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Agriculture Abstract Example

Physiological Responses to Prolonged Drought Differ Among Three Oak (*Quercus*) Species

Caitlyn Cooper, G.W. Moore, J.G. Vogel and J.P. Muir

Department of Agriculture, Texas A&M University

Plant physiological responses to water stress provide insights into which species may survive in exceptional drought conditions. This study on a remnant post oak savanna in College Station, Texas, examined drought effects on the physiology of 3-year-old *Quercus shumardii* (Shumard oak; SO), *Q. virginiana* (live oak; LO), and *Q. macrocarpa* (bur oak; BO) saplings. Species receive one of two treatments: 1) watered the equivalent of average precipitation or 2) droughted, receiving no water from June to October. Droughted saplings exhibited reduced ($P \leq 0.05$) photosynthesis, non-soluble sugar concentration, and ψ , but greater ($P \geq 0.05$) soluble sugar and condensed tannin (CT) concentrations than watered saplings. Droughted LO exhibited photosynthesis rates similar ($P > 0.05$) to those of watered BO and SO, and watered LO was best able to adjust its photosynthesis rates to changes in water availability during short-term drought. CT were greatest ($P \leq 0.05$) in BO, intermediate in LO, and lowest in SO. However, total sugar concentration was greatest ($P \leq 0.05$) in SO. Species differed in carbon allocation strategies and drought may increase these disparities.

Business & Computer Information Systems Abstract Example

Infrastructure of Connected Vehicles and Risks

Mohan Krishna Gangarapu, Shashank Kumar Silveri

Department of Information Systems, Texas A&M University International

Introduction:

Connected vehicles, to put it simple are vehicles which can talk to one another and also with the infrastructure. With an aim to change the transportation system by improving safety and mobility of vehicles on road, U.S. Department of Transportation along with other stakeholders is actively involved in development and deployment of connected vehicles technology. Through vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication standard systems, connected vehicles technology aims to decrease road crashes and increase awareness of on-road situations for drivers. Connected Vehicles would be able to communicate with each other through Dedicated Short Range Communications (DSRC), informing drivers with in-vehicles warnings for crash situations, about vehicles approaching from blind side and braking actions of vehicles moving ahead.

Risks:

As these vehicles use there on board Wi-Fi connections for communications and data transfers, security risks are bound to exist. With all the data being fed into the cloud, a more secure network system and car design is a necessity for these devices. The onboard systems have control over steering wheel, brakes, music system, indicator lights, transmission and every other system of the vehicle, the lack of data encryption, proper cloud security system could lead to serious risks.

The increase in the number of vehicles yearly, data generated by connected vehicles and the related infrastructure could be very large. The question of mobile networks ability to handle this data is also to be answered.

Computer Science Abstract Example

A Discrete Wavelet Transform for Enhanced Security in Steganography

Ashley Kelsey

Department of Computer Science, Prairie View A&M University

Technology is improving drastically every day and there is an increase in the amount of data being transmitted and as a result the security of data and information is decreasing. This poses serious threats to obtaining the secured data or information. Techniques for hiding information have emerged as a significant research field to help decrease or eliminate problems in network security and secure communications through public and private channels. Steganography is a process of hiding the existence of information or data in another medium and is a fusion and encryption in order to have multiple layers of security to create a highly secure steganographic method. The wavelet coefficients of the payload and cover image are fused into a single image using embedding strength factors alpha and beta. These factors are manipulated in order to increase the overall imperceptibility, hiding capacity, security, and robustness of the final steganographic image to create a more efficient and secure steganography process.

Education Abstract Example

Development and Validation of the Grit Trigger Scale

Mathias Vairez Jr., Jerrel Moore

Department of Curriculum & Instruction, Prairie View A&M University

Recent research has established a direct positive correlation between Grit and academic achievement (Duckworth et al., 2007). Research shows that Grit is a better predictor of academic achievement than cognitive factors (Duckworth et al., 2007). If Grit 'triggers' can be determined, interventions may be designed to help students develop Grit, which will help them succeed academically and in life. The purpose of this study was to develop and validate an instrument to identify the catalysts for the development of Grit. To ascertain the content validity, the items were developed based on two hypothesized models of resilience—grit, tenacity, and perseverance and the contextual factors and psychological resources that promote them (U.S. Department of Education Office of Educational Technology, 2013) and triggers of Grit developed by Yates, et al. 2014). The result of this process was a 40 item instrument grounded in the psychological resources and factors that promote resilience. The items were developed to reflect the following domains: Roles of Spirituality, Family, Life Circumstances, Teacher, Model, Peer, and School Climate.

Data were collected from 32 students enrolled at a HBCU in the mid-south. Based on the initial Exploratory determine the reliability of the instrument. The reliability of the 3-item is 0.972 Cronbach's Alpha). A subsequent factor analysis confirmed the seven domains of the instrument.

Environmental Science Abstract Example

Developing Ambient Ozone Air Quality Mitigation Strategies for Neighboring Cities of the Marcellus Shale Plays in the Northeast United States

Chihyuan Chang

Department of Environmental Science, Texas A&M University-Kingsville

Significant increases in oil and gas production from the Marcellus Shale plays in the Northeast United States (U.S.) began in 2010. With projected increases in oil and gas production from the Marcellus Shale, emissions of air pollutant precursors (e.g., nitrogen oxides (NO_x) and volatile organic compounds (VOC)) from shale oil and gas-related activities would have the potential to affect ambient ozone air quality in adjacent cities of shale plays. Understanding ambient ozone formation regimes is essential to develop air pollution mitigation strategies for cities violating the air quality standards. This work leverages: (1) satellite-retrieved column densities of ozone precursors; (2) photochemical air quality modeling and sensitivity analysis; and (3) ratios of satellite-retrieved air pollutant column ratios to investigate ambient ozone formation regimes in neighboring cities of shale plays in the Northeast U.S from 2007 to 2014. Our results show that controls of NO_x emissions, including those from local sources and upwind areas, would mitigate ozone air pollution from 2007 to 2014 in Boston, Philadelphia, Pittsburgh and Washington, D.C. In New York City, controls of VOC emissions from local sources upwind areas would reduce ambient ozone formation in 2007-2009 and 2014.

Life Science Abstract Example

Novel Bioreactor to Study Mechanical Forces Effect on Atherosclerosis

Caleb Davis, Steve Zambrano, Michael R. Moreno

Department of Biomedical Engineering, Texas A&M University

Atherosclerosis is the leading cause of death in the developed world. Development of atherosclerosis depends on responses of endothelial cells (which line the arteries) to the mechanical environment. Changes in fluid shear stress (FSS) or cyclic stretching (CS) have been shown to evoke cell changes associated with atherosclerosis. Fewer investigators consider interactions with both forces applied to cells simultaneously. For example, no group has studied changing the spatial angle between FSS and CS ("stress angle"), even though that angle often varies widely between healthy and disease-prone areas.

We developed a benchtop bioreactor allowing endothelial cell culture which simultaneously applies FSS and CS. Spatial angle between the two forces can be changed to any arbitrary angle. Porcine endothelial cells cultured in the bioreactor were subjected to physiological flow and stretch for 24 hours, with stress angle at 0 or 90 degrees. Brightfield imaging demonstrated qualitative differences in cell shape and alignment depending on stress angle.

These results suggest that spatial angle between FSS and CS affects endothelial cell morphology, meriting further study using quantitative methods. Thus, the bioreactor we developed represents an effective tool to study an aspect of mechanical forces effect on atherosclerosis which has never before been researched.

Mathematics Abstract Example

Flavours of Physics

Nina Culver, Charles Tintera, Cheyenne McCoy

Department of Mathematics, Tarleton State University

Using data from CERN—the European Organization for Nuclear Research—obtained through the Kaggle Competition “Flavours of Physics,” a statistical model was built in order to identify the possibility of a hypothetical situation where a certain particle decays into another particle. Using techniques in Python and RStudio, along with extensive research into this field of physics, the model was built with small chance of over fitting by including conceptual and physical factors. The current result of using this model has a 0.826793 accuracy, according to the leader board on Kaggle, but further optimization and research should yield a better result.

Physical Science Abstract Example

Investigation of Wave Energy on the Texas Coast

Francisco Haces-Fernandez

Department of Mechanical Engineering, Texas A&M University - Kingsville

Due to the great and growing demand of energy in the Texas Coast area the generation of electricity from the ocean waves is considered very important. The combination of the wave energy with offshore wind power is explored as a way to increase power output, obtain synergies, maximize the utilization of assigned marine zones and reduce variability. In this research the electric power generation from the ocean waves and wind along the Texas Coast is investigated, assessing its potential from the meteorological data provided by five buoys from National Data Buoy Center of the National Oceanic and Atmospheric Administration, considering the Pelamis 750 Kw Wave Energy Converter (WEC) and the Vesta V90 3 MW Wind Turbine. The power output for wave energy was calculated using Matlab script and the results in several locations were considered acceptable in terms of total power output, but with a high temporal variability. To reduce variability this resource was combined with wind energy, obtaining a significant reduction on the Coefficient of Variation on wave.

Social Sciences (Humanities) Abstract Example

Parental Divorce and Adjustment in College Students

Breanna Connel, Dr. DeMarquis Hayes, Dr. Maria Carlson

Department of Counseling & Special Education, Texas A&M University - Commerce

Parental Divorce can often have a negative impact on the children, adolescents, and emerging adults in the family unit. With the addition of changing transitions, such as college, parental divorce begins to create difficulties for those who do not have the social support they need to adapt. The purpose of this study was to examine the relation between parental divorce and adjustment in college students with the goal of identifying differences in students who come from intact and divorced families, differences in gender and differences based on the age the emerging adult was when their parents divorced. Overall, results indicated no significant differences as a whole and specifically for gender on college adjustment for divorced or intact families. However, correlation analysis did indicate self-esteem was related to many of the variables of interest, including age of divorce. Specifically, students whose parents divorced later in life had higher levels of self-esteem compared to those who divorced when they were younger. Implications of the study will be discussed.