The Office of Undergraduate Research Presents

The Bulletin of the 7th Annual

Texas STEM Conference

Saturday, November 2, 2019

Lamar University, Beaumont, Texas

Office of Undergraduate Research
LAMAR UNIVERSITY

Hosted by the Department of Physics in the Archer bldg.

Welcome Message from The Interim Director of O.U.R.

Dear Students, Colleagues, and Guests,

We are proud to bring Texas STEM conference to the 7th edition, and warmly welcome you to our event. This year we are offering 46 presentations, with 18 talks and 28 posters. Undergraduate and graduate college students from Texas and Louisiana meet today for sharing the richness of their research experience. We would like to congratulate each presenter for his or her research efforts, and for sharing with us their findings and experience.

Today we welcome a very special guest: our good friend, colleague, and mentor, Dr. Kumer Das, who is the founding director of the Office of Undergraduate Research at Lamar University. His presence today, as keynote speaker is a big honor for Lamar University's STEM community. Dr. Das has received tenure from Lamar University and became one of the most engaged and productive faculty. His dedication to teaching students, to attracting them into research and creative projects, and encouraging them to excel in their academic experience is to be commended. Dr. Das has obtained many significant results with his students, as well as in his personal research projects, which made him to be one of the most successful faculty in Lamar's history.

Our special thanks go to President of Lamar University, Dr. Kenneth Evans, and to Provost and Vice President for Academic Affairs, Dr. James Marquart, for sponsoring our conference, including through offering student awards.

I wish everyone to enjoy the conference and benefit of its content!

With best wishes for everyone,

Dr. Cristian Bahrim, Interim Director

Nirmal Gope, Administrative Associate

OFFICE OF UNDERGRADUATE RESEARCH (O.U.R.)

Dr. Cristian Bahrim
Interim Director

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Mr. Nirmal Gope, M.Ed. Administrative Associate

PLENARY SPEAKER

Dr. Kumer P. Das

Assistant Vice President for Research, Innovation, and Economic Development and Assistant Provost
University of Louisiana, Lafayette

Kumer Pial Das, Ph.D. has a vast academic experience. Before he joined University of Louisiana at Lafayette, Dr. Das was a professor of statistics and founding director of the Office of Undergraduate Research at Lamar University in Texas. Dr. Das also served as an Interim Associate Provost for Research at Lamar. He was an American Council of Education Fellow. He received his Ph.D. in mathematics from Auburn University in 2005. His research interest is in the area of statistics, big data analytics, actuarial mathematics, undergraduate research and international education. He has received many regional and national awards for teaching, mentoring and research. Notably, he was a recipient of 2013 Mathematical Association of America's Alder award for distinguished teaching. He was also a recipient of the 2016 Mathematical Association of America's Robert V. Hogg Award for Excellence in Teaching Introductory Statistics. He has published extensively on a variety of topics in statistics and mathematics with his undergraduate and graduate students. He was named the 2015 Lamar University Scholar in recognition of a lifetime of outstanding scholarly and creative achievements. He was also the recipient of Lamar University's 2015 Julie & Ben Rogers Community Service Award and the 2016 Fulbright International Education Administrator Seminar Award to France by the J. William Fulbright Foreign Scholarship Board. Over his career, Dr. Das has been involved with over $3 million in research grants and contracts.

2019 TEXAS STEM CONFERENCE AGENDA

SATURDAY, November 2, 2019

All events will take place in Archer Building

REGISTRATION

8:00 A.M. – 8:30 A.M. Registration (Continental Breakfast will be served)

8:30 A.M. – 9:00 A.M. POSTER SESSION - I

WELCOME
Archer 108

9:00 AM – 9:20 AM Dr. James Marquart, Provost and Vice President, Lamar University

Dr. Cristian Bahrim, Interim Director of the Office of Undergraduate Research

KEYNOTE SPEECH
Archer 108

9:20 AM – 9:25 AM Introduction of our Guest Speaker

Dr. Cristian Bahrim, Professor of Physics

9:25 AM – 10:05 AM Keynote Speaker
Dr. Kumer Pials Das
Assistant Vice President for Research, Innovation, and Economic Development and Assistant Provost
University of Louisiana at Lafayette

10:05 AM – 10:15 AM BREAK

Session 1A - Oral Presentation Archer 108

10:15 a.m. – 11:15 a.m. Chair: Dr. Dentcho Genov / Department of Physics / Louisiana Tech University

10:15 a.m. – 10:35 a.m. *The Search for Baryon Resonances – the Excited States of Protons.*
Alek Hutson / Department of Physics / University of Houston
Mentor: Dr. Phil Cole / Department of Physics / Lamar University

10:35a.m. – 10:55 a.m. *A Study of Current Data on Fast Radio Bursts.*
Matthew Johnson / Physics / Lamar University
Mentor: Dr. Cengiz Sen / Department of Physics / Lamar University

10:55 a.m. – 11:15 a.m. *Hydrocarbon Leak Detection through Infrared Imaging Systems Mounted on Drones.*
Jared Richards / Physics / Lamar University
Mentor: Dr. Philip Cole / Department of Physics / Lamar University

Session 1B - Oral Presentation Archer 107

10:15 a.m. – 11:15 a.m. Chair: Dr. Jane Liu / Department of Computer Science / Lamar University

10:15 a.m. – 10:35 a.m. *Radiation from a Non-Conformal Antenna Array on an Electrically Large Conducting Convex Platform.*
Babajide Salau / Electrical Engineering / Lamar University
Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University

10:35 a.m. – 10:55 a.m. *Efficient Radar Signature Prediction.*
Manthan Shah / Electrical Engineering / Lamar University
Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University

10:55 a.m. – 11:15 a.m. *Multiscale investigation of corrosion on super-hydrophobic aluminum alloy using electrochemical techniques and in-situ AFM.*
Divine Sebastian / Mechanical Engineering / Lamar University
Mentor: Dr. Chun-Wei Yao / Department of Mechanical Engineering / Lamar University

12:00 PM – 12:10 PM	Group Picture In front of Archer Physics Building in the Parking Lot

12:15 PM – 1:00 PM	Poster Session - II

Session 2A - Oral Presentation Archer 108

1:05 p.m. – 2:05 p.m. Chair: Dr. Cengiz Sen / Department of Physics / Lamar University

1:05 p.m. – 1:25 p.m. *Basics of Quantum Computing*
Satzhan Sitmukhambetov / Physics / University of Texas Rio Grande Valley
Mentor: Dr. Malik Rakhmanov / Department of Physics and Astronomy / University of Texas Rio Grande Valley, Brownsville

1:25 p.m. – 1:45 p.m. *Active modulation of Surface Plasmon Polaritons at Degenerate Semiconductor Interfaces*
Dr. Raj K Vinnakota / Ph.D. in Physics / Grambling State University
Co-Author: Dr. Dentcho Genov, Dr. Daniel Wasserman, Zuoming Dong
Mentor**:** Dr. Dentcho Genov / Department of Physics / Louisiana Tech University and Dr. Daniel Wasserman / Department of Electrical and Computer Engineering, University of Texas at Austin

1:45 p.m. – 2:05 p.m. *Quantum Corrections to the Electromagnetic Response of Metal Nanostructures*
G. Neal Blackman, III / Physics / Louisiana Tech University
Mentor**:** Dr. Dentcho Genov / Department of Physics / Louisiana Tech University

Session 2B - Oral Presentation Archer 107

1:05 p.m. – 2:05 p.m. Chair: Dr. Sunny Lei / Department of Chemistry and Biochemistry / Lamar University

1:05 p.m. – 1:25 p.m. *GMOs vs Organic: Exploring Genetic Engineering Education among Elementary Students***.**
Anna Carter / Teacher Education / Lamar University
Mentor: Dr. Mamta Singh / College of Education and Human Development / Lamar University

1:25 p.m. – 1:45 p.m. *siRNA Silencing of VPS32 in Tritrichomonas foetus.*
Katherine Harmon / Biology / Lamar University
Co-Authors: Peter Connolly, Guadalupe Cisneros, Diana Dang, Khushi Malani, Emily McCall, and Duy Vo
Mentor: Dr. Ashwini Kucknoor / Department of Biology / Lamar University

1:45 p.m. – 2:05 p.m. *Effects of Vitamin D on Human Meibomian Gland Epithelial Cells*
Kyle Delk / Biology / Lamar University
Co-Author: Carolina Lema / University of Houston, Houston, TX
Mentor: Rachel Redfern / University of Houston / College of Optometry

Session 3A-Oral Presentation Archer 108

2:10 p.m. – 3:10 p.m. Chair: Dr. Jenny Zhou / Mechanical Engineering / Lamar University

2:10 p.m. – 2:30 p.m. *Characteristics and Travel Behavior Analysis of Vessel Traffic based on AIS Data-A Case Study at Houston Ship Channel.*
Uttara Roy / Civil and Environmental Engineering / Lamar University
Co-Author: Sepideh Zohoori
Mentors: Dr. Xing Wu and Dr. Maryam Hamidi / Department of Civil and Environmental Engineering / Lamar University

2:30 p.m. – 2:50 p.m. *HVAC System Selection and Design for Rare Document Storage and Archives building*
Deependra Yadav / MS in Mechanical Engineering / Lamar University
Mentor: Dr. Kendrick Aung / Department of Mechanical Engineering / Lamar University

2:50 p.m. – 3:10 p.m. *Reliability Prediction Model for Rail Track Geometry.*
Oluseye Fafiolu / Industrial Engineering / Lamar University
Mentors: Dr. Berna Tokgoz and Dr. Jaeyoung Cho / Department of Industrial Engineering / Lamar University

Session 3B-Oral Presentation Archer 107

2:10 p.m. – 3:10 p.m. Chair: Dr. Ozge Gunaydin-Sen / Department of Chemistry and Biochemistry / Lamar University

2:10 p.m. – 2:30 p.m. *Biosynthetic Conversion of Ag+ to Colloidally Stable Ag0 nanoparticles by Chlamydomonas Reinhardtii: A Mechanistic View of the Light-Induced, Extracellular Polymeric Substances-Mediated Synthesis Process*
Ashiqur Rahman / Ph.D. candidate in Chemical Engineering / Lamar University
Co-authors: Shishir Kumar[1], Adarsh Bafana[1], Julia Lin[1], and Si Amar Dahoumane[2]
[1]Nanobiomaterials and Bioprocessing Laboratory (NABLAB), Dan F. Smith Department of Chemical Engineering / Lamar University
[2]School of Biological Sciences and Engineering, Yachay Tech University, Hacienda San José s/n, San Miguel de Urcuquí 100119, Ecuador
Mentor: Clayton Jeffryes[1,3]
[3]Center for Advances in Water & Air Quality, Lamar University

2:30 p.m. – 2:50 p.m. *Hydrodynamics-Dominated Wetting Phenomena on Hybrid Superhydrophobic Surfaces*
Arash Azimi / Mechanical Engineering / Lamar University
Co-author: Chae Rohrs
Mentor: Ping He / Department of Mechanical Engineering / Lamar University

2:50 p.m. – 3:10 p.m. *An Analysis of Baking Schedules for Highly Moisture Sensitive Electronic Components*
Mukunda Khanal / Mechanical Engineering / Lamar University
Mentors: Dr. Xuejun Fan and Dr. Jenny Zhou / Department of Mechanical Engineering / Lamar University

3:15 PM – 3:45 PM	Poster Session - III

3:50 p.m. – 4:05 p.m.	Dr. Kelley Bradley, Director of Makerspace in the SciTech facility at Lamar University.
4:05 p.m. – 4:20 p.m.	AWARD CEREMONY for graduate and undergraduate students.
	CLOSING REMARKS and GROUP PHOTO WITH THE AWARDEES
	THE CONFERENCE ENDS AT 4:30p.m.

Poster Sessions Chairs: Dr. Eileen Curl

Dr. Gevorg Sargsyan

Dr. Kelley Bradley

Dr. Mamta Singh

Dr. Sylvestre Twagirayezu

Dr. Tracy Benson

Poster Session I (Time 8:30 p.m. - 9:00 p.m.)

Poster Session II (Time 12:15 p.m. - 1:00 p.m.)

Poster Session III (Time 3:15 p.m. - 3:45 p.m.)

LOCATION: The hallway of the first floor of the Archer bldg.

Poster Directory

P1
Model Proposal for Underground Aggregate Stormwater Infiltration Beds
Nara Almeida
Civil and Environmental Engineering Major / Lamar University
Co-Author: Irumi Han

Mentor: Dr. Liv Haselbach,/ Department of Civil and Environmental Engineering / Lamar University

P2
Calculations of Thermodynamic Properties of Ammonia Borane and Its Potential Energy Surfaces
Syed Amir
Chemistry and Biochemistry / Lamar University
Co-Author: Emily Ingram
Mentors: Dr. Sylvestre Twagirayezu and Dr. Ozge Gunaydin-Sen
Department of Chemistry and Biochemistry / Lamar University

P3
Mapping Lamar Using Geolocation
Chandler Barlow
Computer Science / Lamar University
Mentor: Jane Liu / Department of Computer Science / Lamar University

P4
Experimental Setup to Model Gravitational Wave Detection
Artemiy Bogdanovskiy
Physics / Department of Physics and Astronomy
University of Texas Rio Grande Valley, 1 W University Blvd., Brownsville, TX 78520
Mentor: Dr. Malik Rakhmanov / Department of Physics and Astronomy /
University of Texas Rio Grande Valley, Brownsville

P5
Closing the Gap through Computer Science Education Project using Robotics and Gaming
Madison Boudreaux
Computer Science / Lamar University
Co-Authors: Ann Chapple and Rachel Van Sciver
Mentor: Dr. Sujing Wang / Department of Computer Science / Lamar University

P6
Vision Guided Autonomous Robot
Steve Boudreaux
Electrical Engineering / Lamar University
Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University

P7

Thermo-Optical Characterization of Organic Verdazyl Biradicals

Caitlyn Clark
Chemistry and Biochemistry / Lamar University
Co-Authors: Emily Ingram and David Brook
Mentor: Dr. Ozge Gunaydin-Sen / Department of Chemistry and Biochemistry / Lamar University

P8

Predicting Federal Funds Rate Using Extreme Value Theory

Ashim Kumar Dey
Mathematics / Lamar University
Mentor: Dr. Kumer Pial Das / Department of Mathematical / Lamar University

P9

Development of an Algal-based Landfill Leachate Treatment System

Kyleigh L Dixon
Civil and Environmental Engineering / Lamar University
Mentor: Dr. Thinesh Selvaratnam / Department of Civil and Environmental Engineering / Lamar University

P10

Fast and Scalable Density Clustering Algorithm for Big Data Analysis

Amol Dulal
Computer Science / Lamar University
Co-Author: Aakash Raj Pokhrel
Mentor: Dr. Sujing Wang / Department of Computer Science / Lamar University

P11

Theoretical Calculations of Epoxyketene to Lactone Thermal Rearrangement Transition States and Kinetics

Donna Fleming
Chemistry and Biochemistry / Lamar University
Mentor: Dr. Christopher B. Martin / Department of Chemistry and Bio-chemistry / Lamar University

P12

RF Spectroscopy with Nonlinear Si Integrated Microring Resonators

Anton Gribovskiy
Physics / Department of Physics and Astronomy
University of Texas Rio Grande Valley, 1 W University Blvd., Brownsville, TX 78520
Mentor: Dr. Malik Rakhmanov / Department of Physics and Astronomy /
University of Texas Rio Grande Valley, Brownsville

P13

The Correlation between Alzheimer's disease and Alcohol Consumption

Hayden Henslee
Biology / Lamar University
Co-Authors: Carter Dufilho and John Le
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

P14

Influence of Pulverized Bottom Ash on Nano-Mechanical Properties of Interfacial Transition Zone and Bulk Matrix

Seyedsaeid Hosseini
Civil and Environmental Engineering / Lamar University
Mentor: Dr. Nicholas A. Brake / Department of Civil and Environmental Engineering / Lamar University

P15

Analysis of the Catalyst Effect on Bulk Ammonia Borane-Polyethylene Oxide Hydrogen Storage Composites

Emily Ingram
Chemistry and Biochemistry / Lamar University
Co-Authors: Caitlyn Clark, Krishna Karel, Riqiang Fu and Dr. Ozge Gunaydin-Sen
Mentor: Dr. Ozge Gunaydin-Sen / Department of Chemistry and Biochemistry / Lamar University

P16

Molecular Links and Biomarkers of Stroke to Alzheimer's Disease

Yves Kenfack
Biology / Lamar University
Co-Authors: Jennifer Aguirre and Taylor Spell
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

P17

Heavy Metals in Cosmetic Products and Their Effect on the Development and Progression of Alzheimer's Disease

Dakotah Kilday
Biology / Lamar University
Co-Author: Adeline Hernandez
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

P18

Analysis of Non-Emergency Calls for Efficient Resource Allocation in Houston, TX

Nader Madkour
Industrial Engineering / Lamar University
Mentor: Dr. Berna Tokgoz / Department of Industrial Engineering / Lamar University

P19

Relationship of Exercise Intensity on Blood and Sweat Lactate

Benjamin Morales
Health and Kinesiology / Lamar University
Co-Author: Dr. Alan Moore
Mentor: Dr. Shannon Jordan / Department of Health and Kinesiology / Lamar University

P20

Regional Convolution Neural Network

Hieu Nguyen
Computer Science / Lamar University
Mentor: Dr. Jane Liu / Department of Computer Science / Lamar University

P21

Evaluation of a thermo-tolerant acidophilic alga,
***Galdieria sulphuraria*, for landfill leachate treatment**

Shanglei Pan
Civil and Environmental Engineering / Lamar University
Mentor: Dr. Thinesh Selvaratnam / Department of Civil and Environmental Engineering / Lamar University

P22

Evaluation of Condition of Utility Poles of
Electric Power Distribution Networks for Natural Disasters

Ashikur Rahman Abid
Industrial Engineering / Lamar University
Mentors: Dr. Berna Tokgoz, Dr. Seokyon Hwang and Dr. Jing Zhang
Department of Industrial Engineering / Lamar University

P23

Detection of Trace Amount of Water in Organic Solvents
by a K-Band Molecular Rotational Resonance Spectroscopy

Sandeep Singh / Chemistry and Biochemistry / Lamar University
Co-authors: Ratna Sekhar[1], Alex Mikhonin[2], Matthew T. Muckle[2], and Justin L. Neill[2], Sylvestre Twagirayezu[1]
[1] Department of Chemistry and Biochemistry, Lamar University
[2]BrightSpec Inc, 770 Harris St, Suite 104b, Charlottesville, VA 22903.
Mentor: Dr. Sylvestre Twagirayezu / Department of Chemistry and Biochemistry / Lamar University

P24

Glucose Metabolism Impairment in AD: Does Decreased Glucose Metabolism Lead to AD

Aziz Shaaban
Biology / Lamar University
Co-Authors: Katherine Correa and Jordan Curl
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

P25

Estimation of Silica, Carbonate and Other Clay Mineral Content by FTIR Spectroscopy in Mud-Rich Sediments and its Implications for Sediment Provenance Analysis

Haley Snyder
Chemistry and Biochemistry / Lamar University
Co-Authors: Dr. Ozge Gunaydin-Sen, Dr. Edgardo Pujols and Dr. Julio Lev-Lopez
Mentors: Dr. Ozge Gunaydin-Sen and Dr. Edgardo Pujols
Department of Chemistry and Biochemistry / Lamar University

P26

Comparison between Shear Strengths of Stabilized Clayey Dredged Soil Samples

Ratish Jung Subedi
Civil and Environmental Engineering / Lamar University
Mentor: Dr. Mien Jao
Department of Civil and Environmental Engineering / Lamar University

P27

Triglycerides and their Potential Role in Cognitive Decline

Hannah Thompson
Biology / Lamar University
Co-Authors: Katelin Catching and Trayce Gray
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

P28

Hearing Loss as It Relates to Alzheimer's Disease

Yen Vu
Biology / Lamar University
Co-Authors: Tara Holder and Nyah Sciarrilla
Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University

Abstracts

All abstracts are listed alphabetically by last name of student presenter

1.

Model Proposal for Underground Aggregate Stormwater Infiltration Beds

Nara Almeida
Civil and Environmental Engineering Major / Lamar University
Co-Author: Irumi Han

Mentor: Dr. Liv Haselbach,/ Department of Civil and Environmental Engineering / Lamar University
Form of Presentation: Poster

Permeable pavements and other stormwater infiltration systems are relevant strategies within urban environments, since it might mitigate the runoff and floods occurrence. Despite these benefits, the efficacy of stormwater infiltration systems on sites where the soil presents low infiltration rates is not well known, thus this research aims to create a model for the infiltration of underground stormwater infiltration beds, based on a percolation rate constant (k_p). The data was collected from two existing pervious concrete pavement systems, located in Pullman, Washington and in Beaumont, Texas, and in both sites, the soil presented low saturated hydraulic conductivity. The model is represented by a linear function and results indicate that Pullman data fits this accordingly. The graph describing Beaumont data no longer presents linear behavior whenever the water into the infiltration bed reaches the level of some ponds in the surrounding grounds, suggesting that the infiltration rate might be affected by the groundwater head. Also, the infiltration rate in Beaumont decreased after one year of measurements, indicating the need of future research accounting for long-term variables. This research considered the saturated hydraulic conductivity (KH) of Beaumont and Pullman and also obtained data of other locations, in order to compare those to the measured percolation rates (kp). The work denotes the efficacy of permeable pavement systems over low saturated hydraulic conductivity soils, but the systems might be impacted by partially saturated conditions in the surroundings. Moreover, the hydraulic conductivity typically presented much lower values than the measured percolation constant.

2.

Calculations of Thermodynamic Properties of Ammonia Borane and Its Potential Energy Surfaces

Syed Amir
Chemistry and Biochemistry / Lamar University
Co-Author: Emily Ingram

Mentors: Dr. Sylvestre Twagirayezu and Dr. Ozge Gunaydin-Sen
Department of Chemistry and Biochemistry / Lamar University
Form of Presentation: Poster

Hydrogen is considered to be the cleanest energy supplier that could replace fossil fuels. Novel materials are currently being developed and investigated for practical use in the hydrogen fuel cell, and ammonia borane (AB) is one of those materials due to its stability at room temperature and high content of H2(19.6 wt %). The aim of this project is to examine and understand the nature of chemical reactivity in ammonia borane by calculating its thermodynamic properties and potential energy surface according to AB's torsional coordinates. In addition to the determination of energy barrier heights, our results show that AB internal rotation motion has

a significant impact on AB geometry and its potential energy surfaces. The patterns of thermodynamic properties (i.e., enthalpy) calculated in this work are in good agreement with published literature [J. Chem. Phys. 2007, 126(18), 184703]. The results of this project shed light on the roles of internal rotation motion as a possible dominant reaction coordinate in AB, and have opened doors of opportunity for future research.

3.

Hydrodynamics-Dominated Wetting Phenomena on Hybrid Superhydrophobic Surfaces

Arash Azimi
Mechanical Engineering / Lamar University
Co-author: Chae Rohrs

Mentor: Ping He / Department of Mechanical Engineering / Lamar University
Form of Presentation: Talk

Because of rich local hysteresis, it is a challenge to determine the global minimum surface energy and consequently, the true apparent contact angle of a liquid droplet on chemically-heterogeneous, rough surfaces. We investigate a specific type of wetting phenomena associated with the chemically-heterogeneous micropatterned surfaces, which is strongly dominated by the coupled wetting and hydrodynamics. The hybrid feature of the micropatterns presented here has two defining facets: the pillar top-surface is highly hydrophilic, while the pillar side-surface and substrate bottom surface is hydrophobic (Teflon). The simulated contact angles agree with the experiments in the literature. This study vividly depicts the hydrodynamics-dominated wetting processes.

4.

Mapping Lamar Using Geolocation

Chandler Barlow
Computer Science / Lamar University

Mentor: Jane Liu / Department of Computer Science / Lamar University
Form of Presentation: Poster

Geolocation data provides the latitude and longitude of a user obtained via GPS. By recording the Geolocation data of on campus buildings it is possible to map the campus accurately. A data set can be created by collecting latitude and longitude values included in each building and creating a profile of points considered inside. Data collection will be achieved by both examining and recording the data provided by Google Maps and collecting location data manually on campus with a phone GPS. After collecting the location information the goal will be to create a methodology for determining which building a point is located in. The goal of this study is to gather location data about buildings on the Lamar campus and develop a system that can utilize this information for mapping purposes.

5.

Experimental Setup to Model Gravitational Wave Detection

Artemiy Bogdanovskiy
Physics / Department of Physics and Astronomy
University of Texas Rio Grande Valley, 1 W University Blvd., Brownsville, TX 78520

Mentor: Dr. Malik Rakhmanov / Department of Physics and Astronomy /
University of Texas Rio Grande Valley, Brownsville
Form of Presentation: Poster

Direct observation of gravitational waves in 2015 opened a new era in the exploration of the Universe. Design and development of new, more sensitive interferometers is underway. A simplified version of a large-scale detector is realized in the experimental setup in a laboratory environment at UTRGV. This table-top interferometer is built to test optical configurations and analyze their performance for future detectors.

6.

Quantum Corrections to the Electromagnetic Response of Metal Nanostructures

Neal G. Blackman, III
Physics / Louisiana Tech University

Mentor: Dr. Dentcho Genov / Department of Physics / Louisiana Tech University
Form of Presentation: Talk

Metal-dielectric composite materials are one of the most promising platforms for advancement in optical technology. These materials are traditionally designed using classical electromagnetism, but feature sizes are continuing to shrink to the point that quantum effects must also be considered. We use perturbation theory and the quantum box model to study how quantum confinement impacts the optical response of materials containing metallic nanostructures. It is already known that quantum theory predicts enhancement of the electric properties of metal structures smaller than 10 nm. We now find that the quantum model also predicts enhanced magnetic properties.

7.

Closing the Gap through Computer Science Education Project using Robotics and Gaming

Madison Boudreaux
Computer Science / Lamar University
Co-Authors: Ann Chapple and Rachel Van Sciver

Mentor: Dr. Sujing Wang / Department of Computer Science / Lamar University
Form of Presentation: Poster

This project is to introduce a computer science education project that used games and robotic coding/programming as engaging hands-on approaches to teach young females coding/programming concepts to increase their knowledge and interest in computer science. Careers in computer science continue to grow, but fewer women than men are even considering these careers. Increasing participation of women in coding/programming is really necessary to meet the growing demand for coding professionals to develop a diverse workforce. To address pressing equity issues of the lack of females in computer science careers, the goal of this summer coding/programming camp was to educate and empower young females, at an early age, to discover computer science careers, which has been one of the first attempts to establish a coding/programming academy for young females in our region. The positive findings of the assessment of the 2018 coding/programming summer camp overwhelmingly suggest that all student cohorts increased their knowledge in the field of computer science. We can conclude that the participants were actively engaged and experienced significant learning during this education project.

8.

Vision Guided Autonomous Robot

Steve Boudreaux
Electrical Engineering / Lamar University

Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University
Form of Presentation: Poster

Autonomous navigation is a hot research topic. Navigation in unfamiliar or unknown environments requires autonomous robots. Localization without GPS signals, presence of enemies or obstacles, communications between friendly parties, and mapping and identification of an environment are some difficulties with navigation in these environments. Vision based capabilities will be added to a robot to determine its location, identify certain objects, pick them and place them inside their slots in a mothership while avoiding obstacles. Image processing algorithms will be developed to identify objects, obstacles, lights and mothership, and for localization based on the images from the camera on the robot.

9.

GMOs vs Organic: Exploring Genetic Engineering Education among Elementary Students

Anna Carter
Teacher Education / Lamar University

Mentor: Mamta Singh / College of Education and Human Development / Lamar University
Form of Presentation: Talk

The purpose of this study was to introduce a basic understanding of the advancement in contemporary genetic engineering education. Participants for this study were sixteen elementary students attending a local summer program at one of the BISD schools. Guided inquiry and hands-on activities in cooperation with 5 E Instructional Model with 2-days lesson plan were used for this study. Findings suggested that 75% of student participants understood the content well enough to describe future advancements for genetic work not previously discussed while others struggled to understand the concepts in general. For the further study, a week long unit plan on genetic engineering education rather than 2-days lesson plan is recommended with pre-during-post assessments along with embedded formative and summative assessments to fully assess students' knowing and understanding of genetic engineering education.

10.

Thermo-Optical Characterization of Organic Verdazyl Biradicals

Caitlyn Clark
Chemistry and Biochemistry / Lamar University
Co-Authors: Emily Ingram and David Brook

Mentor: Dr. Ozge Gunaydin-Sen / Department of Chemistry and Biochemistry / Lamar University
Form of Presentation: Poster

Recently, biradicals have become a very important topic attributing from their unique properties. Early studies show that magnetic properties found from these systems can be used extensively in the electronics, computer technologies, and renewable energy fields. It can also lead to the manufacturing of other new organic magnetic materials. Unlike most of the other radicals, organic verdazyl biradicals are stable at room temperature which gives ease with experimentation. They can also be linked to form bi- and tri-radicals which are also stable at room

temperature. To further understand the photo-physical properties of verdazyl biradicals, the biradical 1,1′,5,5′-tetramethyl-6,6′-dioxo-3,3′-biverdazyl was investigated utilizing thermo-optical spectroscopy, (UV-VIS). The spectra were then analyzed using Beer's law and Curie population Analysis techniques to extract the singlet-triplet spin gap at several wavelengths by evaluating the excitations. Investigating the photophysical properties of 1,1′,5,5′-tetramethyl-6,6′-dioxo-3,3′-biverdazyl determined an average spin gap, Δ_0, for Curie population and Beer's Law analysis, found to be, 303.3 K and 369.0 K, respectively. The analysis suggests, stronger excitations are representative of $\pi \square \pi^*$ transitions while the weaker excitations are representative of forbidden $\pi \square \pi^*$ transitions. Thermo-optical studies of Methylene Bis(1,5-diisopropyl-6-oxoverdazyl) via UV-VIS spectroscopy are still under progress.

11.

Effects of Vitamin D on Human Meibomian Gland Epithelial Cells

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Mentor: Rachel Redfern / College of Optometry / University of Houston / The Ocular Surface Institute (TOSI)
Form of Presentation: Talk

Meibomian gland dysfunction (MGD) is strongly associated to dry eye disease (DED). Given the well-known anti-inflammatory properties of Vitamin D (VitD), we assessed its effects on cultured human Meibomian gland epithelial cells (HMGEC). In vitro 24h-treatment was followed by RNA extraction and quantitative polymerase chain reaction (qPCR) to measure the expression levels of vitamin D receptor (VDR) and two enzymes: CYP27B1 and CYP24A1, which are involved in VitD activation and degradation, respectively. Preliminary data showed a dose-response increase of CYP24A1 expression after treatment of HMGEC with VitD when compared to the vehicle control. Apparent inactivation of VitD by the Meibomian gland epithelia deserves further investigation.

12.

Predicting Federal Funds Rate Using Extreme Value Theory

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Form of Presentation: Poster

The extreme value theory (EVT) is a very vital aspect of statistics to assess the risk of extreme events caused by natural calamities or untoward circumstances in the social and economic sectors. In probability theory, and statistics, Leonard Tippett developed this theory to study the frequency of rare events and to build up a predictive model so that one can attempt to forecast the frequency of a financial collapse and the amount of damage from such an event. In this study, the Federal Funds Rate in the United States from 1954-2019 has been analyzed. The study has the following objectives. First, normalizing Federal Funds Rate data and fitting an appropriate model for the normalized Federal Funds Rate data. Secondly, predicting the maximum economic return rate from a Federal Funds Rate in the future by using the concept of the return period. Thirdly, applying both generalized extreme value (GEV) distribution and generalized Pareto distribution (GPD) to investigate and compare several estimation methods and their implications. Finally, we investigate the bias of estimated parameters applying a simulation study. Simulated data and real financial data are considered for our research, and the outcome satisfies the efficiency of its application.

13.

Development of an Algal-based Landfill Leachate Treatment System

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Mentor: Dr. Thinesh Selvaratnam / Department of Civil and Environmental Engineering / Lamar University
Form of Presentation: Poster

Landfill leachate is high strength wastewater containing a variety of inorganic species and organic wastes that can possess chronic and acute toxicity. The costs for treating landfills continues to grow throughout the years. The most common method for handling and treating leachate is to co-treat with municipal wastewater. These current practices are energy extensive and deemed unsustainable. The proposed research will develop an algal-based on-site bioremediation pathway to treat leachate. Another benefit that comes from the nutrient removel is the algal biomass produced. This algal biomass can be used for biofuel production, value-added bioproducts, and livestock feed supplements. Successful implementation of the proposed system will reduce the current leachate treatment costs and provide an avenue for supplemental revenue from the produced algal biomass. In this research activity, we have evaluated the potential of using thermophilic mixotrophic algae, *Galdieria sulphuraria* (*GS*) 5587.1 (Isolated from Yellowstone National Park, WY) to efficiently perform on-site treatment of leachate. The initial experiments were conducted in 50 mL algal bioreactors under mixotrophic conditions. We experimentally determined the growth rates *GS* in various dilutions of actual municipal landfill samples and evaluated the nutrient and removal rates. The mixotrophic algal growth rate with a 2.5X dilution of leachate was determined to be 0.209 g $L^{-1}d^{1}$ and yielded a nitrogen removal rate of 22.6 mg $L^{-1}d^{-1}$, which were higher than values recorded with control sets.

14.

Fast and Scalable Density Clustering Algorithm for Big Data Analysis

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Form of Presentation: Poster

Clustering is a very useful unsupervised data mining technique. It has played a crucial role in numerous applications. Big data introduces unique computational challenges to clustering tasks. Efficient clustering algorithms and implementation techniques are keys to coping with the scalability and performance requirements in big data analysis. The purpose of this project is to develop a novel clustering algorithm that can deal with large scale data efficiently and effectively. The proposed algorithm, called KDSpark-SNN (KD tree improved Shared Nearest Neighbor Clustering on Spark), is faster and can be scalable to big data. The KDSpark-SNN algorithm is developed and implemented in a distributed environment using the Spark framework. The effectiveness of KDSpark-SNN is evaluated through a case study involving two data sets, the 911 call dataset and Bristol dataset.

15.

Reliability Prediction Model for Rail Track Geometry

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Form of Presentation: Talk

The railway is one of the important means of transportation for cargo and passengers in the society due to its low cost, relative safety, and carbon emission reduction potential. The railway is a complex system consisting of tracks, safety, telecommunication, and power distribution. The expansion of economic activities has placed unprecedented demand on the railway industry that requires increased capacity in terms of tonnage and speed which has led to a higher degradation rate and maintenance costs for railway assets. Over the years, new technologies and improved safety standards are continuously being introduced, but the accidents still occur. The implications of train derailment are enormous including loss of life, economic loss, damage to property, and environmental impact. Rail transport, asset management, and safety is an interesting area for stakeholders. One of the criteria to ensure the safety of the railway and acceptable railway service is to maintain a high quality of railway track geometry since the deterioration of other track elements is directly related to the condition of the railway track geometry. A railway track geometry reliability prediction model is proposed based on a physics-of-failure approach. The failure mechanisms that cause rail track geometry degradation are incorporated into the model. We expect that the reliability model predicts accurately the optimum working hours under normal operating conditions of the rail track geometry prior to maintenance actions being required.

16.

Theoretical Calculations of Epoxyketene to Lactone Thermal Rearrangement Transition States and Kinetics

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Form of Presentation: Poster

This research focuses on analyzing the rearrangement of an epoxyketene intermediate to a lactone; proposed in 1976 by Padwa but never experimentally proven. The presence of electron donating (EDG) or withdrawing groups (EWG) on the para position of the phenyl ring has the possibility to decrease or increase the energy of activation (Ea) and thus the rate of rearrangement. The rearrangement is exothermic with a negative overall change in energy (ΔH = -46.8 kcal) and occurs in a single step with one transition state. The effects of the groups on the cis isomer showed that EDG decreased the Ea while EWG increased the Ea on phenyl 1; phenyl 2 was insignificant with electronics. For the trans isomer, EDG decreased Ea while EWG increased Ea for phenyl 1; EWG decreased Ea while EDG increased for phenyl 2.

17.

RF Spectroscopy with Nonlinear Si Integrated Microring Resonators

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Form of Presentation: Poster

Microring resonators are widely used as narrow-band filters and efficient wavelength multiplexers for applications in biomedical research, sensor technology, and high bandwidth data transfer. The micrometer-size of such resonators is crucial for modulation of light at gigahertz frequencies. Moreover, research is underway for microring resonators as logic elements for optical micro-processors in future all-optical computing. Measurement of the optical parameters of microring resonators is important for understanding of their performance. However, very small size of such devices poses serious challenges for any such measurement. Therefore, we developed a

different method based on GHz modulation of light and applied it to microring resonators. We demonstrated that this method is successful for measurements of the line width of resonators. We also used this method to measure the nonlinear properties of our microring resonators.

18.

siRNA Silencing of VPS32 in *Tritrichomonas foetus*

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Form of Presentation: Talk

Bovine trichomoniasis caused by Tritrichomonas foetus is an expensive problem among cattle ranchers, causing reduced fertility or miscarriage in females, as well as the need to constantly cull and replace bulls in order to keep transmission within a herd low. Current methods of prevention and treatment are generally ineffective, especially when dealing with bulls, as they are lifelong carriers on the parasite once infected. TfVPS32 gene expression was chosen as the focus of this study in order to advance research on this understudied organism. VPS32 in other organisms has a role in cell division. Therefore, siRNA was used to knock-down the expression of VPS32 gene and the transfectants were analyzed for gene expression and growth. RT-PCR analysis showed that the gene expression was completely abolished, and the cell morphology looked drastically different compared to control cells. Growth curve analysis however did not show a drastic difference between the control and transfected cells. These results suggest that VPS32 gene expression was knocked down using siRNA and it also suggested that VPS32 gene is involved in the maintenance of cellular morphology.

19.

The Correlation between Alzheimer ’s disease and Alcohol Consumption

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Form of Presentation: Poster

Alzheimer’s disease is a sporadic, non-inherited neurodegenerative disease that is characterized by an abnormal extracellular deposition of amyloid-β (Aβ) proteins in the brain. It affects memory, thinking, behavior, and the ability to perform daily tasks. While numerous well-known risk factors contribute to the development of this disease, countless surprising prevention factors could potentially lower one’s chance of being diagnosed with dementia. One of the most controversial factors is alcohol consumption. People who consume excessive amounts of alcohol tend to develop serious cognitive problems. Though some experiments have been performed to accredit the idea that consuming high levels of alcohol can accelerate Alzheimer’s disease, there is no concrete evidence to support this. In fact, there is a newfound interest in discovering the positive health benefits that low to moderate alcohol consumption can offer. Due to various factors, many believe that such levels of alcohol intake may protect against dementia and other brain problems. Despite an influx in new research supporting low levels of alcohol consumption as a potential fighting-agent, there are many unanswered questions regarding the relationship between alcohol and Alzheimer’s disease which prevents a cohesive conclusion from being established. The

purpose of this project was to explore the link between Alzheimer's disease and alcohol consumption. For data gathering purposes, the PRISMA guideline was used. A new insight into how alcohol consumption fits into Alzheimer's disease pathology may help to design new strategies to delay the progression of the disease.

20.

Influence of Pulverized Bottom Ash on Nano-Mechanical Properties of Interfacial Transition Zone and Bulk Matrix

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Form of Presentation: Poster

The effects of pulverized bottom ash (PBA) on nano-mechanical properties of interfacial transition zone (ITZ) and bulk matrix in recycled aggregate concrete (RAC) was studied. Chemical composition of bottom ash was determined by X-ray Diffraction (XRD). Statistical nanoindentation technique (SNT) was proposed to deconvolute the mechanical properties of each phases. The microstructure mapping of ITZ and bulk matrix were analyzed based on the elastic modulus (E) and hardness (H) distributions. The morphology and elemental analysis the of ITZ and bulk matrix were investigated by means of Scanning Electron Microscopy (SEM) and Energydispersive X-ray spectroscopy (EDX) respectively. It was found that utilization of the PBA can significantly enhance the compressive strength of the concrete. Furthermore, EDX results reveal that by decreasing the Ca/Si ratio compressive strength increases. Deconvolution results indicate that micro porosity proportion decreases in both bulk matrix and ITZ to 5.9% and 2.1% respectively. Finally, optical microscopy of the ITZ shows that replacement of bottom ash with cement effectively decreases the ITZ width and consequently improves the particles bonding strength.

21.

The Search for Baryon Resonances – the Excited States of Protons

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Mentor: Dr. Philip Cole / Department of Physics / Lamar University
Form of Presentation: Talk

Nuclear physicists use quantum chromodynamics (QCD), the theory of strong force interactions as a guide for understanding nucleon structure. Using QCD and experimental data, physicists at Jefferson Lab (JLab) in Newport News, Virginia are able to answer questions about confinement, further developing the standard model, nucleon resonances, etc. This project focuses on identifying baryon resonances that decay through the omega meson mode using data taken by the CEBAF Large Acceptance Spectrometer (CLAS12).

22.

Analysis of the Catalyst Effect on Bulk Ammonia Borane-Polyethylene Oxide Hydrogen Storage Composites

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Mentor: Dr. Ozge Gunaydin-Sen / Department of Chemistry and Biochemistry / Lamar University
Form of Presentation: Poster

Ammonia Borane (NH_3BH_3, AB) has been a popular topic of research for chemical hydrogen storage due to its high weight percentage of hydrogen (19.6 wt%) and willingly decomposes around 110 °C to give one mole of hydrogen. A downfall to the applicability of AB is its slow dehydrogenation kinetics and production of unwanted byproducts. Studies show that introduction of a polymer, such as polyethylene oxide (PEO), can improve the performance of AB and decrease the release of harmful byproducts. Furthermore, catalytic additions such as, magnesium chloride ($MgCl_2$) and calcium chloride ($CaCl_2$), have proven to lower the activation energy, improve kinetics, and lower the temperature of hydrogen release. This study explores thermal and vibrational analysis of bulk AB composites with PEO and individual additions of $MgCl_2$ and $CaCl_2$ as catalysts. The bulk composites were prepared by mixing AB with a catalyst solution and then adding the AB-catalyst solution to PEO. Dehydrogenation kinetics were studied using a differential scanning calorimeter (DSC) and the data was compared with AB, bulk AB/PEO composites and analyzed. The results with catalyst exhibited a lower E_a than pristine AB and composites. Evidence of the interactions between AB:PEO:Catalyst were given by Fourier-transform infrared spectroscopy (FTIR) analysis. Thermogravimetric analysis (TGA) was used to determine the weight loss in composites with catalyst compared to pure AB and bulk composites along with observing the electronic structure and functional groups using nuclear magnetic resonance (NMR) spectroscopy.

23.

A Study of Current Data on Fast Radio Bursts

Matthew Johnson
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Mentor: Dr. Cengiz Sen / Department of Physics / Lamar University
Form of Presentation: Talk

Fast radio bursts (FRBs) are millisecond duration radio signals that reach our telescopes from varying distances outside of our galaxy. First discovered about 12 years ago, the origin of these signals is still a big mystery. Some details of FRBs are also under debate. For example, it is yet to be determined that repeating and non-repeating FRBs are caused by identical events. In this study, we propose to analyze various available data to shed light on some of the characteristics shared by FRBs. In particular, we propose to (1) find the relation between the strength/distance/duration of these signals, (2) quantify the degree of isotropy of FRBs, and (3) investigate the medium through which these signals propagate using the dispersion measure data. We believe such an analysis of the available data on FRBs will not only provide some characteristics these signals share, but also give insight as to the mechanism that created these events.

We mapped all known FRBs, using their right ascension and declination data, to a 2-dimmensional representation of the sky. We then mapped Z values using their dispersion measure data to determine distance. This showed us that these signals are isotropic in nature. We then overlaid the FRB map, on top of a map of all known galaxy clusters to see if there were any overlaps of points to find were these signals may be coming

from. We found ten potential matches, of those ten we found three near matches. If these three matches can be confirmed, this could be a tool for use in locating future signals.

24.

Molecular Links and Biomarkers of Stroke to Alzheimer's Disease

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Form of Presentation: Poster

Alzheimer's disease is a type of dementia that causes problems with memory, thinking and behavior. Symptoms usually develop slowly and get worse over time, becoming severe enough to interfere with daily tasks. Alzheimer's disease can be caused by several risk factors like hypertension, diabetes, and obesity. Neurodegenerative operations act with these risk factors to intensify the rate of the disease. Specifically, for this research project, the risk of acute ischemic stroke was looked into and has been observed to be correlated to Alzheimer's disease. Literature states that those who experience a stroke, Alzheimer's is doubled with 30% developing cognitive disfunction in 3 years. Risk for both stroke and Alzheimer's increases significantly after the age of 65 with 75% of strokes occurring in the US with patients who are 65+ and 80% worldwide with Alzheimer's. An animal study of mouse models was completed to monitor if ischemic stroke is more prevalent in mice with Alzheimer's. By monitoring the rate of rarefaction in pial collaterals, the vascular dysfunction was seen to promote the onset of AD. Scans of the mouse brains revealed the significance of cognitive decline caused by ischemic stroke. The purpose of this project is to explore the link between Alzheimer's disease and ischemic stroke. For data gathering purposes, the PRISMA guideline was used. Despite numerous data, there is still lack of evidence to draw a direct correlation between stroke and Alzheimer. However, it is imperative that we conduct more studies to adequately understand this relationship.

25.

An Analysis of Baking Schedules for Highly Moisture Sensitive Electronic Components

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Mentors: Dr. Xuejun Fan and Dr. Jenny Zhou
Department of Mechanical Engineering / Lamar University
Form of Presentation: Talk

The distributed moisture inside the molded plastic body plays a vital role for the survivability of the Highly Moisture Sensitive components. Moisture humidity penetrate permeable electronic packaging materials by diffusion. Highly Moisture Sensitive Components are required to be baked by the manufacturer prior to the packing process. If the bake times are not enough to reduce the moisture below the critical value for the given sensitivity level of a mold Compound, then it causes a serious issue of permanent device failure during solder reflow process. Meanwhile, at the same time, a supplier also does not want an excessive baking time. An attempt to formulate an analytical solution and the parametric study to predict the profile of an accumulated moisture inside the body during manufacturing process is done. A set of MATLAB script is developed to simulate the moisture absorption and baking process, and on which the parametric study is performed. In order to reduce the

Manufacturing Cycle time of the SMDs, an attempt is done to recommend the manufacturer for the bake time required before electronic packaging.

26.

Heavy Metals in Cosmetic Products and Their Effect on the Development and Progression of Alzheimer's Disease

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Form of Presentation: Poster

Alzheimer's Disease and neuroinflammation is becoming an unnerving reality for many individuals as the most populated age group, the baby boomers, reach an elderly age. Many Alzheimer's patients require intensive care and numerous resources for their continued treatment and wellbeing. This review is conducted to draw awareness to exposure to heavy metals in cosmetics that are potentially a factor in the progression of Alzheimer's Disease, so we may reduce the cost and energy associated with treating the onset and progression of Alzheimer's. Cosmetic products are frequently used by individuals to improve hair, skin, nails, and general health. However, a collection of articles have identified various heavy metals present in these daily-use products. Furthermore, research and clinical studies have revealed certain heavy metals lead to severe detriments to human health including those that have been linked to the adverse effects that accompany neurodegenerative diseases such as Alzheimer's Disease. These metals have been associated with the accumulation of toxic β-amaloids and tau proteins, the buildup of which causes a decrease in the brain's physiology. Exposure to the heavy metals in certain cosmetics through inhalation, ingestion, or topical application have effects that appear to show undeniable links to Alzheimer's Disease. As even small traces of nonessential metals can disrupt the homeostasis of the body, in order to prevent or slow the progression of Alzheimer's Disease, this research presentation may provide a new strategy to delay neurodegenerative disease by avoiding exposure to heavy metals, such as with excessive cosmetic use.

27.

Analysis of Non-Emergency Calls for Efficient Resource Allocation in Houston, TX

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Mentor: Dr. Berna Tokgoz / Department of Industrial Engineering / Lamar University
Form of Presentation: Poster

The 311 helpline is offered in the US for submitting requests regarding non- emergency municipal services. City residents can report public issues such as sewage problems, solid waste collections, street hazards, and potholes. 311 calls fluctuate which might affect the timely deployment of resources. In this study, 311 calls between 2011 and 2018 have been analyzed to predict future calls for Houston, TX. Predicting future calls by analyzing the historical data as well as using different forecasting methods can help to allocate resources. In addition, prediction helps in resource allocation in the aftermath of disasters such as flooding and wind damage.

28.

Relationship of Exercise Intensity on Blood and Sweat Lactate

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Mentor: Dr. Shannon Jordan / Department of Health and Kinesiology / Lamar University
Form of Presentation: Poster

Blood lactate levels are used in exercise testing to determine the amount of anaerobic metabolism occurring during high-intensity exercise. Typical procedures for measuring blood lactate involve either a finger stick blood sample or a venous blood draw. To date, the literature is equivocal regarding whether sweat lactate values change with exercise intensity. The purpose of this study is to examine the relationship between sweat lactate and blood lactate values during incremental exercise. This pilot study would consist of 20 healthy recreationally active individuals (10 male, 10 female) between the ages of 18 and 35 who volunteer to participate in the study. Participants will perform an exercise test on a cycle ergometer to volitional fatigue to determine VO_{2peak} and HR_{peak}. Blood lactate will be collected via finger stick and sweat lactate will be collected in a sweat "pouch" at each state of exercise. Participants will perform an additional exercise session at 40, 60, and 80% heart rate reserve. During this test, blood and sweat lactate will be collect during each intensity level. Lactate samples will be analyzed via the lactate oxidase method on the Chemwell 2910 chemistry analyzer. Whole body sweat rate will be calculated and correction factors will be applied if necessary. The research design will be a randomized block design. Statistical analysis will be performed on SPSS software for descriptive statistics and analysis of variance.

29.

Regional Convolution Neural Network

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Mentor: Dr. Jane Liu / Department of Computer Science / Lamar University
Form of Presentation: Poster

Deep learning and neural network give the best result to train for recognizing images. Deep learning applications use multilayers network through algorithm that can teach itself to recognizing object such as human, handwriting, object, etc. Especially, convolution neural network (CNN) is a category of neural network that consider to be widely effective identify, classify, and quantify patterns in images. CNNs was heavily in use since 1990s, there are two main approaches of this for image classification which are regional convolutional neural network (RCNN), and fully convolutional regional network (FCNN). Representation depth is beneficial for the classification accuracy and performance in image recognition. Image recognition has basically 3 programs in it which are training, testing and validation. Evaluation of image classification is on VOC-2007, VOC-2012 for action classification, and presently VGG image-only and VGG image and bounding box. Regional Neural Network is a different CNN like GoogLeNet, which approaches model prioritizes in simplicity, accuracy and speed with lower cost. It is widely used in medical field nowadays.

30.

Evaluation of a thermo-tolerant acidophilic alga, *Galdieria sulphuraria,* for landfill leachate treatment

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Mentor: Dr. Thinesh Selvaratnam / Department of Civil and Environmental Engineering / Lamar University
Form of Presentation: Poster

Landfill leachate is high strength wastewater containing a variety of inorganic species and organic wastes that can possess chronic and acute toxicity. Depending on the landfill size and age, costs associated with the treatment of leachate range between hundreds of thousands to millions of dollars per year. The most common method for handling and treating leachate is to collect and transport to a Publicly-Owned Treatment Works (POTWs) where it is co-treated with municipal wastewater. However this method is considered unsustainable due to various water quality and regulatory issues. Therefore, it is vital to develop sustainable, cost-effective on-site leachate treatment technologies focusing on near and longer-term contaminant issues. In this research study, we evaluated the potential of using thermophilic mixotrophic algae, Galdieria sulphuraria (GS), to efficiently perform on-site treatment of leachate. We experimentally determined the growth rates of GS in various dilutions (20%, 40%, 60%, 80%, 100%) of actual municipal landfill leachate samples, and evaluated the nutrient and removal rates in 50 mL algal bioreactors. Based on the results, it was clear that the growth reactors with 20% landfill leachate outperformed the other growth reactors in terms of final biomass density and nutrient removal rates. Final algal biomass density in 20% landfill leachate was 2.16 g L -1 , which is more than twice as in standard Cyanidium medium (CM) with 0.96 g L -1 , and the observed growth rate was 159 mg L-1d-1. Fourteen-day removal efficiencies were 99.9% for ammoniacal-nitrogen and 34% for phosphate. Removal rates were 22.78 mg L-1d-1of ammoniacal-nitrogen and 2.91 mg L-1d-1 of phosphate. Overall, this study showed a promising algal-based treatment system for landfill leachate nutrient removal, meanwhile achieving high algal-biomass production using landfill leachate to instead of freshwater and chemical fertilizer as nutrient source.

31.

Biosynthetic Conversion of Ag+ to Colloidally Stable Ag0 nanoparticles by Chlamydomonas Reinhardtii: A Mechanistic View of the Light-Induced, Extracellular Polymeric Substances-Mediated Synthesis Process

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Form of Presentation: Oral

In the current study, the freshwater microalga Chlamydomonas reinhardtii bioreduced Ag+ to colloidally stable silver nanoparticles (AgNPs), demonstrating a more sustainable alternative process to conventionally produced AgNPs. The process required photons to promote the reaction. The production of AgNPs was confirmed by the

characteristic Ag0 surface plasmon resonance (SPR) band in the range of 415-430 nm using UV-Vis spectrophotometry. X-ray diffraction (XRD) determined that the NPs were Ag0 . Transmission electron microscope (TEM) images showed stable AgNPs were mostly spherical with size < 10 nm. Moreover, Ag+ to AgNP conversion rate was determined by inductively coupled plasma atomic emission spectroscopy (ICP-AES). The AgNPs were stable over time in the cell culture media, acetone, NaCl and reagent alcohol solutions. This was verified by a negligible change in the features of the SPR band after t > 300 days of storage at 4 °C. Fourier-transform infrared spectroscopy (FTIR) of the as-produced AgNPs confirmed the presence of polysaccharides, polyphenols etc. and the corresponding shifts in the peak intensities and positions indicated the functional groups in the EPS that reduced Ag+ , capped Ag0 , and promoted the stability of AgNPs. Based on these findings, EPS-mediated biosynthesis mechanism has been proposed that began with the non-photon-dependent adsorption of Ag+ to EPS biomolecules followed by the light-driven reduction of Ag+ to Ag0 by an electron donated by the biomolecules. Following the reaction, stabilization of the NPs took place as a function of EPS concentration, which was identified as the final step of the mechanism.

32.

Evaluation of Condition of Utility Poles of Electric Power Distribution Networks for Natural Disasters

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Form of Presentation: Poster

The electric power distribution network is one of the infrastructures that experience frequent and large-scale damages caused by storms. In particularly, the wooden poles carrying power from local substations to customers are found to be extremely vulnerable to storms. There are several reasons for pole failure such as pole inclination angle, decay over time, falling trees or branches, etc. Among them, the pole inclination angle is assumed to have significant impacts and not much addressed in the existing literature. On the other hand, pole failure inevitably leads to power outages for hours, days, or even weeks, depending on the intensity of storms and the severity of damages. This study is focused on evaluating the condition of electric poles for wind events. Images collected by Unnamed Arial Vehicle are used to determine the current inclination angles of the poles. Predetermined inclination angle images by using Convolution Neural Network (CNN) are used to determine the forces and corresponding moments generated at the pole. Different wind speeds are applied to the inclined poles with the finite element analysis by using ANSYS® Workbench. Progressive dynamic moments on the poll are calculated for the future wind events.

33.

Hydrocarbon Leak Detection through Infrared Imaging Systems Mounted on Drones

Jared Richards
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Mentor: Philip Cole / Department of Physics / Lamar University
Form of Presentation: Talk

Mounted on an unmanned aerial vehicle, an infrared camera can detect hydrocarbon leaks. Developed at Infrared Cameras Inc., these drones mounted, infrared imaging systems provide a productive approach to reducing

hydrocarbon emissions. This project focused on determining the sensitivity of ICI's cameras to varying environmental conditions and on developing the requisite testing methods.

34.

Characteristics and Travel Behavior Analysis of Vessel Traffic based on AIS Data-A Case Study at Houston Ship Channel

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Department of Civil and Environmental Engineering / Lamar University
Form of Presentation: Talk

This paper studied one-way vessel traffic delay analysis in Houston Ship Channel (HSC) using AIS data. Data for the month of August obtained from Houston Pilot has been used in this study. There are three different restrictions on the width (beam) of vessels for different narrow sections of the HSC. This study focuses on one restriction: wide-body restriction according to which there cannot be any meeting of ships greater than or equal to 106 feet (32 m). The restriction starts where the Beltway-8 Bridge is located, and it continues until the end of the channel. Wide-body vessels in this study are considered as those with width of 106 feet (32 m) or more. The objective of the study is to determine the number of vessels that might be potentially impacted by a wide-body vessel moving in this narrow part of the channel. Also, the study aims to investigate the delay of vessels caused by each wide-body vessel at each dock located above the Beltway-8 Bridge. We found because of 78 wide-body vessels arriving at the narrow part of the channel, 47 sailing vessels in 19 docks (located above the Bridge) are actually impacted. The most severely impacted dock is City docks where total delay is estimated at about 13.51 hours. The result of the study would be helpful for decision makers to reduce the negative impact of long waiting time of vessels in the narrow channel.

35.

Radiation from a Non-Conformal Antenna Array on an Electrically Large Conducting Convex Platform

Babajide Salau
Electrical Engineering / Lamar University

Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University
Form of Presentation: Talk

Numerous antennas are installed on the fuselage of a typical aircraft. These antennas usually have various communication and sensing purposes such as ground and satellite communications, GPS, air traffic control, and altitude measurement. These antennas are generally designed in the absence of the platform on which they are mounted. However, the presence of the platform alters their radiation patterns and may significantly affect their performance. Asymptotic methods are preferred over full wave methods in the prediction of radiation patterns of antennas in the presence of platforms that are extremely large compared to a wavelength due to superior computational efficiency of these methods in the analysis of these problems. In this study, the radiation pattern of a non-conformal antenna array on a perfectly conducting smooth convex surface is predicted using an asymptotic method. The array pattern is predicted by transforming and combining the radiation patterns of array elements after generating the radiation pattern of each monopole antenna on the surface, separately. Numerical

results generated using the proposed approach are compared with those obtained using FEKO commercial electromagnetic simulation software for validation. Unlike previous studies, this study allows for the analysis of not only conformal antenna arrays, but also non-conformal antenna arrays.

36.

Detection of Trace Amount of Water in Organic Solvents by a K-Band Molecular Rotational Resonance Spectroscopy

Sandeep Singh
Chemistry and Biochemistry / Lamar University
Co-authors: Ratna Sekhar[1], Alex Mikhonin[2], Matthew T. Muckle[2], and Justin L. Neill[2], Sylvestre Twagirayezu[1]
[1] Department of Chemistry and Biochemistry, Lamar University
[2]BrightSpec Inc, 770 Harris St, Suite 104b, Charlottesville, VA 22903.

Mentor: Dr. Sylvestre Twagirayezu / Department of Chemistry and Biochemistry / Lamar University
Form of Presentation: Poster

Trace amount of water has been detected in ethanol (CH_3CH_2OH) and methanol (CH_3OH) solvents using a K-Band Molecular Rotational Resonance (MRR) spectrometer in the 18-26GHz frequency range. The analysis of the observed rotational spectra reveals the presence of a weak rotational transition of water at 22.3GHz. The capability for K-band MRR to extract water in organic solvents have been further examined and validated by spiking samples with known small amount of water. The resulting linear curves allowed the determination of limit of detection at ppm levels. These findings suggest that K-band MRR has potential to be useful as a tool for fast detection of water in organic solvents or other raw materials.

37.

Multiscale investigation of corrosion on super-hydrophobic aluminum alloy using electrochemical techniques and in-situ AFM

Divine Sebastian
Mechanical Engineering / Lamar University

Mentor: Dr. Chun-Wei Yao / Department of Mechanical Engineering / Lamar University
Form of Presentation: Talk

Corrosion is a serious challenge faced by mankind in terms of economy as well as environmental impact since the iron age. There are various types of corrosion process based on the mechanism by which it occurs. An efficient way for controlling corrosion is arresting one or more factors that lead to the occurrence of corrosion. In this work, a facile superhydrophobic coating for an aluminum alloy is developed and characterized at different scales of investigation using a silica-based nanocomposite coating solution. Proper analysis of corrosion initiation and better understanding about the mechanism of propagation are as important as developing preventive methods to control corrosion. The corrosion resistance of the coating was analyzed using different electrochemical techniques such as potentio-dynamic polarization method and electrochemical impedance spectroscopy. The results confirmed the high anticorrosion behavior of the developed coating. Furthermore, a micro/nanoscale investigation about the physical changes occurring at the interface between the surface of substrate and the corrosive environment was carried out using in-situ Atomic Force Microscopy. The change in surface topography was monitored for the superhydrophobic aluminum alloy for certain period and was compared against the same change occurred in the case of bare aluminum substrate. Overall, the results showed that the superhydrophobic coating

developed in this work is highly effective in controlling corrosion even in mild corrosive conditions for a long time.

38.

Glucose Metabolism Impairment in AD: Does Decreased Glucose Metabolism Lead to AD

Aziz Shaaban
Biology / Lamar University
Co-Authors: Katherine Correa and Jordan Curl

Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University
Form of Presentation: Poster

Alzheimer's disease is the most prevalent and socioeconomically challenging type of dementia in our modern society. Its disabling features affect 5.8 million individuals over the age of 65 in the US alone. With such devastating impact, it is important to study and understand the cause of this disease. The Tau bundles and amyloid beta protein accumulations have long been characteristics of Alzheimer's disease. However, Alzheimer's disease (also appropriately nicknames type 3 diabetes) is found to be linked to the inefficient uptake and processing of glucose in the body. This study is designed to explore recent clinical trials, review studies, and research in an effort to answer the question: does Alzheimer's disease lead to dysfunctional glucose metabolism or does defective glucose metabolism lead to Alzheimer's disease? Through this review of various articles on the matter, an established pattern was found that those with Alzheimer's disease had lower glucose uptake in cells, high glucose concentration within the brain, damage to enzymes involved in the glycolytic cycle, and low activity for glucose transporters. Based on the studies reviewed, we concluded it is most probable that glucose dysmetabolism and enzyme insufficiency contributes to the development of Alzheimer's disease and may even be a leading cause.

39.

Efficient Radar Signature Prediction

Manthan Shah
Electrical Engineering / Lamar University

Mentor: Dr. Cagatay Tokgoz / Department of Electrical Engineering / Lamar University
Form of Presentation: Talk

Radar signature of an object defines how much it is visible or detectible by radar systems. When it is needed to design an object or a vehicle with small radar signature, it is important to be able to predict its radar signature at design stage and reduce it as much as possible using electromagnetic simulations. These simulations will help avoid costly and hard-to-conduct radar signature measurements. In this study, the previous work that is based on physical optics and physical theory of diffraction has been extended to include iterative physical optics (IPO). PTD enables inclusion of diffractions from physical edges of an object whereas IPO helps include multiple reflections or bounces between different parts of an object in electromagnetic simulations to yield better accuracy. These methods are applied to a triangulated mesh surface that is a computer representation of an object. Physical edges of an object are extracted from a triangulated mesh surface to be able to apply PTD in conjunction with PO and its iterative version, IPO. Numerical results generated using a code that applies these methods to predict radar signature of an object will be presented in comparison with simulation results obtained using FEKO commercial electromagnetic simulation software.

40.

Basics of Quantum Computing

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Mentor: Dr. Malik Rakhmanov
Department of Physics and Astronomy / University of Texas Rio Grande Valley, Brownsville
Form of Presentation: Talk

Emerging field of quantum information gave rise to the development of quantum computers. But how do they work? In this talk we will answer this and related questions and give an overview of quantum computing beginning with quantum mechanics. We will introduce quantum computing and explain why it is different from classical computing. We will also describe basic principles of quantum bits (qubits), give examples of quantum algorithms, and compare them with their classical counterparts.

41.

Estimation of Silica, Carbonate and Other Clay Mineral Content by FTIR Spectroscopy in Mud-Rich Sediments and its Implications for Sediment Provenance Analysis

Haley Snyder
Chemistry and Biochemistry / Lamar University
Co-Authors: Dr. Ozge Gunaydin-Sen, Dr. Edgardo Pujols and Dr. Julio Lev-Lopez

Mentors: Dr. Ozge Gunaydin-Sen and Dr. Edgardo Pujols
Department of Chemistry and Biochemistry / Lamar University
Form of Presentation: Poster

Fine-grained particles may yield crucial insights in reconstructing the depositional processes, history, provenance, and paleogeography of many geologic settings. This study utilizes FTIR Spectroscopy to determine the relative abundance of quartz, carbonates, feldspar and other clay minerals in mud-rich conglomerates and sandstones from Cretaceous offshore, shallow marine and alluvial fan deposits in western USA. With this project, we aim to establish a methodology on fine-grained sediment identification and quantification using FTIR as well as establish its limitations on provenance and paleogeographic reconstructions. The samples with different content of minerals were abbreviated as SRAL2, TM401, TC401, and SRAL3. The first three showed with OH stretching and Si-O peaks, typical of hydrated phyllosilicates and amphiboles; the latter's spectra only showed the Si-O peaks. Further work of quantifying the mineral content in the samples is in progress.

42.

Comparison between Shear Strengths of Stabilized Clayey Dredged Soil Samples

Ratish Jung Subedi
Civil and Environmental Engineering / Lamar University

Mentor: Dr. Mien Jao
Department of Civil and Environmental Engineering / Lamar University
Form of Presentation: Poster

This paper is about the comparison between the output of experiment of the stabilized Dredged Material (DM) using additives – Fly ash Class F (FA), Hydrated Lime (HL), Portland Cement (PC) and Quick Lime (QL). The DM was Clayey high plastic soil dredged from the US Army Corps of Engineers Port Arthur (USACEPA) facility along the Neches River which lies on Orange and Jefferson Counties, Texas. The majority portion of dredged material is clay soil. The standard compaction test was performed in order to obtain the optimum moisture content of all mixed samples. Stabilized mixed samples were subjected to direct shear test. It is found the overall stabilized clayey DM has increased in cohesion and shear strength which could be potential use as filling materials which also helps environmentally managing the dredged materials.

43.

Triglycerides and their Potential Role in Cognitive Decline

Hannah Thompson
Biology / Lamar University
Co-Authors: Katelin Catching and Trayce Gray

Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University
Form of Presentation: Poster

Cognitive impairment impacts an estimated 16 million Americans. This often progresses to a more severe condition, known as Alzheimer's disease, which is a neurodegenerative disease that affects upwards of 5.8 million people in the United States. Currently, there are no known strategies to prevent or treat this disease. The current approach to treating symptoms of this disease are expensive, largely ineffective, and burdensome on medical resources and caregivers involved in the patient's care. Recent studies suggest that there is a correlation between healthy lifestyle and diet in the delay of cognitive decline. Lipids, especially triglycerides, have a profound effect on how the brain forms and conducts electrical signals. Studies have shown that altered triglyceride levels demonstrate promising results which could help determine a treatment approach and prevention for the progression of this disease. Our data was compiled using PRISMA guidelines and reviewed to explore the potential link between Alzheimer's disease and triglycerides. We examined the impact of various lengths of triglycerides and their potential role in early detection, prevention, and treatment of Alzheimer's disease. Unfortunately, there are many gaps in this research and conflicting data, which indicates that further research on this topic would be beneficial to understanding and treating this dreadful disease.

44.

Hearing Loss as It Relates to Alzheimer's Disease

Yen Vu
Biology / Lamar University
Co-Authors: Tara Holder and Nyah Sciarrilla

Mentor: Dr. Maryam Vasefi / Department of Biology / Lamar University
Form of Presentation: Poster

Alzheimer's disease is a brain disorder that causes memory loss and other important brain functions. It is one of the most common diseases in the U.S, especially in the elderly. With nearly 5.3 million cases total, out of which 81% are older than 75 years old, Alzheimer's disease is the most common cause of progressive dementia today. Researchers are working diligently to find the answer for not only a remedy, but also a way to slow down or even prevent the disease. Over the past years, multiple studies have shown different risk factors that could potentially lead to a decline in brain function, one of which is hearing loss. Hearing loss can cause indirect atrophy to the

brain by preventing auditory signaling from reaching a higher order, thereby disconnecting the communication to the brain. This hypothesis can be further branched out when the molecular mechanisms of the ear and brain are taken into consideration. By detecting early signs of presbycusis, hearing aids can restore communication between the ear and the brain. Furthermore, it can potentially negate social withdrawal and its negative effects, many of which are risk factors for Alzheimer's disease, leading to a happy and healthy life. For this project, data was gathered from multiple different research as well as scientific articles using the PRISMA approach. Graphs and charts generated from these studies support the hypothesis of hearing loss can potentially lead to or exacerbate Alzheimer's disease.

45.

Active modulation of Surface Plasmon Polaritons at Degenerate Semiconductor Interfaces

Dr. Raj K Vinnakota
Physics / Grambling State University, LA
Co-Authors: Dr. Dentcho Genov, Dr. Daniel Wasserman, Zuoming Dong

Mentors**:** Dr. Dentcho Genov / Department of Physics / Louisiana Tech University and
Dr. Daniel Wasserman / Department of Electrical and Computer Engineering /
University of Texas at Austin
Form of Presentation: Talk

We demonstrate an optoelectronic switch for plasmonic circuits based on active control of Surface Plasmon Polaritons (SPPs) at degenerate PN+-junction interfaces. We developed a Self-consistent multi-physics model to study the electromagnetic, thermal and IV characteristics of the device. PN+ diodes are fabricated, consisting of degenerately doped n-type and heavily doped p-type material, where the n++ semiconductor supports infrared propagating SPPs. Devices were characterized electrically and optically. We achieved reflectivity modulation of 1.5% under applied bias in mid-IR wavelengths. A strong agreement between our model and experimental results is exhibited. The presented devices offer new synergy between electronic and photonic devices.

46.

HVAC System Selection and Design for Rare Document Storage and Archives building

Deependra Yadav
MS in Mechanical Engineering / Lamar University

Mentor: Dr. Kendrick Aung / Department of Mechanical Engineering / Lamar University
Form of Presentation: Talk

Temperature and humidity have great impact on deterioration of rare documents that demand these documents be stored in a controlled environment maintaining temperature and humidity throughout the year. In this study, an HVAC system was designed for Rare Document Storage and Archive Center utilizing a whole-building systems approach to achieve energy efficiency with all thermal requirements. The Center with a floor space of 1625 square feet is located in Mumbai, India. The design alternatives for the building envelope and HVAC system has been simulated with EnergyPlus to develop an HVAC system that meets ASHRAE Standards 189.1 and 90.1.

OFFICE OF UNDERGRADUATE RESEARCH ANNOUNCES THE 2019 O.U.R. GRANT RECIPIENTS IN STEM FIELDS

Sindi Castillo | Major in Biology | Mentor: Dr. Ashwini Kucknoor
Project in Biology – Titled: "*The Inflammatory Investigation of Cervical Cancer Cells in Response to Trichomonas Vaginalis*"

Caitlyn Clark* and *Emily Ingram | Majors in Chemistry & Biochemistry and Chemical Engineering | Mentors: Dr. Ozge Gunaydin-Sen and Dr. Cengiz Sen
Project in Chemistry and Physics – Titled: "*Investigations of Autocatalytic Phenomena using a Continuously Stirred Tank Reactor and Python Simulations*"

Kyleigh Dixon | Major in Civil Engineering | Mentor: Dr. Thinesh Selvaratnam
Project in Civil Engineering – Titled: "*Development of an Algal-based Landfill Leachate Treatment System*"

Menna Elsaka | Major in Chemistry | Mentor: Dr. Ashwini Kucknoor
Project in Biology – Titled: "*Effect of Akkermansia Muciniphila on Intestinal Epithelial Cell Integrity upon Interaction with Other Common Gut-Bacteria*"

Karen Figueroa | Major in Chemical Engineering | Mentor: Dr. Clayton Jeffryes
Project in Biology – Titled: "*Conversion of Corn Ethanol Waste to Value-Added Products by Algae*"

Donna Fleming | Major in Chemistry & Biochemistry | Mentor: Dr. Christopher B. Martin
Project in Chemistry – Titled: "*Synthesis of Epoxyketene Precursors*"

David Halnon **|** Major in Physics | Mentor: Dr. Philip Cole
Project in Physics – Titled: "*Optical Gas Imaging – Remotely Locating Hydrocarbon Leaks*"

Marua Hernandez* and *Jesse Blackburn | Majors in Chemical Engineering | Mentor: Dr. Sidney Lin
Project in Chemical Engineering – Titled: "*Study of Micro-Encapsulated Phase Change Materials for Energy Storage*"

Matthew Johnson | Major in Electrical Engineering | Mentor: Dr. Cengiz Sen
Project in Physics – Titled: "*Using Python Programming Software to Identify Radio Signals of Interest in Radio Pulsar Data*"

(Continues)

Cleveland Elijah Keal | Major in Chemical Engineering | Mentor: Dr. Clayton Jeffryes
Project in Chemical Engineering – Titled: "*Microwave-Assisted Separation of Fuel Feedstocks from Waste Streams*"

Ablasse Kingcaid-Ouedraogo and Rebekah Schilberg | Major in Chemistry & Biochemistry | Mentor: Dr. Sylvestre Twagirayezu
Project in Chemistry – Titled: "*Accurate Methods based on Molecular Rational Resonance Spectroscopy for Fast Detection of Polar Impurities in Petroleum Mixtures*"

Samantha Marchner | Major in Biology/ Pre-Med | Mentor: Dr. Maryam Vasefi
Project in Biology – Titled: "*Associations between Beta-Amyloid Aggregation and Pathogens in Alzheimer's Disease*"

Aris Martinez | Major in Physics and Civil Engineering | Mentor: Dr. Bogdana Bahrim
Project in Physics – Titled: "*Electron Transfer during Ion-Surface Collisions*"

Tyler Nelson | Major in Mechanical Engineering | Mentor: Dr. Ian Y. Lian
Project in Biology – Titled: "*Development of 3D Printed Substrate for β-islet Cell Culturing*"

Dylan Palmer| Major in Mechanical Engineering| Mentor: Dr. Chun-Wei Yao
Project in Mechanical Engineering – Titled: "*Laser-Assisted Fabrication of Micro-structured Hydrophobic Steel and Aluminum Surfaces with Corrosion Resistance*"

Julio Benjamín Morales | Major in Health and Kinesiology | Mentor: Dr. Julio Morales
Project in Health and Kinesiology – Titled: "*Reliability and Validity of New Test to Measure Anaerobic Power*"

Hannah Thompson | Major in Biology / Pre-Med | Mentor: Dr. Maryam Vasefi
Project in Biology – Titled: "*A Structured Intervention for Cognitive Decline*"

Jared Richards | Major in Physics| Mentor: Dr. Philip Cole
Project in Physics – Titled: "*Resonating the Proton at Jefferson Lab*"

Jordan Snowden | Major in Biology | Mentor: Dr. Matthew P. Hoch
Project in Biology – Titled: "*Exploring Light Dependence of Sulfide Oxidizing Microbial Communities in Southeast Texas Coastal Marsh*"

Kimanh Tsan | Major in Biology| Mentor: Dr. Matthew P. Hoch
Project in Biology – Titled: "*Microbial Response to and Environmental Fate of Copper Oxide Nanoparticles in Aquatic Ecosystems*"

GET INVOLVED in Undergraduate Research!

It is FUN!

Upcoming events & more!

6th Annual Humanities, Arts, Social & Behavioral Sciences, Education & Business (HASBSEB)

November 23, 2019 in Galloway building

Keynote Speaker: Dr. Danny Chand
Associate Professor of Political Science
Kent State University, Kent, OH

Abstracts due by November 7th | Registration deadline: November 14th

Join our student organization: Lamar University Undergraduate Research Association (LURA)

"LURA was founded in fall 2019 to fulfill the need for a community *by* and *for* undergraduate students to discuss, collaborate, and learn how effectively one can conduct research.

The consistent quality and volume of research conducted by undergraduate students at Lamar University has made it clear that there is a need for an organization to act as a vital resource for building young researchers. Thus, LURA provides an academic forum that connects all level students from freshmen to seniors with their professors and mentors, and facilitates communication between Lamar undergraduates and their peers around the nation.

LURA is a platform for offering panel discussions about

- Research opportunities inside and outside Lamar,
- Better ways to deliver undergraduate research results in poster and oral presentations,
- Ways to perform peer mentoring,
- Organizing workshops on various topics, including how to successfully apply to graduate schools.

LURA is the premier student organization at Lamar University for any undergraduate student interested in doing research. The Office of Undergraduate Research provides strong support and offers logistics to this student organization."

Please contact URALamar@gmail.com or visit the Office of Undergraduate Research at Lamar in Chemistry 115A or https://www.lamar.edu/undergraduate-research/index.html.

NOTES

Thank you