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Abstract Booklet

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Becktemba, Nyasha, Prairie View A&M University

Space Radiation Environment and Space Travel: First 500 Explorers

There are many different kinds of risks for any human space exploration endeavor. One such inevitable risk is the exposure to space radiation environment. We currently have wealth of data with several short duration Space Shuttle (STS) flights to the low earth orbit (LEO) and long duration International Space Station (ISS) expeditions as well as Shuttle-Mir missions. Assessment of such radiation risk is very important particularly for the anticipated long term and deep-space human explorations such as travel to moon and Mars in near future.

We have developed a database of first 500 + human explorers and their space travel logs from the Space Shuttle missions during the past three decades. Many have traveled for only few days while others have been in space for several months. We present the time-line distribution of the space travelers log along with the time correlated radiation environment changes in the outer space to assess radiation risk for human exploration. These results and assessment of radiation exposure helps in our understanding of space travel associated risk of cancer and cataracts as well as other biological consequences.

Booker, Jarred, Prairie View A&M University

Environmental Affects on Construction Materials Chosen for Freeway Pavement

When being educated on the subject of transportation you are taught how to design a freeway, but you are not taught if the freeway's environment will decide if one material is chosen over another material. The research investigates the environmental effects on the construction materials chosen for freeway pavement. The factors of an environment that are investigated are climate, population, funding allocation for freeways, and natural plant and wildlife. Construction materials chosen from freeway pavement are affected by all factors except natural plant and wildlife. The results of this research provided a better understanding of how these factors influence pavement construction.

Brailsford, Brittany, Prairie View A&M University
Burnett, Tyrone, Prairie View A&M University
Rawls, Stephanie, Prairie View A&M University

Characterization of *Streptococcus pneumoniae* role in Bacterial Keratitis

Streptococcus pneumoniae (pneumococcus), a gram positive coccus, is a common cause of ocular infections such as keratitis, endophthalmitis, and conjunctivitis. *Streptococcus pneumoniae* also causes many types of pneumococcal infection including pneumonia, acute sinusitis, otitis media, meningitis, and bacteremia. The use of *Streptococcus pneumoniae* as a model organism allows the examination of the mechanisms of pathogenesis during ocular and systemic pneumococcal disease. The study will involve the analysis of bacterial virulence in the eye by infection of mouse eyes and will further elucidate the immune response in the pneumococcal keratitis model in mice (Moore et. al, 2009). The use of this animal model will also help identify the specific genes that are activated by the infection and the mechanism behind the immune response to the eye infection. The study will examine host immune factors involved in bacterial ocular virulence through the use of pneumococcal strains that are deleted in specific pneumococcal virulence proteins. Utilizing human corneal epithelial cells (HCE), we will examine the role of various pneumococcal proteins in pneumococcal keratitis and the differences in pathogenesis. The objective of the study is to identify mechanisms involved in bacterial and host factors that are elicited in response to pneumococcal ocular infections.

Brown, Eric, Prairie View A&M University

Laser Surrogate Models

Motivation-The topic chosen is about neural networks. Neural Networks are fascinating because they represent artificial networks or circuits or artificial neurons or nodes. Problem Statement-What are other functions of neural networks? A neural network is composed of a group or groups of chemically connected or functionally associated neurons. A single neuron may be connected to many other neurons and the total number of neurons and connections in a network may be extensive. My research is to show how the neurons in a neural network interact with each other for a common purpose. Approach- A neural network is composed of a group or groups of chemically connected or functionally associated neurons. A single neuron may be connected to many other neurons and the total number of neurons and connections in a network may be extensive. My research is to show how the neurons in a neural network interact with each other for a common purpose. Conclusions-The applications of neural networks are immense. There will be many strives in the field of the technological frontier due to neural networks.

Cardenas, Mercedes, Texas A&M University

Investigation into the mechanism by which shrinkage reducing admixtures reduce concrete shrinkage

Shrinking Reducing Admixture (SRA) is an additive used in fresh concrete. When mixed with SRA, concrete shrinks less during drying when compared to concrete without SRA. Our objective is to provide insights into concrete drying shrinkage mechanisms by testing cement pastes and Vycor glass with different dosages of SRA. This was accomplished by measuring mass loss rates at prescribed relative humidity (RH) conditions. Different dosages of the additive were added to solutions used to soak Vycor glass rods and to the mix water for cement paste strips. The rods and paste strips were placed in a controlled environment at different RH conditions to test for mass loss and shrinkage. The data gathered allowed measurement of the mass loss rate change between specimens with and without SRA. Vycor rods with SRA showed similar shrinkage at the same RH levels, but with a slower mass loss rate, indicating the SRA slows shrinkage by reducing the drying rate. Insight into the mechanisms by which SRA reduces concrete shrinkage may lead to development of improved admixtures in the future.

Chapman, Oneisha, Prairie View A&M University

The Impact of Initial Decisions – Mentoring

It is widely accepted that one of the most critical times determining success in a continued education is the first year an individual is enrolled in college courses. The purpose of our "Impact of Initial Decisions" research is to explore critical points that affect many freshmen and sophomore STEM majors in college. Our study examines three main areas: Mentoring, Networking and Study Habits. My focus is on the availability of professors to students for help. In our research we have designed a questionnaire that targets these three areas to get insight into the outcomes of decisions students made throughout their first two years of college. I will also be surveying professors and getting their opinion on this issue. A common issue that individuals face is making the personal connection with a professor, especially if they are known on campus to be intimidating, and asking for help. I hope to help find a solution to this problem that will lead to students being more comfortable with talking to professors and asking for help. This will hopefully lead to better grades and building better study habits.

Cooper, Cullen, Prairie View A&M University

Integration of Carbon Nanotubes into Material Science

Motivation: The motivation behind this project is personal. A close family member of mine has cancer, and I am interested in looking at alternative and less evasive methods of treatment.

Problem statement: Are carbon nanotubes effective in medicinal delivery to cancer cells? Current, the chemotherapy method is effective in killing cancer cells, but often destroys healthy body tissue and lower immune system capabilities. Carbon nanotubes (CNTs) are prevalent in today's world of medical research.

Approach: My approach is to research clinical trials of carbon nanotube based medicines and compare their treatment results to those on placebo, and various chemotherapies. I also am comparing the types of carbon used in medicinal delivery. This will be done through analytical modeling.

Results: With the research done thus far, carbon nanotubes are more effective in proper drug delivery, but the research is still on-going.

Daniels, Jonathan, Prairie View A&M University

The Impact of Initial Decisions (Mentoring – Summer Programs)

The purpose of "The Impact of Initial Decisions" is to investigate what decisions an underclassman (freshman or sophomore) makes that help ensure their success. We anticipate there is a combination of three factors in which mentoring is my focus. Mentoring has become a major concern in the engineering world. With the government funding many different engineering projects, engineering is becoming a very demanding major where many will be needed. This dire need for engineers in the coming future calls for mentors to push their constituents into these STEM majors. With a greater influence and a more efficient way of implementing mentors, the program will become more effective. Summer programs are a major venue to give students their respective mentors to lead them for the rest of their lives. We anticipate that students who complete summer programs have a greater retention rate, higher overall GPAs, as well as more leadership positions during their college careers. We intend to gather data from Prairie View A&M University, to analyze such data and compare this data to students who do not complete incoming summer program. By analyzing the data, universities will understand the need to look at the importance of summer programs and seek ways to allow universities to expand on their STEM summer programs for the betterment of their STEM departments.

De Santos, Janie, Texas A&M University Corpus Christi

Synthesis of Bismuth Selenium Nanowires

Bi_2Se_3 is one of the binary end members of the $(Bi, Sb)_2(Te,Se)_3$ family of thermoelectric materials. Decades of work in the chemistry, physics, and processing of these materials have led to complex formulations of compounds and microstructures optimized for use as thermoelectrics (such as cooling and power generation) under various conditions. Recent study is motivated by the theoretical prediction that *p*-type Bi_2Se_3-based material is one of the prime candidates for the study of topological surface states. The character and stability of the surface states in Bi_2Se_3 at room temperature has motivated the suggestion that they may be useful for not only thermo electronics but quantum-computing applications. The purpose of this project is to produce high quality single-crystal Bi_2Se_3 nanowires and study their electrical transport properties in low temperatures. The synthesis of single-crystal Bi_2Se_3 nanowires has not yet been reported. The current method is template-directed electrodeposition which is known for depositing metals and alloys. For the growth of semiconducting materials a number of aqueous solutions were reported. In this research we use DMSO organic solvents with various Bi/Se ratios and grew the nanowires under different deposition potential. XRD was used to characterize the wire structure and SEM/TEM was used to image the wire morphology. This work is underway. Further contributions to synthesize Bi_2Se_3 nanowires will include learning the techniques and physics as well as the related theory of semiconductors. Overall, this summer project belongs to a disciplinary subject combining chemistry, physics, mathematics and engineering. As a previous chemical researcher this combination of sciences will be able to understand the physical aspects of nanotechnology. This is the new technology which is going and will have great impact on our future life.

Dolan, Rebekah, Texas A&M University

Application of Mathematics

Many college students pick a major based on what careers they can choose from upon graduation, regardless of whether it is something in which they truly have interest. If students are given more information about the available careers in the field of mathematics, those who have an interest in math will be more likely to pursue a math career. This project puts together important characteristics of some well-known math careers, as well as some that are not nearly so popular. Through internet research and interviews from those in the workforce, information has been gathered about math careers across the spectrum. Of students interested in mathematics, there are many different personality types and math specializations. If each person who likes math was provided with the summarized information in this study, they would find the perfect job for him or her. No one has time to research every math profession, the personality type best suited for it, the drawbacks, and the average salary for each job. Even if he/she is able to do that, it is another issue to find a company which will hire them for the job they want. Summarizing the characteristics of many different jobs in the math field and providing a list of the types of companies who hire will allow students to enter mathematics with less worry about what they will do with their life and for whom. Hopefully, more students will choose to major in math in light of this information, because it is where their interest lies.

Enih, Chijoke, Texas A&M University

Determining Required Aquifer Area and Well Count to Sequester CO2

The capture and subsequent geologic sequestration of CO_2 has been central to plans for managing CO_2 produced by the combustion of fossil fuels. Published reports on the potential for sequestration fail to address the necessity of storing CO_2 in a closed system. Our calculations suggest that the volume of liquid or supercritical CO_2 to be disposed cannot exceed more than about 1% of pore space. This will require from 5 to 20 times more underground reservoir volume than has been envisioned by many, and it renders geologic sequestration of CO_2 a profoundly non-feasible option for the management of CO_2 emissions.

Material balance modeling shows that CO_2 injection in the liquid stage (larger mass) obeys an analog of the single-phase, liquid material balance, long-established in the petroleum industry for forecasting under saturated oil recovery. The total volume that can be stored is a function of the initial reservoir pressure, the fracturing pressure of the formation or an adjoining layer, and CO_2 and water compressibility and mobility values.

Further, published injection rates, based on displacement mechanisms assuming open aquifer conditions are totally erroneous because they fail to reconcile the fundamental difference between steady state, where the injection rate is constant, and pseudo-steady state where the injection rate will undergo exponential decline if the injection pressure exceeds an allowable value. A limited aquifer indicates a far larger number of required injection wells for a given mass of CO_2 to be sequestered and/or a far larger reservoir volume than the former.

Figgs, Rachel, Texas A&M University Corpus Christi

Correlations of Measured Water Depths with TCOON Water Levels at Seagrass Study Sites in the Laguna Madre and East Flats of Corpus Christi Bay

Seagrasses are flowering plants that live anchored in marine environments. These plants must photosynthesize in order to survive and must therefore live in shallow sheltered waters with sufficient light. Seagrasses are a vital part of the ecosystem due the ability of their roots and rhizomes to trap sediments and prevent erosion, they also provide habitat for an array of marine inhabitants and are essentially the base of the food web. Because of their requirements for light, shading by phytoplankton blooms and epiphyte algae reduces seagrass productivity with nutrient loadings stimulating phytoplankton and epiphytes. In the natural setting, when epiphyte load has overpowered the leaf, the seagrass would grow another shoot and shed the old dead one; this requires more energy when less light is available so it is difficult for the seagrass to keep up their regenerative properties. The goal of these studies is to understand the relationship between growth and shading by epiphytes relative to growth of shoots. This will be achieved by measurements taken at different depths corresponding to different light availabilities. Due to tidal and wind driven fluctuations, it is necessary to compare the average depths at different sites at varying times. For this portion of the study we attempt to correlate depth measurements at study sites and the Texas Coastal Ocean Observation Network (TCOON) water level gauges in the area. Depth measurements were taken at various study sites in Nighthawk Bay of the Laguna Madre and East Flats of Corpus Christi Bay. Corresponding TCOON water levels were retrieved (http://lighthouse.tamucc.edu/TCOON/HomePage) for stations at Bird Island (013), Port Aransas (009), Packery Channel (005), and Ingleside (006). Comparisons were made as to the difference in water level fluctuations between the sites and the gauges. Depth readings at East Flats correlated with water levels at the Ingleside station, but surprisingly not with the Port Aransas station. Similarly, Laguna Madre sites correlated with only the Bird Island station. In the future more depth data will be collected to improve the robustness of the correlations, and will then be used quantify seagrass and epiphyte growth at various depths.

Fuentes, Natividad, Texas A&M University Corpus Christi

Cloning the Putative Actin Gene of the Seagrass *Syringodium filiforme*

Seagrass meadows are highly diverse and productive ecosystems that contribute to a variety of different species, however they are rapidly declining worldwide. Despite our modern era of technological advances our knowledge of sea grasses such as *Syringodium filiforme* is extremely limited. One persisting problem is that common seagrass monitoring techniques such as biomass measurement are only "lagging indicators" of seagrass health and do not answer the question of why they are in decline. Genomic indicators offer an alternative perspective on the assessment of seagrass health. Actin 1 (ACT1) is a highly conserved protein vital in cellular processes and is considered a "house-keeping" gene. The genetic sequence for actin in *Syringodium filiforme* can be used as a control to determine the basal level of gene expression in stress related genes. Genomic DNA was isolated from *Syringodium* rhizoid tissue and used to run Polymerase Chain Reaction (PCR) with primers designed previously for a similar seagrass-*Halodule wrightii*. A 2 Kb product was amplified from genomic DNA, ligated into a vector and transformed into *E. coli* for cloning. M13 primers were then used to screen clones for the expected insert size. Five clones were partially sequenced and BLASTN was used to identify sequence homology in other plants with *Helianthus annuus* having the most sequence similarities of 70-86 %. Future direction includes cloning and sequencing stress related genes and phylogenetic analysis on *Syringodium* to understand ancestral plant migration from land to sea.

Garza, Manuel, Texas A&M University Corpus Christi

Examination of single bond and double bond terminated amino acid based surfactants

The purpose of this research is to synthesize and compare valine, leucine, alanine and glycine based undecylenic and undecanoic amino acid surfactants. The difference between these two groups of surfactants is that the undecylenic surfactants have an alkene group at the end of the hydrophobic tail while undecanoic surfactants have a saturated hydrophobic tail. Aggregation number and critical micelle concentrations (CMC) of these surfactants were measured using fluorescence spectroscopy. In addition, 2DNMR techniques were utilized to study the structure and identify the regions of hydrogen bonding among the polar head functional groups. The results indicated several differences between these two classes of surfactants. These surfactants will be utilized as pseudostationary phases in capillary electrophoresis to study and compare the chiral recognition ability of these two groups of surfactants.

Giese, Melissa, Texas A&M University

Peo-modified silicones with enhanced blood protein resistance

Adsorption of blood proteins by blood-contacting materials induces thrombosis which compromises device success and safety. Silicones have been utilized in many biomedical applications because of their excellent bulk properties including thermal and oxidative stability, gas permeability, low modulus, flexibility, and good biocompatibility. However, silicones generally exhibit poor resistance to plasma proteins because of its extreme hydrophobicity. To reduce protein adsorption, silicone surfaces have been hydrophilized by various approaches involving physical or chemical treatments or a combination of both. In contrast, poly (ethylene oxide) (PEO; or poly (ethylene glycol) PEG) is a neutral, hydrophilic polymer which exhibits unusually high protein resistance because of its hydrophilicity and configurational mobility. Thus, incorporation of PEO into silicones may improve the latter's protein resistance. In this study, we have prepared PEO-modified silicones using novel linear and branched PEO-silanes with flexible siloxane tethers to enhance protein resistance. PEO-silanes with the basic formulas were prepared: α-$(EtO)_3Si(CH_2)_2$-oligo-dimethyl-siloxane$_n$-block-[PEO_m-OCH_3] (*linear architecture*) and α-$(EtO)_3Si(CH_2)_2$-oligo-dimethyl-siloxane$_n$-block-[PEO_m-OCH_3]$_2$ (*branched architecture*). Finally, each were crosslinked via phosphoric acid (H_3PO_4)-catalyzed sol-gel condensation withα,ω-bis(Si-OH)--PDMS (P, M_n = 3000 g/mol) and their resistance to blood protein adsorption was related to PEO-silane structure. For crosslinked PEO-modified silicone coatings, resistance to protein adsorption was enhanced with increased siloxane tether length of the PEO-silane. Enhancement in molecular mobility and amphiphilicity of the surfaces may contribute to this behavior.

Gillie, David Jr., Prairie View A&M University

Parameters for Wind Turbine and Wind Turbine Blade Design

Wind turbines have been widely used as a source for energy in the engineering field. The design, material, and placement of the blades play a vital role in the success of the wind turbine. These key features also ultimately decide the productivity of the wind turbine and can save funds if constructed correctly. My research is over the most productive combinations of materials used and the blade design. Some factors that play into this productivity is the parameters of the blade's CFD, lift, drag, and bending force moments of the blades material. With the entire world making efforts to "Go Green", I hope that this research will play a part in helping convert wasteful wind turbines into more efficient ones, saving a great deal of money for companies.

Gomez, Juana, Texas A&M University

Integrating cavity for weak molecular absorption lines

When studying the expansion of the universe, a significant problem is measuring the red shifts of stellar absorption lines with sufficiently accuracy; this requires extremely accurate reference frequencies for calibration. An important recent development is the use of laser frequency combs to provide the calibration frequencies. This approach is very time consuming and expensive. This proposal introduces a calibration approach that is not only simpler, but for long term observations will be more accurate; it makes use of weak molecular absorption lines. This new approach is based on the recent development of a new diffuse reflecting surface whose reflectivity far exceeds anything previously available. Consider a basketball size cavity whose wall is made from this new diffuse reflector. Due to the high wall reflectivity, the effective absorption path length for light bouncing around inside this cavity is of the order of a kilometer. Consequently, even molecules with very weak absorption will show very strong distinct absorption lines that can be used to accurately calibrate the redshifts of stellar absorption lines.

Heard, Jacqueline, Prairie View A&M University

The Impact of Initial Decisions - Study Habits

It is widely accepted that one of the most critical components determining success in higher education is the first year an individual enrolls in college courses. The purpose of our "Impact of Initial Decisions" research is to explore critical points that affect many freshmen and sophomore STEM majors in college. Our study examines three main areas: Mentoring, Networking and my focus is on Study Habits. In our research we designed a questionnaire that targets these three areas to gain insight concerning the outcomes of decisions students made throughout the first two years of college. A common issue that individuals face is finding a set of study habits that best suits them. My quest is to find the correlation between study habits, effective study groups, reading prior to class and the grades students attained in their courses.

Hollins, Souivon, Prairie View A&M University

Development of a Universal Joint Simulator

Currently, available joint simulators and testing machines are normally limited in the degrees of freedom of movement, the type of control mode, and designed for a specific joint. This universal joint simulator will be designed so it that it can quickly reconfigure into many different biological joints such as a knee, hip, or ankle. It will have 6 servo-hydraulic actuators that can be controlled independently in displacement, velocity, acceleration, or force control mode. The system will also include a computer vision system along with displacement, force, and pressure sensors so the kinematics of the entire joint can be determined in 3D space. This simulator will enable research and teaching in many areas of biomechanics including: replacement joint tribology, kinematics of different joints in 3D space, prosthetic and orthotic testing, kinematics and dynamics of real biological joints and soft tissue, and general mechanism design and testing.

Hysmith, Erica, Prairie View A&M University

The Impact of Initial Decisions - Networking

The goal of "The Impact of Initial Decisions" is to investigate the manner in which freshman and sophomore engineering students study, interact amongst their peers and professors academically, as well as their relations in organizations and with professionals. The skills mentioned are three critical areas in which students can continuously improve upon. The portion of the research project devoted to the importance of networking skills and their potential to advance an individual's career. There have been many discussions concerning the lack of interpersonal skills possessed by engineering graduates and how this can negatively affect their career. This deficiency plagued the industry, and we intend to find a relationship between students' social abilities and their level of networking activity. Activities will include becoming active in organizations, undertaking leadership positions, attending professional seminars, career fair and the like.

Johnson, Trenton, Prairie View A&M University

The Lockheed Martin Storefront Project

Prairie View A&M University offers the opportunity for its students to participate and work with Cimarron, Inc. – The Lockheed Martin Storefront. In this growing office space located on campus, students utilize knowledge obtained in the classroom to apply to real world software environments. The storefront maintains the Facilities Development and Operations Contract between Lockheed Martin and the National Aeronautics and Space Administration. Projects include but are not limited to: Procedure Development & Control (PDAC), Command Display (CMD), Planning Communication and Timeline Tools (PCATT), Delivery Management, Auto CAD, and Web Development. These teams, alongside many more, operate on the development and maintenance level to assist in running the International Space Station, Space Shuttle Missions, and Satellite expansion.

Kaur, Manjinder, Prairie View A&M University

Effects of Mach Number and Angle of Attack on Mass Flow Rates and Entropy Gain in a Supersonic Inlet

A parametric study of a mixed-compression supersonic inlet is performed and reported. The effects of inlet Mach Numbers, varying from 4 to 10, and angle of attack, varying from 0 to 10, are reported for a constant inlet dynamic pressure. The purpose is to look at the variations of mass flow rates through the inlet, gain in entropy through the inlet, and the angles of the external oblique shocks. The mass flow rates were found to decrease monotonically with Mach numbers and increase with angle of attacks. On the other hand the entropy gain through the inlet increased with increasing Mach number and angle of attack. The variation in static pressure was found to be identical from the inlet throat to the exit for Mach number values higher than 6.

Madrigal, Susana, Prairie View A&M University

The Effects of Captopril Treatment and its Withdrawal on Blood Pressure and Vessel Reactivity in the Spontaneously Hypertensive Rat (SHR)

Endothelial cell dysfunction is a pathological manifestation associated with both clinical and experiment models of hypertension. Dysfunction of the vasculature endothelium is phenotypically characterized as impairment in blood vessel relaxation to endogenous vasodilators. In the Spontaneously Hypertensive Rats (SHR), relaxation to acetylcholine, which depends on the integrity of the endothelial cell, is severely impaired in comparison to age matched normotensive Sprague Dawley rats (SD). Additionally, contractile responses to the vasoconstrictor serotonin are enhanced in SHR, and this increased Sensitivity has been suggested to contribute to the maintenance of established hypertension in this model. Over the past twenty five years, angiotensin converting enzyme inhibitors (ACE-I) have proven to be potent antihypertensive agents. Studies from our laboratory, as well as others have demonstrated that oral administration of an ACE-I to young SHR during the developmental stages of hypertension can prevent elevations in arterial pressure. Further, these studies demonstrated that the antihypertensive effects of ACE-I persist in the SHR for several months after cessation of therapy. Presently, the exact mechanism(s) involved in the sustained antihypertensive effects of ACE-I following withdrawal of treatment remains to be elucidated. However, one possible contributing factor could be the protective effect of ACE-I on endothelial cell function. Studies have shown, that oral administration of an ACE-I can prevent or reverse endothelial dysfunction in the SHR. The goal of this study will be to determine whether SHR, chronically treated with the ACE-I, captopril, during the developmental stages of hypertension followed by a period of withdrawal would exhibit normal acetylcholine-mediated endothelium-dependent relaxation. Specifically, we will test the hypothesis that the persistent antihypertensive effects of captopril following its withdrawal, is associated with a sustained protective effect on endothelial cell function.

Khade, Parth, Texas A&M University

Khade, Parth, Texas A&M University

Purpose: The presentation of a patient with hydrocephalus and 4th ventricular neurocysticercosis presented a review of the medical literature. There was no consensus as to the post-operative use of anti-helminthic (parasitic) medical therapy. **Methods:** We searched medical/research treatment databases for reports of post-operative medical therapy for intraventricular neurocysticercosis. Articles were included if they described post operative treatment in a fashion that could be easily documented. Existing treatment options for more indolent disease included surgical removal of the cyst through direct excision or endoscopy, or antiparasitic therapy with Albendazole or Praziquantel. **Results:** 24 articles were included. 50% documented post operative use of anti-parasitic therapy while the remaining was treated using surgery alone. 85% of isolated ventricular lesions were treated without follow-up procedure. Conclusions: There is no standard of care with respect to treatment of intraventricular neurocysticercosis through use of anti-parasitic therapy alone. Options include Prednisone, Albendazole, and Praziquantel, with Albendazole treatment having the most documented use.

Mandinaveitia, Sofia, Texas A&M University

Mapping of the E.coli Mutation the Reduces Stationary Phase Induction of Pmcb

The bacterial growth cycle is composed of different phases: lag, exponential, and stationary. During lag phase cells are not ready to divide. In exponential phase, cells start to double, and in stationary phase cell growth slows down. We are most interested in analyzing the genes that regulate E.coli's entry into stationary phase. Pmcb is the promoter for the mcb operon, which is most active during stationary phase. We used Hfr mapping to locate the mutation that reduces the activity of the Pmcb promoter in stationary phase. A Pmcb-LacZ reporter gene was inserted in the E.coli chromosome in order to assay Pmcb activity by measuring β-galactosidase levels of the recombinants. Results showed that different Hfr donors gave rise to different types of recombinants that either had high, medium or low β-galactosidase concentrations. Hfr donors DS924, CAG5054, CAG5053 and EA1002 produced recombinants with high β-galactosidase levels, therefore had high Pmcb activity. Based on the location of the origins of transfer for each Hfr strain we concluded that the location of the mutation affecting the Pmcb activity is between 9 and 36 minutes on the E. coli genome.

Melendez, Peter, Texas A&M University Corpus Christi

Using GIS to Model Bull Shark Distribution Patterns Along the Texas Coast

The shark population along the Texas coast is decreasing at an alarming rate. The purpose of this research is to examine what effects this could have on the surrounding ecosystems and what is causing their decline. From August 2008 to October 2009 a collaboration project was conducted in the Harte Research Center at Texas A&M University-Corpus Christi. The project included studying four different species of shark known to be found along the Texas Coast including: the Sharpnose, Bonnethead, Blacktip, and Bull Shark. The project had 2 main groups of attributes, the Abiotic and Spatial attributes. The data spanned over a period of 30 years. As a G.I.S. Analyst, the researcher focused on the Spatial Attributes of Location, Inlet Distance and Bay System. The Abiotic attributes are important to the biological aspect of the project, which are the Dissolvable Oxygen, Salinity, Turbidity, Temperature and Water Depth which can be mapped out and spatially analyzed as well. By using statistical analysis, researchers were able to determine the most likely locations for a successful shark catch.

Neville, Courtney, Prairie View A&M University
Whiteside, Candice, Prairie View A&M University

Expression profiling of angiogenic genes in Antrozous pallidus

The unique anatomy of Pallid Bats (Antrozous pallidus) makes them an ideal *in vivo model* research in microvascular mechanobiology, because their non-pigmented wings allow the vasculature to be studied noninvasively. The genome of this species of bat has not been sequenced; therefore our interest is to specifically identify functional genes in vascular pathways of interest by using a comparative genomic strategy. We hypothesize that peripheral blood gene expression profiling in the Pallid bat model will identify gene signatures/markers associated with vascular adaptive changes (angiogenesis). The goals are to: 1) identify genes in different vascular pathways in the Pallid bat genome by using a bioinformatics evaluation strategy; and 2) use minimally invasive sampling procedures and molecular biology techniques to establish and expression profile for peripheral blood in the Pallid bat. The application of genomics to the bat model offer enormous promise to elucidate vascular physiology and disease, and impact the biomedical and biological research communities. This research is supported in part by the Texas A&M University's Louis Stokes Alliance for Minority Participation.

Powell, Robert, Prairie View A&M University

Residential Location Choice: Behavior Modeling of Households in the City of Lisbon, Portugal

This research is part of the SOTUR project which aims to address the emerging needs of land use transportation policies. The new simulation model UrbanSim serves as the modeling platform made up of several interacting sub models. The focus of this research is on the residential location choice model. The model predicts the probability that a household will choose a particularly defined location. Initial estimates were performed using preliminary data collected and analyzed by a research team in Portugal (Martinez, Silva, & Viegas, 2009). In this case, the choice set was built using random samples from the existing data, followed by the estimation of a multinomial logit with linear utility. Primary outputs proved to be counterintuitive and resulted in statistically insignificant values, possibly due to limitations with the data. The sample may have been small and not representative of the distribution of dwelling units in the city of Lisbon. These assumptions were addressed with combined data from another source that corresponds to asking prices from a 2007 study of cross sectional real estate data from an online realtor's database for Lisbon, Portugal (Martinez & Viegas, 2008). The results using the combined sources were shown to be statistically significant and in accordance with inferences of values.

Renteria, Anthony, Texas A&M University Corpus Christi

Chloroplast microsatellite variation and the origins of King Ranch Bluestem, *Bothriochloa ischaemum* var. *songarica*

The King ranch Bluestem, *Bothriochloa ischaemum* var. *songarica,* is an invasive, non-native plant species that occupies large portions of the Southern Great Plains, as well as the Edwards Plateau and parts of South Texas. Invasive plant outbreaks, in short, can be environmentally and economically destructive. Comparing the chloroplast DNA of different accessions of King Ranch bluestem collected from across its native range can provide evidence for the origin of the original introductions. This approach could also determine whether or not these plants were introduced from the same geographical regions or introduced from multiple regions. We extracted DNA from ninety-six accessions collected throughout the native range obtained from the USDAs Germplasm Research Information Network (GRIN). We are genotyping each individual using seven chloroplast-specific microsatellite markers on a Beckman CEQ 8000 sequencer. Structure, a Bayesian computer package, will be used to compare these accessions to individuals collected from central Texas and identify their origins. We hypothesize that multiple introductions of this species have contributed to its invasiveness. Therefore, we expect to find that Texas samples will group with more than one region represented in the GRIN accessions. This research on the King Ranch bluestem is significant because it will add to our understanding of how genetics may contribute to invasiveness. In addition, knowing the origin or origins of this species may assist in the development of appropriate biological control methods.

Rodriguez, Alvaro, Texas A&M University

Novel Cyanide Degrading Enzymes pH Mutants

Even though cyanide is highly toxic, it is commonly found in industrial waste generated by several industries such as metal plating and mining. This chemical is hazardous for many organisms, including mammals, since it inhibits key factors in the respiratory pathway. Surprisingly, several microorganisms can degrade and even survive cyanide's presence. These microbes, fungi and bacteria, count on a variety of cyanide degrading enzymes. These can break cyanide into less toxic compounds. An example is the Cyanide Dihydratase (CynD stut) found in *Pseudomonas stutzeri* AK61. The enzyme operates optimally around pH 7-8, but most polluted waters have much higher alkaline pH. The aim of this research project is to construct genetic mutants for this enzyme that are able to operate in these highly alkaline environments. The DNA that encodes the enzyme has been cloned into common *Escherichia coli* where it makes functional protein. Using methods such as PCR amplification that creates mutations, strains of *E. coli* can be screened for cyanide degrading activity at pH 10 to find a mutant that survives these conditions. These novel mutant enzymes can then be analyzed for improved properties useful for bioremediation of cyanide waste waters.

Rojas, Diego, Texas A&M University Corpus Christi

Tracking moving objects using two synchronous cameras

The purpose of this research is to construct a system that uses two cameras to track a moving object. Instead of having independent streams to analyze the video from each camera, simultaneous images from each camera are combined using image fusion and the object is tracked in the resulting composed frame. At first, each camera is positioned facing the same direction in parallel. Once frames arrive, they are combined to form a panoramic view, which is then analyzed to find any abnormalities in proportion to previous frames. Abnormal blobs are filtered, grouped and their position features extracted. Then the features are compared to the positions of blobs in previous frames. Using heuristics for correlation, we determine a match for object with a degree of accuracy proportional to the blurriness of the image. The advantage of this method is in its extensibility to more than two cameras while still producing a panoramic view to process on.

Spofford, Sarah, Texas A&M University Corpus Christi

Automatic Rigging for Spore Models

This research project focuses on using models that are taken from the EA game Spore and creating a Maya script that will automatically rig them. These models are exported from the game complete with textures, skeletons, and skin weights, but no IK handles or any other sort of controls for animators. We are in the process of creating a script that will allow the user to select the model they would like to create handles and controls for and running our auto-rigger.

The Spore Creature Creator exports models in the collada format. Using a plug in, we are able to then import these into the 3D modeling and animation program Maya. Since they are exported with skeletons and meshes that contain skin weights, all that is missing is the inverse kinematics controls that animators use to create animations. Without the IK handles, the models are practically useless other than for still images. An automatic rigging script that could create these handles for any possible creature would be immensely useful.

Taylor, Emery, Texas A&M University

Expression profiling of angiogenic genes in *Antrozous pallidus*

The unique anatomy of Pallid Bats (*Antrozous pallidus*) makes them an ideal *in vivo* model for research in microvascular mechanobiology, because their non-pigmented wings allow the vasculature to be studied noninvasively. The genome of this species of bat has not been sequenced; therefore our interest is to specifically identify functional genes in vascular pathways of interest by using a comparative genomic strategy. We hypothesize that peripheral blood gene expression profiling in the Pallid bat model will identify gene signatures/markers associated with vascular adaptive changes (angiogenesis). The goals are to: 1) identify genes in different vascular pathways in the Pallid bat genome by using a bioinformatics evaluation strategy; and 2) use minimally invasive sampling procedures and molecular biology techniques to establish an expression profile for peripheral blood in the Pallid bat. The application of genomics to the bat model offers enormous promise to elucidate vascular physiology and disease, and impact the biomedical and biological research communities. This research is supported in part by the Texas A&M University's Louis Stokes Alliance for Minority Participation.

Walker, LaTonya, Prairie View A&M University

Effect of Selected Transportation Control Measures on the Air Quality of Houston - Galveston – Brazoria Region

With the national interest to protect human health, the development of regulations to govern the air quality was established by The Clean Air Act of 1990. The locations of particular interest are the nonattainment areas that are identified as a locality where the air pollution persistently exceeds National Ambient Air Quality Standards (NAAQS). The US federal government requires states with nonattainment areas to develop State Implementation Plans (SIP), which states control measures to reduce mobile and non-mobile emissions are proposed. One such region that has been on the nonattainment areas list is the Houston-Galveston-Brazoria (HGB) region. The Transportation Control Measures (TCM) are transportation projects designed to reduce on-road mobile source emissions, which influence traffic in a way to change traffic flow, reduce emission, or reduce congestion conditions. The HGB region was chosen for this study because it was classified to be at the Severe-15 level within the designation of an 8-hour Ozone Nonattainment Area. In this research, Mobile Source Control Strategies focused on emission reduction on volatile organic compound (VOC) and mono-nitrogen oxides (NO_x) to decrease ozone production in low atmosphere are being reviewed for the HGB region, 3 On-road Mobile TCMs (i.e. Implementation of Idle Reduction Programs; Expansion of the vehicle emissions inspection (I/M) program to Chambers, Liberty, and Waller counties; and Levy a Vehicle Miles Traveled (VMT) Tax of 5 cents per mile) that are being studied utilizing Benefit Estimation Analysis and EPA's air modeling tool, Motor Vehicle Emission Simulator (MOVES2010). The comparisons will be made between existing and calculated expected emission reductions values to propose suggestions for the most efficient TCM(s) to be implemented to reduce vehicular emissions in the HGB area. The inputs needed for the air quality models will be identified from various sources and the model outputs will be explained to show the impact of each of the TCMs on the region's air quality. The results of this study are expected to show one or more TCMs that can be proposed to be included in the SIP to achieve the NAAQS in the HGB area by 2018.

Wallace, Elizabeth, Prairie View A&M University

Review of Xenon Separation Processes for Application to Nuclear Fuel Reprocessing

Xenon is produced as a fission product in a typical thermal nuclear fuel cycle. The ability to recover Xenon from the spent fuel is desirable for two reasons: it reduces radiotoxicity of the spent nuclear fuel and also it is a valuable resource used in many applications. Xenon is used for applications such as incandescent lighting, automotive headlights, anesthetics, in CAT scans, X-rays and MRIs to improve imaging, in ion engines and ion plasma thrusters for satellites to reduce the propellant mass up to 90%, resulting in reducing launch costs, as well as in manufacturing electronic chips and plasma televisions. The objective of this project is to compare and contrast the pressure swing adsorption process to other proven methods of separating Xenon from spent nuclear fuel using cryogenic distillation, temperature swing adsorption, photochemical separation, and gas-solid chromatography with membrane technology. Cryogenic distillation is a low temperature distillation process most commonly used in the industry for gas separation. Temperature swing adsorption is a system which uses the rapid heating and cooling of a gas at a constant pressure to absorb into a special adsorption material. Photochemical separation uses photolytically produced fluorine atoms to react with the gas mixture to separate the stable Xenon gas at room temperature. Gas-solid chromatography with membrane technology is a process which uses helium as a carrier to isolate Xenon from all other gases in the mixture and a membrane to separate the xenon from the helium. Our interest in this preliminary review is to identify 1 – 2 technologies that will be candidates for further research. Research performed with High Energy Particle Physics group at Oak Ridge National Laboratory (ORNL) to investigate the pressure swing adsorption (PSA) for Xenon recovery will be summarized in this paper. Data on adsorbents and their selectivity, operating pressure ranges and differentials will be presented.

Woodson, Titus, Prairie View A&M University

Resistivity Measurements Using High Magnetic Fields and Low Temperatures

Materials Science research has become a leading area of study in the scientific community. Materials are studied using many techniques, one of which is by measuring the sample's resistivity. Resistivity is a characteristic of the material studied and depends on parameters such as temperature, magnetic field and pressure. Here we present the experimental method for measuring the resistivity using the Van der Pauw configuration, a superconducting magnet and a cryogenic environment. The results allow us to develop electronic phase boundaries and tune materials for numerous applications.

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