22nd Annual UVI Hybrid Fall Research Symposium PROGRAM BOOK

September 26, 2021
Emerging Caribbean Scientists Program
College of Science & Mathematics
University of the Virgin Islands

22nd Annual UVI Hybrid Fall Research Symposium

PROGRAM BOOK

~

Sunday, September 26th, 2021
University of the Virgin Islands
Orville Kean Campus, St. Thomas
Room TED 101
Zoom Meeting ID: 975 8789 0816

~

Event Organized by:
Emerging Caribbean Scientists (ECS) Program
College of Science and Mathematics
University of the Virgin Islands
#2 John Brewer's Bay
St. Thomas, USVI 00802
Phone: 340-692-4109
Fax: 340-693-1245
Email: ecs@uvi.edu
Website: http://ecs.uvi.edu

The mission of the Emerging Caribbean Scientists (ECS) Program is to increase research training and promote excellence for STEM (science, technology, engineering, and mathematics) students at the University of the Virgin Islands.

TABLE OF CONTENTS

SCHEDULE

Zoom: https://zoom.us/j/97587890816

Session #01 (In-Person Presenters)

1:00 PM - Opening Remarks

Time	Student Name(s)	Title	Subject	Research Institution	Mentor(s)
1:05	Brittney Anderson (9)	In Vitro Study of Cobalt and Copper Complexes with Thiosemicarbazone Ligand used to Treat Triple-Negative Breast Cancer	Biomedical & Other Health Sciences	Old Dominion University	Dr. Alvin Holder
1:10	Teh'Rhon Rabsatt (24)	K-Mean Algorithm Usage for Audio Signal Feature Detection	Computer Science & Technology	University of the Virgin Islands	Dr. Marc Boumedine
1:15	Janae Bruce (12)	In Vitro Study of a Copper Complex Drug used to treat Triple-Negative Breast Cancer	Biomedical & Other Health Sciences	Old Dominion University	Dr. Alvin Holder, Dr. Stephen Beebe and Duaa
1:20	Sarai Hutchinson (22)	Stony Coral Tissue Loss Disease Time Series Around St John, USVI.	Marine Biology & Environmental Sciences	Woods Hole Oceanographic Institution - Apprill Lab	Dr. Amy Apprill and Cynthia Becker
1:25	Jordina Pierre (23)	Propofol Anesthesia Disrupts Stimulus-Induced Intracortical Coherence	Biomedical & Other Health Sciences	Massachusetts Institute of Technology (MIT)	Emery Brown, Ph.D. and John Tauber
1:30	Donna Archer (10)	How Can Understanding the Soul of Leadership Be Used to Stimulate STEM Students' Success at	Psychology, Social Science & Humanities	University of the Virgin Islands	
1:35	Ellaina A. Wyllis (26)	Transcriptional regulation by SP1 and c-myc effector domains	Biology, Genetics & Other Life Sciences	Harvard Medical School	Dhana Friedrich, PhD
1:40	Rickila Hanley (21)	Looking for Optical Astronomical Transients with the Etelman Observatory	Physics & Astronomy	University of the Virgin Islands	Dr. Dario Carbone
1:45		BREAK			
1:50					
1:55					

Zoom: https://zoom.us/j/97587890816

Session #02 (Online Presenters)

Time	Student Name(s) & Abstract #	Title	Subject	Research Institution(s)	Mentor(s)
2:00	Chloé Camacho & Samuel Gittens (13)	Condition Assessment of Out Planted and Wild Coral at One of Cramer's Park's Patch Reefs	Marine Biology & Environmental Sciences	St. Croix East End Marine Park	Caroline Pott
2:05	Alexanne Carr (14)	Are Mood and Resilience Associated with Subjective Memory in Older Adults?	Psychology, Social Science & Humanities	University of the Virgin Islands	Dr. Aletha Baumann and Dr. Karin Schon
2:10	Esonica Charles & Akilah Hodge (16)	Got Lead? An Assessment of Lead, Concentration in Cistern Water on St. Croix, USVI	Marine Biology & Environmental Sciences	University of the Virgin Islands	Bernard Castillo II, Ph.D.
2:15	Ashley T. Challenger (15)	"The Relationship among Discrimination, Anxiety, and Cognition in Black Seniors Residing in Boston, MA and St. Croix, USVI"	Psychology, Social Science & Humanities	Boston University and University of the Virgin Islands	Dr. Aletha Baumann
2:20	Naomi Douglas (18)	Gene Expression Reanalysis in Systemic Lupus Erythematosus (SLE)	Biology, Genetics & Other Life Sciences	Michigan State University	Dr. George Mias
2:25	Ariana Athanase (11)	Cross-dialect Accommodation: Effects on DRESS vowels of Engaged vs. Disengaged Interviewer	Psychology, Social Science & Humanities	The Ohio State University	Dr. Kathryn Campbell-Kibler
2:30	Angelisa Freeman (20)	UVI Students' Strategies for Navigating Disasters: "Getting Educated" through the 2017 Hurricanes and COVID-19	STEM Education	University of the Virgin Islands	Dr. Michele Guannel
2:35	Jaiel Wyllis (27)	Solid Waste Management: Mapping the Optimal Bin Sites in St. Thomas	Marine Biology & Environmental Sciences	University of the Virgin Islands, Caribbean Green Technology Center (CGTC)	Dr. Gregory Guannel and Ariel Stolz
2:40	Azriel A. Williams (25)	"Keep Me in the Dark": The Moral Ambiguity of Confessional Apologies to Victims	Psychology, Social Science & Humanities	University of Chicago, Booth School of Business, Center for Decision Research	Shereen Chaudhry, PhD and Emma Levine, PhD
2:45		BREAK			
2:50					
2:55					

Zoom: https://zoom.us/j/97587890816

Session #03 (Online Presenters)

Time	Student Name(s) & Abstract #	Title	Subject	Research Institution(s)	Mentor(s)
3:00	Gerlinder Difo Cheri (17)	Eruptive Beginnings - Simulating an Accretion Outburst from A Massive Protostar	Physics & Astronomy	University of the Virgin Islands	Dr. Jan Staff
3:05	Jackeima Flemming (19)	Can Sargassum be used to Create Low-Cost Organic Fertilizer for Retail?	Marine Biology & Environmental Sciences	USVI Department of Planning and Natural Resources, Coastal Zone Management - SEAS Island Alliance	Kristina Edwards
3:10	Kera Smith (31)	Literature review of current efforts to maximize wastewater treatment efficiency		NASA	Luke Roberson, PhD
3:15	Makayda Gustave (28)		Chemistry	North Carolina Central University	
3:20	Dazonte Mathurin (30)		Chemistry	North Carolina Central University	
3:25	Juchara Margetson (29)		Chemistry	North Carolina Central University	

3:30pm - Closing Remarks

STUDENT ABSTRACTS

In Vitro Study of Cobalt and Copper Complexes with Thiosemicarbazone Ligand used to Treat Triple-Negative Breast Cancer

Brittney Anderson
Mentor(s): Dr. Alvin Holder
Co-Author(s): Janae Bruce

Old Dominion University

Session #01 - 1:05 PM

Triple-negative breast cancer (TNBC) is a subtype of breast cancer that lacks estrogen, progesterone, and HER2 receptors. Therapeutic options for treating TNBC are limited, relying mainly on chemotherapy with cisplatin; however, cisplatin has several side effects. As a result of the high cytotoxicity of cisplatin, the need for less toxic means of eradicating cancerous cells has become evident hence scientists have been exploring alternative transition metals with anti-cancerous properties with fewer drawbacks. Cobalt and copper have shown great potential in anticancerous properties hence cobalt(III) complex $[Co(phen)_2(MeATSC)](NO_3)_3.1.5H_2O{\cdot}C_2H_5OH$ **1** (phen = 1,10 -phenanthroline and MeATSC = 9-anthraldehyde-N(4)-methylthiosemicarbazone) and copper(II) complex, $[Cu(acetylethTSC)Cl]Cl{\cdot}0.25C_2H_5OH$ **2** (where acetylethTSC = (E)-N-ethyl-2-[1-(thiazol-2-yl)ethylidene]hydrazinecarbothioamide) were synthesized to study their cytotoxic activities on MDA-MB-231-VIM-RFP cell lines and MCF 10A cell lines. The cytotoxic study was carried out using Cell Counting Kit-8 (CCK-8) assay, which indicated that the viability of the MDA-MB-231-VIM-RFP cell line was negatively impacted by the complexes **1** and **2** and cisplatin with IC_{50} values of 17.79 ± 0.7, 5.33 ± 0.9, and 22.17 ± 1.8 μM, respectively, after 72 h incubation. The MCF 10 A gave an IC_{50} of 84.13 ± 1.2, 9.79 ± 1.7, and 41.61± 2.0 μM for complex **1**, **2**, and cisplatin, respectively. To study the mechanism of action of the complexes, caspase 3/7 and reactive oxygen species (ROS) activities were examined on MDA-MB-231-VIM-RFP cell lines using CellEvent™ Caspase-3/7 and CellROX® Green flow cytometry assays. The results showed evidence to support death through means of excess stressors caused by ROS, leading to apoptosis following the administration of complex **1**. In contrast, complex **2** showed evidence of dying by means independent of ROS and apoptosis until after 33 h, where the remaining cells died by ROS, leading to apoptosis.

This project was funded by funding from the National Institutes of Health Research Initiative for Scientific Enhancement Program (NIH NIGMS RISE Grant). In addition, I would like to express my sincerest gratitude to Old Dominion University for hosting this program that I had the opportunity to participate in.

How Can Understanding the Soul of Leadership Be Used to Stimulate STEM Students' Success at HBCU?

Donna Archer
University of the Virgin Islands

Session #01 - 1:30 PM

Students, who are underrepresented in science, technology, engineering, and mathematics (STEM) education programs, arrive at Historically Black Colleges and Universities (HBCUs) yet must overcome a series of factors that are likely to deter their success in STEM. Examining what is at the core of leadership to broaden participation in STEM can help students achieve success in STEM. Building from the American Psychological Association's definition of success, STEM success can be defined as a measure of subjective well-being, which involves achieving human happiness and accomplishing self-defined goals through STEM education. STEM success implies the need for emotional intelligence. Leaders and the student they serve can benefit from an ability to assess achievement of wellness, identification and capitalization of strengths, and compensation of weaknesses using introspective assessments to drive behavioral change. A systematic literature review was conducted to explore HBCU "soul of leadership" in STEM and mechanisms that contribute to the success of minorities using the following terms: leadership, soul of leadership, HBCU, STEM success, underrepresented students, emotional intelligence, mental health, STEM education interventions, and higher education. Empirical studies, scholarly text, and published systematic literature reviews were analyzed and synthesized to conduct this research. Findings suggest the significance of introspective journey supported by an aptitude of emotional intelligence and uncover a debate as to whether the soul of leadership is an innate strength, a set of skills that can be cultivated through experiences, or an inextricable combination.
Keywords: leadership, HBCU, STEM success, underrepresented students, emotional intelligence, mental health, higher education

This research was funded through NSF HBCU-UP ACE Implementation Project: The UVI Growth Model Award No. 1623126. Thank you ECS (The Emerging Caribbean Scientist Program) for granting me an opportunity.

Cross-dialect Accommodation: Effects on DRESS vowels of Engaged vs. Disengaged Interviewer

Ariana Athanase
Mentor(s): Dr. Kathryn Campbell-Kibler
Co-Author(s): Sherree Clark-Metcalf, Nick Bednar, Dr. Abby Walker and Dr. Kathryn Campbell-Kibler

The Ohio State University

Session #02 - 2:25 PM

Accommodation is the ability for people to adjust their speaking behaviors according to their social setting (Giles and Coupland, 1991, p. 63). Accommodation between people speaking different language varieties is known as cross-dialect accommodation. For this study, the language varieties observed were Midland Americans and New Zealanders. The purpose of this study was to determine if the manipulation of engaged or disengaged interviewers influenced the way participants or interviewers pronounce DRESS vowels. The 12 participants of this study were Ohio State University undergraduates and three interviewers- one New Zealand graduate student and two American undergraduates. DRESS vowels in the English language sound "higher" and "fronter" for New Zealanders compared to Midland Americans. The interviewers had to act engaged or disengaged during the interview, then, the interviewers had to read a word list of DRESS vowels. Vowels were checked using Praat, an automatic aligner, to analyze their formats. Results showed the average vowel formats with the New Zealand interviewer displaying more divergence from the American interviewers and participants. For the interviewers, the following results were found in the F2-F1 values over time: "American" guise increased slightly, "bad" guise continuously increased, and the "good" guise had a slight decline. For the participants, all three guises stayed close in their F2-F1 values, with only the "good" guise showing a difference with slight normal distribution. There were several challenges with interpreting the data due to phonetic shifts of DRESS vowels, however the findings suggest that unlike the Americans, the New Zealand interviewer exhibited convergence with "good" guise and divergence when "bad" guise was exhibited. Under the "good" guise, participants did not seem to reciprocate the New Zealand interviewer's apparent convergence. This study of cross-dialect accommodation is important because it helps explain communication behaviors, social interactions, and the relationship between DRESS vowels and language variations.

Acknowledgements: National Science Foundation Research Experience for Undergraduates

In Vitro Study of a Copper Complex Drug used to treat Triple-Negative Breast Cancer

Janae Bruce
Mentor(s): Dr. Alvin Holder, Dr. Stephen Beebe and Duaa Alajroush

Old Dominion University

Session #01 - 1:15 PM

Triple-negative breast cancer (TNBC) is a type of breast cancer that lacks estrogen, HER2 receptors and progesterone. Due to the lack of these factors, triple-negative breast cancer is harder to treat compared to normal breast cancer. In the past, the drug Cisplatin has been used to treat triple negative breast cancer, however, due to its negative side effects, there has been a push to develop other transition-metal containing drugs that have less cytotoxicity. The drug that we decided to test was a copper complex drug to see its effects on triple-negative breast cancer cells, along with normal breast epithelial cells. To study the cytotoxicity effect on the cells we used the Cell Counting Kit (CCK-8) assay along with the SpectraMax i3 plate reader. After reading the cells, the raw data retrieved from the plate reader was used to generate graphs to show the half maximal inhibitory concentration (IC 50) value of our drug on the cells. Generally, a low IC 50 value means the drug is effective at low concentrations and thus would have a less toxic effect on cells. After plotting the IC 50 graph for our copper complex drug we compared it to the graph we generated for Cisplatin, which was our control. Upon comparing the graphs of the two drugs, we were able to see that our copper complex drug, though good at killing the triple-negative breast cancer cells, had too high of a cytotoxicity compared to cisplatin to be considered a useful drug. Had the drug been less toxic, *in vivo* studies would have been carried out next to test the effects of the drug in living organisms.

Keywords: Triple-Negative Breast Cancer, Copper Complex

Research funding provided by NSF HBCU-UP ACE Implementation Project: The UVI Growth Model (Grant No: 1623126)

Condition Assessment of Out Planted and Wild Coral at One of Cramer's Park's Patch Reefs

Chloé Camacho and Samuel Gittens
Mentor(s): Caroline Pott

St. Croix East End Marine Park

Session #02 - 2:00 PM

The global eradication of coral reefs would have a major negative impact on the lives of all living organisms. Stony Coral Tissue Loss Disease (SCTLD) is a new threat to corals in the Caribbean. The St. Croix East End Marine Park has been trying through restoration to increase the abundance of corals since their first outplant event in 2019 at Cramer's Park. To assess the condition of the out planted corals, we utilized three universal metrics created by the Coral Restoration Consortium. The three Universal Metrics: Landscape/Reef-Level, Population-level, and Colony-level, were constructed to describe coral restoration sites in a way that can be compared among individual sites worldwide. Using the Landscape/Reef-level metric, we were able to determine the area of ecological footprint of restoration was 276.17 square meters. The Population-level metric showed us that of the 66 total out planted corals, 82% of them measured to be between 5 and 40 cm. The Coral-level metric revealed that 96.97% of the out planted coral had partial live tissue and 51.52% had 100% live tissue. In addition to assessing the out planted corals, we also compared the conditions of 16 wild diseased corals using Universal Metrics #2 and #3 over the course of 3 weeks. Of that 16-coral sample, 6 of them were treated with Amoxicillin with the hopes to halt the progression of SCTLD. In both treated and untreated groups of corals there was a negative change in the distribution of live tissue percentage.

Acknowledgements: This research was funded through the National Science Foundation/Supporting Emerging Aquatic Scientists (SEAS) Islands Alliance. (Award # 1930991). Special thanks to the St. Croix East End Marine Park (EEMP).

Are Mood and Resilience Associated with Subjective Memory in Older Adults?

Alexanne Carr
Mentor(s): Dr. Aletha Baumann and Dr. Karin Schon

University of the Virgin Islands

Session #02 - 2:05 PM

Approximately 15% of men and women 65 years and older in the United States who are not living in assisted living facilities have some form of dementia. As people live longer and the number of older adults increases, the need to understand better the precursors of dementia is amplified. The current study investigates the association among mood, resilience, and subjective memory in older adults. Subjective memory and understanding the importance to healthy aging is still in its infancy, understanding how subjective memory is linked to mood disorders, such as depression, will benefit future clinical practices. Resilience is developed by the experience of adverse events that conclude with positive outcomes; higher levels of resilience permit people to function positively and effectively seek assistance as they age. We hypothesize that elevated mood and higher resilience levels is associated with better subjective memory in older adults. This research is part of a larger study under the direction of Dr. Karin Schon of Boston University School of Medicine which is funded by the Alzheimer Association. All data are collected remotely due to COVID-19 pandemic restrictions. Subjective memory will be measured using the Subjective Memory Questionnaire. Mood will be measured using the Geriatric Depression Scale. Resilience will be measured using the Brief Resilience Scale. We anticipate collecting data from 60 people aged 50-80 in both Boston and in St. Croix in the US Virgin Islands. At this time, five participants have been mailed survey packets. Data will be analyzed using structural equation modeling.

Funded by the Alzheimer's Association award no. AARG-17-529566 and NIH RISE – Building Students' Identities as Scientists grant award no. 2R25GM061325.

"The Relationship among Discrimination, Anxiety, and Cognition in Black Seniors Residing in Boston, MA and St. Croix, USVI"

Ashley T. Challenger
Mentor(s): Dr. Aletha Baumann
Co-Author(s): Dr. Karin Schon

Boston University and University of the Virgin Islands

Session #02 - 2:15 PM

Discrimination varies in severity and occurrence; however, regardless of the severity of discrimination, studies have shown that physical and psychological problems can develop. The onset of anxiety symptoms in men and women decreases their ability to process information and make accurate decisions. This study investigates the retention of memory in adults 50-80 and its relationship to one's perception of being discriminated against and anxiety. This will add to the body of knowledge since both independent variables have never been studied together with the cognition of older adults. Objective cognition is assessed through the Brief Test of Adult Cognition by Telephone which is designed to analyze not only the retention of information within a small period of time but to gauge judgments of each participant. We hypothesize that cognition is inversely related to anxiety and the perception of discrimination in seniors. Based on previous research, we expect to find a direct relationship between perception of discrimination and anxiety in older adults. This study is part of the larger, Boston University-led study, under the direction of Dr. Karin Schon, which is funded by the Alzheimer's Association. Discrimination will be measured using the Experiences with Discrimination questionnaire. Anxiety will be measured using the Beck Anxiety Inventory. Due to the ongoing COVID-19 pandemic, all data are collected remotely. To date, five participants are completing survey packets. Once 60 packets have been received from participants in Boston and in St. Croix, USVI, the data will be analyzed using the structural equation modeling method.

Keywords: discrimination, anxiety, memory

Funded by the Alzheimer's Association - AARG-17-529566 & NIH RISE – Building Students' Identities as Scientists 2R25GM061325.

Got Lead? An Assessment of Lead, Concentration in Cistern Water on St. Croix, USVI

Esonica Charles and Akilah Hodge
Mentor(s): Bernard Castillo II, Ph.D.
Co-Author(s): Dazonte Mathurin

University of the Virgin Islands

Session #02 - 2:10 PM

Lead (Pb) has been used for centuries in pipes for water systems, color pigments, make-up and silverware. In 1978, the US Congress banned lead-based paint for home usage. Lead is a very toxic substance that affects both children and adults. Some symptoms of lead poisoning include abdominal pain, difficulties in concentration, and fertility issues. The objective of our study is to collect water from cisterns and determine the lead concentrations. We collected water samples from seven residential locations from May to July 2021 in St. Croix, US Virgin Islands. We hypothesized whether sites east or west of the refinery have differences in lead concentration. The LeadTrak™ Fast Column Extraction Method was used to determine lead levels and the results were reported as parts per billion (ppb) Pb. Our results showed that there was a statistically significant difference between lead concentration in both sites as demonstrated by one-way ANOVA ($p = 0.032$). Sites east of the refinery had lead concentrations from 0 to 3 ppb with an average of 0.73 ppb ± 1.01 from May to July 2021. Whereas, sites west of the refinery had ranges from 0 to 6 ppb with a mean of 2.43 ppb ± 2.07 during our collection dates. In conclusion, our study showed that concentrations of lead in cistern water in the west were higher compared to those of the eastern sites. None of the samples collected has surpassed the action level of 15 ppb as set by the EPA.

This research was funded by NSF HBCU-UP ACE Implementation Project: The UVI Growth Model Award No. 1623126.

Eruptive Beginnings - Simulating an Accretion Outburst from A Massive Protostar

Gerlinder Difo Cheri
Mentor(s): Dr. Jan Staff
Co-Author(s): Jonathan Tan, Emiko Gardiner, and Jon Ramsey

University of the Virgin Islands

Session #03 - 3:00 PM

Accretion bursts, a potentially crucial part of the star formation process, have been recently detected from massive protostars. An accretion burst is also expected to produce an outflow burst, both of which are simulated here to occur during the formation of a massive star. Specifically, once the star reaches 8 solar masses, the mass outflow rate of its launched disk wind is increased by a factor of 10 and maintained for 1000 years before falling back to its nonbursting value. Compared to a nonbursting test simulation, the burst initiates a significant widening of the outflow cavity, and hence an increase in the outflow opening angle which persists well after the burst. We also observe a sharp increase in the total mass flow rate from primary and entrained outflow as well as the formation of discrete, dense knots which may reveal themselves in outflow spectra. We discuss the implications of our results for the observability of past accretion bursts and for the overall massive star formation process.

Acknowledgement: NASA grant NNX15AP95A

Gene Expression Reanalysis in Systemic Lupus Erythematosus (SLE)

Naomi Douglas[1]

Mentor: George Mias[2,3]

[1]Department of Biology, University of the Virgin Islands,
[2] Department of Biochemistry and Molecular Biology,
[3]Institute for Quantitative Health Science and Engineering, Michigan State University

Session #02 - 2:20 PM

Systemic lupus erythematosus (SLE) is a chronic auto-immune disease that commonly affects the skin, joints, and internal organs. Common symptoms of SLE include extreme fatigue, headaches, and low fevers, swelling in the hands, feet, or around the eyes, and hair loss. According to the Lupus Foundation of America, 90% of adults that suffer from SLE are women, and women aged 15-44 that have a racial/ethnic background of African American, Asian American, Hispanic/Latino, Native American, or Pacific Islander, are more susceptible to develop SLE. In this investigation, to investigate the hypothesis that there is age, sex, and ancestry-specific variation in SLE gene expression, we curate, annotate, and reanalyze RNA-sequencing data from Gene Expression Omnibus (GEO) from multiple previously published studies. Sequencing data are re-mapped to the transcriptome using the Galaxy platform to obtain gene expression, and linear models are used to study the effects of different factors (including age, sex, and race). Pathway and gene ontology (GO) analyses are used to identify the involvement of differentially expressed genes in different molecular pathways. The results of gene specific expression changes can help explain differences in SLE patients versus healthy individuals, identify biological pathways involved in SLE, and identify age and sex associated effects in SLE gene expression. The identified genes can provide molecular targets for improving SLE diagnostics and the basis for further exploration of SLE molecular mechanisms.

Funding: Michigan State University Summer Research Opportunities Program (SROP)

Can Sargassum be used to Create Low-Cost Organic Fertilizer for Retail?

Jackeima Flemming
Mentor(s): Kristina Edwards

USVI Department of Planning and Natural Resources, Coastal Zone Management - SEAS Island Alliance

Session #03 - 3:05 PM

The natural sargassum phenomenon is becoming a nuisance in the Virgin Islands and the Eastern Caribbean. The effects of beached, decomposing sargassum negatively impacts the VI tourism industry and the coastal environment. The current approach of removing and disposing of sargassum is not environmentally friendly or sustainable. A new and sustainable approach must be taken. The goal of this research was to determine if decomposing sargassum can be safely removed from beaches in the territory and instead of being disposed as garbage, be utilized to create an organic low cost fertilizer product for farming. As the VI is also progressively making plans to diversify the economy as part of its Vision 2040 plan, this product can potentially be used for retail.

As such the research question for this study is ‘Can Sargassum be Used to Create an Organic, Low-cost Fertilizer for Retail?’. The study examined how sargassum is manually collected from Coki Point Beach, St. Thomas, cleaned, dried, and separated as mulch for gardening. Following application to garden soil, plant growth and condition were monitored. It also compared results from a survey disseminated to 15 shoppers at the Garden Center at Home Depot, the sale amount and frequency of their most popular organic fertilizer to compare cost and efficiency. The results indicated that clean nutrient rich sargassum can be used as organic fertilizer in farming/ gardening. Most individuals would prefer a local cheaper alternative fertilizer to what they are currently using.

Acknowledgement: SEAS Islands Alliance

UVI Students' Strategies for Navigating Disasters: "Getting Educated" through the 2017 Hurricanes and COVID-19

Angelisa Freeman
Mentor(s): Dr. Michele Guannel
Co-Author(s):

University of the Virgin Islands

Session #02 - 2:30 PM

The United States Virgin Island's (USVI) education system includes diverse public and private schools, and the University of the Virgin Islands serves as the only post-secondary institution. Recently, numerous disasters have challenged the finite educational resources and communities of the USVI. While the 2017 hurricanes negatively impacted the territory, our previous research highlighted that IrMaria survivors demonstrated unity, leadership, and post-traumatic growth. Now, since the COVID-19 pandemic uprooted educational systems worldwide, the aim of the current study was to understand how UVI students navigated the educational disruptions brought by both the 2017 hurricanes and the pandemic. Participants in this study were recruited from UVI's SCI 100 course, a general education science course, who consented to have their assignments analysed for broad themes. Students' assignments were de-identified by the Principal Investigator before analysis for this project. A total of 51 consented essays were reviewed, 26 from Fall 2019 (pre-COVID), 13 from Fall 2020 and 12 from Spring 2021 (post-COVID). A phenomenological approach was used to describe common and unique responses of students, after their formal schooling was disrupted by the 2017 hurricanes and COVID -19. Student experiences identified individual, interpersonal, and systemic impacts of disaster on education. Results showed that more students expressed appreciation for informal learning from hurricane disruptions, compared to learning from COVID-19 disruption. Current and future efforts should focus on combining preparedness strategies and lessons learnt in the event of being faced with multiple disasters simultaneously.

Keywords: Education, disaster, phenomenological, COVID-19

Acknowledgement: ECS Honors Fund

Looking for optical Astronomical Transients with the Etelman Observatory

Rickila Hanley
Mentor(s): Dr. Dario Carbone

University of the Virgin Islands

Session #01 - 1:40 PM

Astronomical transients are sources that are only visible for a limited period of time. The study of such sources is important because they are linked to some of the most intense and energetic events in the Universe, such as stellar explosions. In order to fully understand the origin of a transient event, a very important quantity to measure is the transient rate. I obtained a total of 605 astronomical images of the same part of the sky taken from the Etelman observatory, in St. Thomas. I calibrated the dataset and extracted information on the sources detected in my images in order to create light curves. I inspected the light curves to identify the presence of transients. Finally, I was able to calculate the transient rate from the information obtained in this project.

Acknowledgement: NASA EPSCoR program

Stony Coral Tissue Loss Disease Time Series Around St John, USVI

Sarai Hutchinson
Mentor(s): Dr. Amy Apprill and Cynthia Becker

Woods Hole Oceanographic Institution - Apprill Lab

Session #01 - 1:20 PM

The potential cause of Stony Coral Tissue Loss Disease (SCTLD) has eluded researchers since it was first identified in coral reefs around Florida in 2014. This disease is very detrimental to Caribbean coral reefs, and up to two-thirds of reef-building corals are affected by the disease. The hope is that by monitoring microbiome changes in the *Colpophyllia natans* coral, a possible cause or potential bioindicator for SCTLD can be found. The goal of this study was to examine the coral seawater and tissue microbiomes over time, including before and after SCTLD infection, by investigating the microbial community using 16S rRNA gene sequencing of Bacteria and Archaea. We hypothesize that there will be changes in the coral tissue microbiome after SCTLD infection, and that the seawater microbiome would also change as a result. Over the course of 11 months of the experiment, Coral Bay did not have any diseased coral colonies, whereas some monitored Fish Bay corals contracted SCLTD. We found an increase in the presence of Firmicutes, Desulfobacterota and Campylobacterota in the specific colonies at Fish Bay that were infected by SCTLD. Data analysis also showed the presence of previously identified genera associated with SCTLD in both the tissue and seawater microbiomes of the colonies. Future work will continue to investigate changes in affected corals and relate them to other efforts to combat SCTLD in the United States Virgin Islands and beyond.

Keywords: SCTLD, Time Series, Colpophyllia Natans

Acknowledgement: Funding for this project was provided by the National Science Foundation Award EEID-2109622.

Propofol Anesthesia Disrupts Stimulus-Induced Intracortical Coherence

Jordina Pierre
Mentor(s): Emery Brown, Ph.D. and John Tauber

Massachusetts Institute of Technology (MIT)

Session #01 - 1:25 PM

Nearly 60,000 people a day undergo general anesthesia in the United States. Propofol is the most widely used anesthetic and although it is understood on a clinical and pharmacological level, the understanding on a systems neuroscience level is still developing. A critical function of anesthesia is to block the perception of sensory stimuli while undergoing surgery. Recent work showed propofol broadly disrupts intracortical communication, but it is unclear how it affects cortical response to sensory stimuli.

In previous work, Local Field Potential (LFP) data was simultaneously recorded from Utah arrays implanted in auditory, somatosensory, and cognitive areas of the cortex before and during propofol anesthesia. Auditory tones and air puffs were delivered randomly throughout each experimental session. We found the evoked response potential (ERP) to sensory stimuli was strongly altered, but not eliminated, during anesthesia. In particular, the auditory cortex continued to show a strong response, while the ERP in higher-order brain regions was more noticeably disrupted.

Oscillatory synchrony between brain regions is thought to be involved in creating channels for reliable, selective communication. Given the strong changes we observed in the evoked response during anesthesia, we hypothesized stimulus induced synchrony may also be disrupted. We tested this by computing coherence, a measure of synchrony, between pairs of electrodes from separate brain regions and found robust stimulus-induced coherence for ~1-30 Hz between all brain regions during the awake state. This coherence was virtually eliminated during anesthesia, suggesting propofol blocks transmission of sensory information throughout the brain.

Acknowledgement: CBMM, NSF

K-Mean Algorithm Usage for Audio Signal Feature Detection

Teh'Rhon Rabsatt
Mentor(s): Dr. Marc Boumedine
Co-Author(s):

University of the Virgin Islands

Session #01 - 1:10 PM

Algorithms are a set of rules used in calculations or problem-solving operations especially for computers. Algorithms have become the backbone for our modern society and yet we rarely see them. They are everywhere in our lives, and we are completely ruled by them. Everyday companies and governments implement more and more policies that require the proliferation of algorithms. Most algorithms are obscured from not only the people they are used on but their very creators. Apps are the lynchpin by which most young and future focused individuals experience the world. Today you would be hard pressed to find an app that didn't use some form of algorithm to run its services. A deeper understanding of algorithms is desperately needed to ensure they don't become exploitative or discriminatory given through the entropy of technology they bound to rule the world.

This research studies the machine learning process as it relates to audio and the ability for computers to differentiate different audio files. Using Python-3 and pre-constructed K-mean signaling algorithms which were slightly modified I attempted to develop a more effective machine learning structure for differentiating features of audio signals. The audio files used were procured via numerous online sources. The algorithm I used extracted the features of the audio file and then separated the files based on these features. My algorithm used note frequency and pitch to create an audio heatmap. My work with algorithms has highlighted the importance of the public's literacy on the subject and more transparency on algorithm usage and implementation.

In conclusion, creating an algorithm to test out K-Mean clustering parameters and better algorithm decision loop feedback mechanisms. These things are the best way to resolve these issues however they have proven quite difficult. Without larger, cleaner, and denser audio samples increasing the feature detection will prove difficult. From this research, I have derived that the K-Mean clustering method to algorithmic feature detection is simplistic yet powerful. Additional work is necessary to further research on improving feature detection and developing better algorithmic feedback mechanisms.

Keywords: K-Mean, Algorithm, Audio Signaling

Research funding provided by NIH MARC at UVI: A Holistic Approach (Grant #3T34GM008422-27S1).

"Keep Me in the Dark": The Moral Ambiguity of Confessional Apologies to Victims

Azriel A. Williams
Mentor(s): Shereen Chaudhry, PhD and Emma Levine, PhD
Co-Author(s):

University of Chicago, Booth School of Business, Center for Decision Research

Session #02 - 2:40 PM

Psychology literature has shown that apologies are helpful in resolving conflict and strengthening interpersonal relationships, but we ask whether there are cases in which the relationship would be better served by the absence of an apology. Past research suggests that when the value of the truth is low and the information cannot be utilized by the target of honesty, then the target would rather not know the truth. Indeed, people actively avoid information when it may cause unwanted emotions or unwanted change in their lives or relationships. We predict that there will be a converse association between the preference for the avoidance of victimhood information and the perceived usefulness of victimhood information. Participant survey data will be collected using a Qualtrics survey, and participants will be found on Prolific Academic and/or Amazon's Mechanical Turk platform. Firstly, participants will complete a recall survey in which they will be asked to remember a situation in which they did not know that they were a victim until a transgressor confessed. Secondly, the participant will be asked questions that will examine whether the confession contained an apology, their emotions about the confession, whether anything changed after the confession, and if they preferred that the transgressor not confess. We predict that victims will indicate preferring that the transgressor have not confessed in cases when the victims did not act on the information that they had been made a victim.

Acknowledgement: NIH RISE - Building Students' Identities as Scientists - 2R25GM061325.

Transcriptional regulation by SP1 and c-myc effector domains

Ellaina A. Wyllis[1]
Mentor(s): Dhana Friedrich, PhD[2] and Angela DePace, PhD[2]

[1]University of the Virgin Islands, College of Science and Mathematics
[2]Harvard Medical School, Blavatnik Institute, Department of Systems Biology

Session #01 - 1:35 PM

Transcription factors (TFs) play a fundamental role in regulating gene expression. SP1 and c-myc TFs regulate genes involved in cell growth and have been associated with cancer progression when overexpressed. While the DNA-binding domains of TFs have been well-characterized in past decades, the role of their effector domains (EDs) for modulating target gene expression is less understood. Here we aimed to isolate the regulatory effects of these EDs using an engineered gene regulatory circuit in HEK293T cells. The specific goal of this project was to determine how stochastic transcription of reporter mRNA is altered upon the transfection of SP1 and c-myc effector domains and the impact of zinc-finger binding affinity. We used single-molecule fluorescence in situ hybridization (smFISH) and FISH-quant-based computational image analysis to quantify GFP mRNA in single cells. Overall, our data suggest that both SP1 and c-myc synTFs increased transcription levels of the GFP gene, with SP1 having a greater effect. An increase in the fraction of active promoters might explain the rise in transcription levels, suggesting a change in the frequency of stochastic bursting. Interestingly, reduced affinity did not decrease transcription levels as expected. In future work, we aim to explore this further by correlating the smFISH data with the synTF abundance for each condition and investigating other parameters of mRNA regulation.

Acknowledgments:
The NSF-Simons Center for Mathematical and Statistical Analysis of Biology at Harvard, award number #1764269 and the Harvard Quantitative Biology Initiative.

Solid Waste Management: Mapping the Optimal Bin Sites in St. Thomas

Jaiel Wyllis
Mentor(s): Dr. Gregory Guannel and Ariel Stolz
Co-Author(s):

University of the Virgin Islands, Caribbean Green Technology Center (CGTC)

Session #02 - 2:35 PM

There is a major issue of improper waste management occurring all around the world. The production of waste from nations worldwide is at an all-time high causing massive problems for the environment and human health. Waste removal is becoming more expensive while also more dangerous for the environment. Similar to the rest of the world, the USVI struggles with proper waste management. The USVI is even more challenging because of the terrain, extreme weather, isolated island, and other issues in the waste management system. The system is pretty impaired overall, and a lot of work needs to be done to improve waste management. There are small areas where we could improve the structure as it is now to inherit better results. This can be done by determining where we could provide additional house-to-house collection and toters/carts for the Territory to help deter illegal dumping. By providing additional bin sites and house-to-house pickups, we hope to provide everyone on the island an avenue to dispose of their trash. This would then hopefully bring down the illegal dumping of waste around the island. The main goals of this project are to determine the process of waste management in St. Thomas, how effective and environmentally friendly it is, and how we can steadily improve the infrastructure by adding more sites. There are multiple methods to come to the results that we hope for, but by way of research and ArcGIS mapping software, it opens a door to a whole new avenue. The mapping software of ArcGIS allows a new way to hypothesize in this research project. Furthermore, this project could benefit St. Thomas in many ways, including improving our important environment, as it would prolong the beauty of our wonderful island.

This work was supported by NSF HBCU-UP ACE Implementation Project: The UVI Growth Model (award no. 1623126).

Makayda Gustave
Mentor(s):
Co-Author(s):

North Carolina Central University

Session #03 - 3:15 PM

Pending...

Juchara Margetson
Mentor(s):
Co-Author(s):

North Carolina Central University

Session #03 - 3:25 PM

Pending…

Dazonte Mathurin
Mentor(s):
Co-Author(s):

North Carolina Central University

Session #03 - 3:20 PM

Pending…

Literature review of current efforts to maximize wastewater treatment efficiency

Kera Smith
Mentor(s): Luke Roberson, PhD

National Aeronautics and Space Administration (NASA)

Session #03 - 3:10 PM

Pending…

Acknowledgements

Sponsors

- ◊ National Institutes of Health (NIH): Maximizing Access to Research Careers (MARC) Program - A Holistic Approach, *Grant ID # 5T34GM008422*
- ◊ National Institutes of Health (NIH): Research Initiative for Scientific Enhancement (RISE) Program - Building Students' Identities as Scientists, *Grant ID # GM061325*
- ◊ National Science Foundation (NSF): Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) - ACE Implementation Project: The UVI Model, *Grant ID # 1623126*
- ◊ Generous donations from private donors to the Emerging Caribbean Scientists (ECS) Honors Fund

Event Organization Team

Dr. Alice Stanford, *RISE Program Director*
Dr. Robert Stolz, *HBCU-UP & MARC Program Director*
Dr. Verleen McSween, *MARC/RISE Coordinator, St. Croix*
Dr. Lavida Rogers, *RISE Coordinator, St. Thomas*
Dr. Marc Boumedine, *Professor and Chair of Computational Sciences Dept.*
Dr. Aletha Baumann, *Retired Professor of Psychology and RISE student mentor*
Dr. Jan Staff, *Physics Asst. Professor and Judges Coordinator*
Ms. Aimee Sanchez, *ECS Grants Manager*
Ms. Resa Berkeley, *Data Specialist*
Ms. Genae Gonsalves*, SEAS Program Coordinator*
Ms. Orpha Penn, *Physics Dept. Grants Manager*

Judges

The event organizers would like to recognize the judges who have volunteered their time and energy to critique these student presentations. They have made a great contribution to the success of our students and this symposium. Thank you for your dedication to the advancement of young Caribbean scientists. You are greatly appreciated.

Thank you to friends, family, and members of the wider community for attending and supporting student research at the University of the Virgin Islands.

SPECIALIZING IN FUTURES

HISTORICALLY AMERICAN.
UNIQUELY CARIBBEAN.
GLOBALLY INTERACTIVE.

Emerging Caribbean Scientists Program
College of Science & Mathematics

University of the Virgin Islands