Sciences

Research Title

Ionic Solar Cells from Non-Recyclable Polyethylene Plastic Dyed by Phycocyanobilin from Spirulina Algae

Main Presenter: Maryam Ahmed Alhefeiti

ABSTRACT: Despite the enormous environmental damage caused by plastic waste, there are no low cost and commercially viable alternatives to plastic materials. Here, we propose the construction of solar cells from plastic waste. Only over the past 3 years, ionic analog to the electronic pn-junction solar cell has been constructed for sunlight-to-ionic-electricity power conversion based on covalently linking photoacids to electrode membrane, the so called ionic solar cells. Photoacids are molecules which become more acidic in their excited state, leading to an increased acidity and dissociation of protons (ions). We propose a natural source from these photoacids (chromophore) from the pigment of Spirulina blue-green algae. Specifically, the construction a photoacid-dye-sensitized bipolar ion-exchange membranes and the final solar cell devices are relied on non-covalent interactions of the bioactive chromophore phycocyanobilin (PCB), which has been extracted from Spirulina, with low-density polyethylene (LDPE) plastic film. Novelty in our proposal is ensured because it focuses on the plastics that have low recycling rates but large production rates (e.g. LDPE), and on the construction of novel ionic solar cells from naturally available photoacids (e.g. PCB from Algae).

Meet the co-presenters

None

Meet the supervisor

Na'il Saleh

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 10:00 to 10:20

Sciences

Research Title

Analysis of microbeads in cosmetic products in the United Arab Emirates

Main Presenter: Furtuna Ghirmai Ghebremedhin

ABSTRACT: Rinse-off cosmetics are seen as a source of microplastic. The United Arab Emirates (UAE) is the world's seventh-largest per capita consumer of beauty products. The microparticle content of 89 common cosmetic products was analyzed by determining the chemical composition, ash content at 600°C, loading, particle size, shape, and thermal properties. Cosmetic products were dissolved in warm water to extract microbeads. Cotton cloth and Whatman filter paper were used to filter the solutions. The extracted beads were filtered with distilled water and dried followed by analyzing the beads using Fiji ImageJ software for size and shape after a micro-photo was taken using the stereoscope. Then analyzed for particle count, weight, size, and shape. FT-IR spectroscopy was used to determine the chemical composition. The spectra were matched with OMNIC 9 software. Differential Scanning Calorimetry was used to understand the fate of particles at elevated temperatures. Only 11 out of 37 products contained microplastic. Microparticles made of microcrystalline cellulose and crushed walnut shells were found on many of the remaining products. Microplastic products showed softening points as low as 84 °C except for two products that fused at 100°C. Flotation characteristics of beads were altered in one of them.

Meet the co-presenters

Marim Elkashlan

Meet the supervisor

Prof. Thies Thiemann / Dr. Ruwaya Rashed Hamad Sultan Al Kendi

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

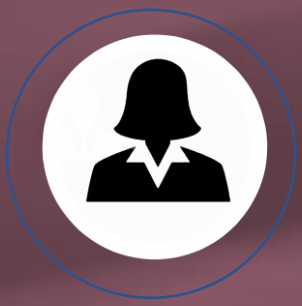
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 10:30 to 10:50

Sciences

Research Title

Piperine: Extraction and solvent effects



Main Presenter: Amina Abada

ABSTRACT: Black pepper, the spice from the fruit of the Piper nigrum species, is widely used in food preparations and as a folk medicine. Of the numerous constituents present in black pepper, the alkaloid piperine is the most important. In our research project, piperine was extracted from black pepper. Different extraction methods were used and compared. Piperine was purified and characterized NMR spectroscopy. The interaction of piperine with different solvents was investigated using UV-Vis and Fluorescence spectrophotometry.

Meet the co-presenters

Eman Mohamed Mustafa Ibrahim Abu Samra

Sara Salem Khalfan Alghaithi

Meet the supervisor

Soleiman Hisaindee

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

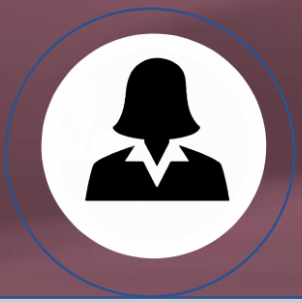
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 11:00 to 11:20

Engineering

Research Title

Surface Roughness Prediction



Main Presenter: Kanna AlShamsi

ABSTRACT: Surface Roughness (SR) is an essential factor of a workpiece during manufacturing as it can determine how it will interrelate with the environment and its mechanical performance. The enhancement of surface roughness is vital as it is one of the most specified customer requirements in metal cutting. Unfortunately, the conventional trial and error method is time-consuming and expensive. Our research project aims to develop a regression model for predicting the surface roughness in terms of these parameters. Since mild steel is a widely popular material in the manufacturing industry, we are going to focus on testing the surface roughness on a mild steel workpiece. The cutting tool's geometry or cutting process parameters such as the depth of cut, feed rate, and cutting speed play essential roles in the irregularities on the surface produced. The model can be done by determining the significant parameters and their optimum ranges in the CNC end milling process using design of experiment techniques which will be applied using Minitab Software. A full factorial 24 experiment is engaged in examining the cutting characteristics of mild steel and analyzing the effect of cutting speed, feed, and depth of cut on SR of mild steel.

Meet the co-presenters

Sheikha Albedwawi

Asraa AlAli

Mahra AlHassani

Hasna AlSubousi

Meet the supervisor

Dr. Tariq AlJuneidi

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

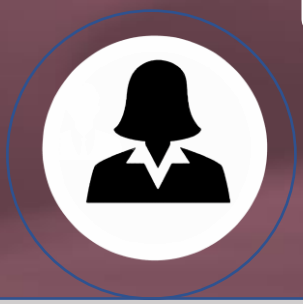
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 11:30 to 11:50

Engineering

Research Title

Automated High Precision Industrial Quality Control System Using Smart Jigs and Fixtures of Military



Main Presenter: Maitha Khalfan AlShamsi

ABSTRACT: Additive manufacturing has played an essential role in many industries over recent years (e.g., medical, education, industrial, military, and. Within these sectors, AM enables manufacturers to design tooling that could be manufactured quickly at a low cost and then used to produce small and medium components. AM allows the fabrication of high precision, sophisticated and lightweight components with high stability and quality. Repeatability, accuracy and time optimization are core targets for precision industries, where jigs and fixtures are essential components to achieve such crucial targets, by providing tools guiding, proper piece alignment, and preventing human errors that lead to cost-saving. The project focuses on the design and the manufacturing an automated and computerized quality control set up and system using smart innovative jigs and fixtures using additive manufacturing technology, that meets the compulsory and critical standards for military and aerospace industries, and to overcome the drawbacks of the hand-operated versions and satisfy the requirements for precision manufacturing and assuring the high quality and the precision of the produced components. Besides, the innovative system improves the accuracy of the measures data, enhances efficiency by reducing the test time significantly, and eliminates the requirement for highly skilled laborers to run the test.

Meet the co-presenters

Latifa Ali Suhail AlDhaheri

Mariam Sultan Khalfan AlNuaimi

Eng. Muthanna Aziz

Meet the supervisor

Waleed Ahmed

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

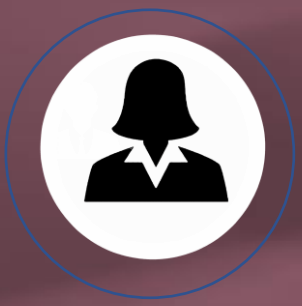
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 12:00 to 12:20

Engineering

Research Title

Production of Ammonium Sulfate



Main Presenter: Reem Musabbeh

ABSTRACT: The desulfurization of flue gas to marketable ammonium sulfate fertilizer" aims to design a plant to reduce the sulfur dioxide emitted when flue gas is flared and convert them into a marketable product. The major pollutants emitted during the combustion of fossil fuels and that could be found in the flue gas are sulfur dioxide, nitrogen oxides, and particulate matter. This can affect the planet and human health in several ways. The design comprises a heat recovery unit that produces 25 MW of electricity from the high-temperature flue gas, and a desulfurization unit that converts SO2 to ammonium sulfate. In this project, we show many alternatives for desulfurization and we list the pros and cons of each one that helps us in the decision-making.

The main goal of our graduation project is to apply what we learned during the study years and relate it to select the best technological alternative for producing ammonium sulfate from flue gas desulfurization and this process solves the issue of pollutants emitted into the atmosphere and generates power from high temperature in the flue gas emitted. The best process among alternatives is the ammonia scrubbing process

Meet the co-presenters

Halima

Sarah

Mahra

Meet the supervisor

Dr. Joy Tannouse

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

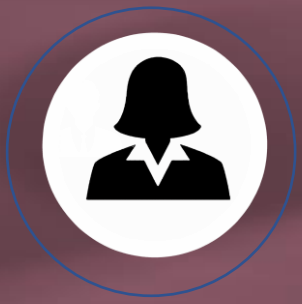
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 12:30 to 12:50

Engineering

Research Title

Sustainable Natural Defense for UAE: Coral Reef Effect on Marine Floods



Main Presenter: Mahra Hareb Alketbi

ABSTRACT: Marine floods such as high waves, big-storms, tsunamis are on the increasing trend over the world. They are typically potential enough to hit destructively the coast. Corals reefs are considered wave barriers however, their role in wave energy dissipation is least understood. The Arabian Gulf is ideal for reef-building corals and substantial reefs have been formed along the coasts of UAE. Although the biological focus on coral reefs has been extensively studied, the capability of coral reefs to mitigate marine floods is hardly tested. This research project aimed to investigate the potential of Acropora corals; one of the thriving coral types in the Arabian Gulf, to mitigate the marine floods in an experimental study. Acropora corals were modeled as vertical cylinders on rough base and marine floods were simulated by special crank system. Three cases tested: healthy coral reef, damaged coral reef, and no coral reef. The inundation length for each case was measured. Results confirmed that the healthy coral reef mitigated the highest amount of flow energy thus the least inundation length on the coast. Although the inundation length was greater for damaged coral reef compared to the healthy coral reef, it was smaller compared to no coral reef.

Meet the co-presenters

Meet the supervisor

Mariam Ahmed Aljunaibi

Kulaitham Saeed Al Nuaimi

Aruna Napayalage

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 1:00 to 1:20

Engineering

Research Title

Injury Biomechanics and its application in Motor Vehicle Safety for Child Restraint Systems (CRS)

Main Presenter: Shimwa Muhire Beni

ABSTRACT: Engineering systems are designed to be safe with a low risk of injury to their users and this is best achieved when we have a better understanding of the biomechanics of injury and disabilities.

Injury Biomechanics (IB) is a field of biomechanics that applies the principles of mechanics to study the physical and physiological effect of mechanical impact on the human body

This research is a brief introduction to Injury Biomechanics as field of research and a study of its applications in engineering systems with a focus on Motor Vehicle Safety particularly Child Restraint Systems (CRS).

Our research was done through a literature review on the field of Injury Biomechanics and an analysis of statistical data of injuries in motor vehicle accidents.

Results showed that the risk of serious injury and the risk of hospitalization was over 70% lower for children in CRS than in seat belts for children.

IB research is a broad and continuous research that still needs a lot of data to be effective. With the advancement of technology, especially in motor vehicles, greater effort should be put on studying and applying CRS in vehicles to build safe and reliable systems for children.

Meet the co-presenters

Joel Klint Kayihura

Meet the supervisor

Kassim Abdullah

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 1:30 to 1:50

Engineering

Research Title

Diesel Engine Cycle

Main Presenter:
Abdulrahman Mohammed Sulaiman

ABSTRACT: Diesel engines are economical in fuel consumption since they are thermally efficient compared with spark ignition engines. As a result, diesel engine is preferred in many different sectors. Thus, this study aims to understand the Diesel Engine Cycle and investigates possible improvements on it. A series of equations were used to evaluate the efficiency of diesel engines and some assumptions were taken into consideration while doing the analysis. Moreover, graphs were used to give a better understanding of the processes and illustrated some important parameters that affects the performance of the engine. The findings from the research have indicated three ways to improve the diesel engine cycle that helps to increase the efficiency, increase the work produced from the engine, or decrease the fuel consumed during the combustion process. Future research should further test whether some modifications can be implemented and improved in such a way that it provides sufficient results.

Meet the co-presenters

Ahmed Humaid Alhassani

Mohammed Mohammed Alneyadi

Meet the supervisor

Dr. Bobby Mathew

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

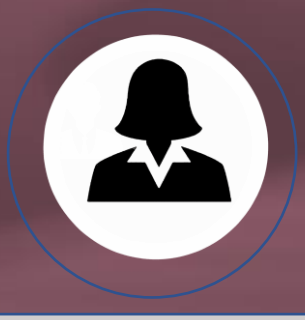
وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 2:00 to 2:20

Engineering

Research Title

EEG Based Drowsiness Detection System for Safe Driving



Main Presenter: Sara Mansour Ahmed Abboud

ABSTRACT: There is a large amount of traffic accidents are caused by driving fatigue. The electroencephalogram (EEG), a device whose application relies on adhering electrodes to the scalp, is the primary method used to monitor brain activity. EEG is considered as a promising method to detect driving fatigue. In this project, the students will build an EEG sensory system consisting of EEG electrodes and instrumentation amplifier, then the EEG signal is acquired by the computer. EEG signals will be recorded from several healthy volunteers in a simulated driving experiment. They were obliged to avoid sleeping for about 20 hours before the test. A feature extraction strategy-based will be built to achieve high accuracy to detect a biomarker for fatigue. When fatigue feature is detected the system will introduce an audible alarm to keep the driver aware and avoid the accident.

Meet the co-presenters

Meet the supervisor

Amna Al Baloushi

Meirah Alzeyoudi

Meera Al Shamsi

Abeer Al-Nawah

Mohamed Atef Elsayed Abdelaal

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 2:30 to 2:50

Engineering

Research Title

A survey on the willingness towards utilization of biodegradable plastic water bottles in the UAE

Main Presenter: Lina Awni

ABSTRACT: The present study has been conducted in the United Arab Emirates University, Al Ain. This research's main purpose is to study the willingness of people in the UAE to use biodegradable plastic bottles, instead of the conventional ones. For the data collection, a survey sheet was prepared consisting of various questions. The questionnaire was prepared in both Arabic and English language with a total of 10 questions. The data has been collected from 449 respondents out of which 374 were females and 74 were males. The survey was conducted on-line on social media platforms and the data was collected. This study was also done through offline means by distribution of survey questionnaire at UAE university campus, among family and friends, and at conferences venues. Most of the individuals participated in this survey activity were well educated and were university degree holders. Various questions were answered by these participants on the willingness of using biodegradable plastic bottles for packing of drinking water and on the basis on their response various aspects related to biodegradable bottles were predicted, and the results were displayed as pie charts and bar figures. If implemented, using biodegradable water bottles can make a huge positive effect on the environment.

Meet the co-presenters

Noor Ameen

Fatima Zraydi

Rime ElKaid

Meet the supervisor

Dr. Ashraf Aly Hassan

UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

وحدة نجاح الطلبة Student Success Unit (SSU)

Presentation Time: 3:00 to 3:20

END OF PROGRAM