatment |
| 5 | 13-INF2039-02 | The Development of a National Anthropometric Data Bank for Saudi Adults Using 3D Body Scan Technology |
| 6 | 13-INF2080-02 | Cryptographically Privacy Preserving Mechanism for Cloud-based Healthcare System in KSA |
| 7 | 13-INF2109-02 | Using GIS in Implementation Assessment of the Innovative Alternative Intersections Approach to Reduce Traffic Congestions in Roadway Network in Riyadh city, Saudi Arabia. |
| 8 | 13-INF2114-02 | Image watermarking using local texture descriptors in the spatial and transform domains. |
| 9 | 13-INF2136-02 | Crowd Managment based on Shortlink Message Passing |
| 10 | 13-INF2168-02 | Enhancing Security of Fingerprint Biometrics with Heartbeat Signal for Unattended Applications |
| 11 | 13-INF2203-02 | Computer Aided Bus Skeleton Design (BUS-CAD) |
| 12 | 13-INF2318-02 | A Smart Blood Donation Social Network in KSA |
| 13 | 13-INF2409-02 | Scalable Processing of Graph Data Using The Power of Distributed Systems |
| 14 | 13-INF2433-02 | Secure and Privacy Preserving Communications in Cooperative Wireless Networks |

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$$\left[\frac{-\hbar^2}{2m} \nabla^2 + V \right] \Psi = i\hbar \frac{\partial}{\partial t} \Psi$$

برنامج الرياضيات والفيزياء
MAT Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|---------------|---|
| 1 | 13-MAT1813-02 | Differential equations on a Riemannian manifold |
| 2 | 13-MAT2048-02 | STOCHASTIC AGEING, DISTRIBUTIONAL PROPERTIES AND THEIR APPLICATIONS |
| 3 | 13-MAT2111-02 | Deciphering the Global Economic Downturn: Controlling Chaos in Multi-team Economic Systems |
| 4 | 13-MAT2137-02 | Fractional Differential Equations and their Applications |
| 5 | 13-MAT2180-02 | Wavelet Analysis of Directional and Anisotropic Regularities and some Applications in Real World Life |

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التقنيات الطبية والصحية

MED Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|--|
| 1 | 12-MED2888-02-R | Phenotypic and functional characterization of Mucosal Associated Invariant T (MAIT) Cells in colorectal cancer patients |
| 2 | 12-MED2911-02-R | Exploring the Trajectory of Spirituality and Subjective Well-being in Human Brain using fMRI |
| 3 | 12-MED2934-02-R | A New Class of Metal-Based Sulfonamides as Novel Anticancer, antitumor and Carbonic Anhydrase Inhibitors, Design, Synthesis and Biological Evaluation |
| 4 | 13-MED1744-02 | The role of the right prefrontal cortex in binge eating disorder: a translational research study using transcranial direct current stimulation |
| 5 | 13-MED1854-02 | Synthesis of novel 2-oxo-N-(2-oxoindolin-3-ylidene)-2H-chromene-3-carbohydrazides as potent anticancer agents |
| 6 | 13-MED1883-02 | The pattern of gastroesophageal reflux and esophagitis in infants and children In Saudi Arabia |
| 7 | 13-MED1908-02 | Tumor suppressive role of novel siRNA nano-formulations in silencing of PI3K/HBx gene in murine carcinoma |
| 8 | 13-MED1915-02 | Circulating MicroRNA Expression Profiling: Potential Biomarkers in Saudi Patients with Different Types of Glaucoma |
| 9 | 13-MED1947-02 | Whole Genome Sequencing and Phylogenetic Analysis of Human Respiratory Syncytial Virus strains from Riyadh, Saudi Arabia |
| 10 | 13-MED1948-02 | Effect of Motor Vehicle Pollution on Lung Functions, Fractional Exhaled Nitric Oxide Levels and Cognitive Functions of Children and Adolescents Studying in Schools in Traffic-Congested Areas in Riyadh, Saudi Arabia |
| 11 | 13-MED2029-02 | Designing Tubulin Binding Drugs for Novel Chemotherapy Applications |
| 12 | 13-MED2042-02 | Thymoquinone activates the signaling cascade responsible |

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| | | for hypoxic vasoconstriction in obstructive sleep apnea |
| 13 | 13-MED2104-02 | Treating the Cancer Disease through the Application of Different Safe and Non-Invasive Techniques |
| 14 | 13-MED2113-02 | Development and validation of new nutritional assessment tools for renal patients in KSA |
| 15 | 13-MED2120-02 | Novel Semisynthetic Quinazoline and Sulfonamide Derivatives from the Natural Alkaloid L-Norephedrine as Anticancer Agents |
| 16 | 13-MED2307-02 | High-Throughput screen to identify chemosensitizing microRNAs for human solid tumors |
| 17 | 13-MED2341-02 | Identification, characterization and in vitro evaluation of food surfactant associated-ultrafine carbonaceous particulates on human colon-, immune- and adult mesenchymal stem- cells |
| 18 | 13-MED2353-02 | Identification and study of the natural plant products in photo chemoprevention of skin cancer |
| 19 | 13-MED2358-02 | Effect of Obesity on Lung Functions, Fractional Exhaled Nitric Oxide Levels and Cognitive Functions of school-aged Saudi children and adolescents |
| 20 | 13-MED2383-02 | Determination of Angiotensin (1-7) Pathway Role in Osteoporotic Diabetic Bone Following Experimental Induction of Diabetes |
| 21 | 13-MED2479-02 | Determination of toxic substance associated with Chronic Disease in various food products in Saudi Arabia |



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تقنية النانو

NAN Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|-----------------|--|
| 1 | 12-NAN2625-02-R | Nano structured Organic semiconductor sensors for the measurement of ionizing radiation |
| 2 | 12-NAN2871-02-R | Macro, micro and nano-durability of high performance concrete under mono and multiple aggressive environments: A key pathway towards sustainable concrete |
| 3 | 13-NAN1897-02 | Development and Characterization of a Novel Nano-sized Formulation for Oral Delivery of Paclitaxel |
| 4 | 13-NAN1964-02 | Design of novel antimicrobial herbal buccal muco-adhesive biofilms of pomegranate extract by a nanotechnological approach |
| 5 | 13-NAN1967-02 | Ultrafast active and nonlinear nanoplasmonics-hybrid quantum systems for nano-integrated light wave electronics |
| 6 | 13-NAN2038-02 | Development of advanced photoelectrodes for efficient solar H ₂ generation using tandem cell |
| 7 | 13-NAN2066-02 | Investigation of room temperature nanostructured ferromagnetic semiconductors for Spintronics applications |
| 8 | 13-NAN2103-02 | Development of Graphene Based Metal Oxide Hybrid Nanomaterials System for Energy Storage Applications |
| 9 | 13-NAN2121-02 | nano devices modeling Gold Nanoparticles as a Potential Vehicle for Antisense Oligonucleotides Delivery to Regulate Gene expression and Control Ichthyophthiriosis |
| 10 | 13-NAN2126-02 | Synthesizing and Characterizing New Thermoluminescent Nanomaterials for Radiation Dose Measurement and Other Semiconductor Applications |
| 11 | 13-NAN2367-02 | Steady state vibration analysis and mitigation of nanostructures based on nonlocal elasticity theory |

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|---------------|---------------|--|
| 1 | 13-PET1997-02 | Development of Adsorptive-Biodesulfurization Combined System for Desulfurization of Crude Petroleum Oil and Fuels |
| 2 | 13-PET2150-02 | Catalytic Studies of Catecholate-type Pt/Ru Mixed-Metal Complexes Derived From Tripodal Ligands: Synthesis and Structural Characterization |

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تقنية الفضاء والطيران
SPA Technology

| Serial Number | Proposal Code | Proposal Title |
|---------------|---------------|--|
| 1 | 13-SPA2075-02 | Application of Remote Sensing and GIS for Locating Suitable Mangrove Plantation Sites along Al-Khobar – Al Salwa strip, Arabian Gulf, Saudi Arabia |
| 2 | 13-SPA2079-02 | Experimental and analytical investigation of unsteady three dimensional flow interactions with high aspect ratio airfoils |
| 3 | 13-SPA2117-02 | Use of non-uniform plasma actuators for wing-tip vortex control with application to UAVs |
| 4 | 13-SPA2149-02 | Thermal and Hyperspectral Unmanned Aerial Vehicle Imaging for Precision Farming |

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|---------------|---------------|---|
| 1 | 13-WAT2084-02 | Nonconventional Desalination Using Freezing Technique |

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