University of the Virgin Islands

UVI Research Day

April 20, 2018

St. Croix:
UVI Great Hall

St. Thomas:
UVI Sports & Fitness Center

The UVI Research Day Committee would like to express gratitude to the sponsors of UVI Research Day 2018:

- **Office of the Provost**
- **Office of the Vice Provost for Research and Public Service**
- **Agricultural Experiment Station***

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UVI Research Day 2018

Poster, Roundtable and Demonstration Proceedings

April 20, 2018

St. Croix:
UVI Great Hall, Albert A. Sheen Campus
(9:00 a.m. – 3:00 p.m.)

St. Thomas:
UVI Sports & Fitness Center
(9:00 a.m. – 3:00 p.m.)

University of the Virgin Islands

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Office of the President

MESSAGE FROM DR. DAVID HALL
PRESIDENT OF THE UNIVERSITY OF THE VIRGIN ISLANDS

It is my distinct honor and privilege to welcome you to the seventh annual ***UVI Research Day***.

Research Day has become one of the highlights of our year at the University of the Virgin Islands. It allows us to showcase the wonderful and exciting research activities of our faculty, students and staff. A university cannot thrive without the exploration of new ideas, and the testing of old pathways. It is through the energy of intellectual investigation and discovery that the society moves forward. I am extremely proud that UVI is a forerunner in various research fields that can propel the Virgin Islands toward a more productive and resilient future. I also cherish the fact that so many of our students are involved in research projects with our faculty and with faculty around the nation. This is a testament to how bright they are, and how supportive our faculty has been of their quest for knowledge.

I want to applaud Dr. Frank Mills and all members of the Research Day Committee for developing this outstanding opportunity. To have so many high school students and community members join us for Research Day demonstrates that we are fulfilling our ultimate mission, which is to inspire curiosity and self-actualization. May everyone leave this space more curious about life than when they came.

Congratulations to the organizers and all those who worked tirelessly to ensure the success of this year's UVI Research Day! Research is the key to new worlds, and this day is an opportunity to see the worlds that our faculty and students are exploring and creating. I am confident that the day will be both educational and inspirational. Thank you for taking the time to experience this research showcase of the University.

Sincerely,

David Hall

David Hall, SJD
President

No.2 John Brewers Bay • St. Thomas • U.S. Virgin Islands 00802 • Tel: (340) 693-1000 • Fax: (340) 693-1005

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MESSAGE FROM PROVOST AND VICE PRESIDENT FOR ACADEMIC AFFAIRS CAMILLE A. MCKAYLE, PHD *UVI RESEARCH DAY* 2018

Welcome to *UVI Research Day* 2018! This has been an eventful year for the Territory. As a result of the catastrophic storms, some research projects were aborted, others found new direction, while some were born because of the opportunity the passage of the storms presented. I applaud the resilience of the UVI faculty and staff who, even in these times, were able to continue to produce a high quality of work.

There is much to highlight in the works on display this year. For those of you who have attended in the past, you will find many of the types of projects that you have seen over the years. However, you will also find an increase in the number of research posters from students in the College of Liberal Arts and Social Sciences, and first time presentations from students in the university's PhD program in Creative Leadership for Innovation and Change. The growth in diversity of projects is a reflection of UVI's commitment to research as a means of engaging students, and creating new knowledge in the age-old tradition of academia.

One aspect of much of the research presented that should not be overlooked is the relevance to our Virgin Islands Territory, as well as the region. The University of the Virgin Islands utilizes its resources and stature as a university to add value to the Territory by exploring issues and projects in order to add to our understanding of the world immediately around us. These are addressed in a manner and with a rigor that result in publication in journals at the national and international levels. Though our researchers write for experts in their fields, *UVI Research Day* provides them with an opportunity to communicate their work to a more general audience, and provides attendees with a glimpse into a part of academia that inspires faculty and, in turn, inspires students.

UVI's Research Day epitomizes the University's mission: excellent teaching, innovative research, and responsive community service.

Welcome, enjoy, and be inspired.

Provost, and Vice President for Academic Affairs

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Office of the Vice Provost for Research and Public Service

MESSAGE FROM VICE PROVOST FOR RESEARCH AND PUBLIC SERVICE

Six months ago, after the destructive passages over the US Virgin Islands of Hurricanes Irma and Maria, the likelihood of a *2018 UVI Research Day* event seemed forlorn. But the driving resilience that pervaded the campuses in our efforts to fully recover made itself evident when President Hall unhesitatingly expressed his desire for the event to take place in April 2018. With that level of encouragement, the *UVI Research Day* team set about to produce the program that is captured in this booklet.

Several of the research topics that are presented in this year's event are related in numerous ways to the effects of the hurricanes. While in recent years we have been particular in our recruitment of 11th and 12th graders in both districts, we were thrilled by the appeal of one set of 9th graders who wanted to participate. This is enormously encouraging, for it is our belief that if one or a few youngsters' imaginations are intellectually fired by what they see or hear, their attendance would have been well worth the trip.

Each year we perceive the growth of research efforts by faculty, staff and students alike. It is inspiring to witness the improvement in the level of research of our undergraduates and graduates on both campuses, as this is what was envisaged in our current strategic plan *Pathways to Greatness.*

My sincere thanks are extended to all students, faculty and staff who have exerted themselves to the enrichment of the experience of all participants, especially to our pre-university students and to the public at large.

Frank Mills

Frank L. Mills
Chair, UVI Research Day Steering Committee

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Event Program

Friday, April 20, 2018

ST. CROIX

UVI Great Hall, Albert A. Sheen Campus, 9:00 a.m. – 3:00 p.m.

Poster presentations and display	9:00 a.m. – 3:00 p.m.
Opening and keynote address	11:00 a.m. – 11:30 a.m.

ST. THOMAS

UVI Sports & Fitness Center, 9:00 a.m. – 3:00 p.m.

Poster presentations and display	9:00 a.m. – 3:00 p.m.
Opening and keynote address	11:00 a.m. – 11:30 a.m.

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UVI Research Day Committee 2018

UVI Research Day Planning Committee Members:
Frank Mills, *Committee Chairperson and Awards Subcommittee Chair*

Ayishih Bellew, *Program Subcommittee Chair*

Stafford Crossman, *Logistics Subcommittee Chair AAS*

Dale Morton, *Logistics Subcommittee Chair STT*

Tamika Thomas Williams, *Public Relations Subcommittee Chair*

Donald Bailey, Agricultural Experiment Station

Lorna Chesterfield, Research and Public Service

Dara Cooper, Cooperative Extension Services

Nicolas Drayton, Virgin Islands Experimental Program to Stimulate Competitive Research

Howard Forbes, Jr., Center for Marine and Environmental Studies

Kelly Harrigan, Virgin Islands Experimental Program to Stimulate Competitive Research

Stevie Henry, Eastern Caribbean Center

Marissa Johnson Rogers, Eastern Caribbean Center

Aimee Sanchez, College of Science and Math

Deshona Williams-Liburd, Eastern Caribbean Center

Mary Joe Williams, Small Business Development Center

St. Croix Poster Abstracts,
Albert A. Sheen Campus

Pitaya Floral and Fruit Development in the Virgin Islands

Samuel Joseph, *Student, Agricultural Experiment Station*
Thomas W. Zimmerman, *Faculty, Agricultural Experiment Station*

Dragon Fruit (*Hylocereus undatus*) also known as pitaya is a fruit native to dry tropical areas in the Americas. There are cultivated and wild varieties of the species. On the island of St. Croix, there are varieties of Pitahaya that grow in the wild besides the cultivated varieties that farmers grow. The objective of this research is to document flower and fruit development over time during both beginning and end of the season. Flower buds from three cultivated varieties of dragon fruit, 'Delight', 'Halley's Comet', and 'Physical Graffiti', were selected at random, and tracked from bud to flower. The flower buds took on average 20 days to reach anthesis, and four days for the flower to dry, which meant the fruit was set. The research on fruit development was a success because predictions can now be made when the fruit will reach its full maturity after the plant flowers.

STX-P1

Comparison of Two NFT Hydroponic Nutrient Sources For The Production Of 4 Types of Red Leaf Lettuce

Marc-Anthony Colon, *Student, Emerging Caribbean Scientist Program*
Donald S. Bailey, *Staff, Agricultural Experiment Station*

A trial was conducted comparing two nutrient sources for Nutrient Film Technique (NFT) hydrponic production of lettuce (*Lactuca sativa*). The two treatments were inorganic nutrients, using a standard hydroponic formula, and organic nutrients using aquaponic sludge which had been aerated for 28 days. The inorganic solution was formulated from compounds with an initial concentration of 212 ppm nitrogen, 34 ppm phosphorus, 193 ppm potassium and Electrical Conductivity (EC) of 1.78. Micronutrients were supplied with ConMicros Premium. The organic nutrients had initial concentrations of 20 ppm nitrogen, 37 ppm phosphorus, 29 ppm potassium and EC of 0.65. The NFT systems used 10-cm x 10 m channels. Each system holds 300 plants at a density of 20 plants/m2. The channels are placed on elevated stands of decreasing height with a 3% slope from inlet to outlet. Four types of red leaf lettuce were planted; Alkindus, Cherokee, Majenta, Red Cross and Rosaine. Plants grew for 21 days until harvest.
The inorganic nutrient treatment produced higher biomass for all four lettuce types. Higher nutrient concentrations were the direct cause of the greater yield. The research should be repeated with higher nutrient levels of organic nutrients from the aquaponic system to increase those yields.

STX-P2

Comparison of Nutrient Film Technique and Aquaponic Production of 4 Lettuce Types

Donald S. Bailey, *Staff, Agricultural Experiment Station*

A comparison of Nutrient Film Technique hydroponic production was made with aquaponic production of 4 types of lettuce (*Lactuca sativa*). Two tilapia (*Oreochromis niloticus*) feeding rates (60 and 100 g/m^2/day, LOW and HIGH) were used. The NFT nutrient solution was formulated from inorganic nutrients with an initial concentration of 212 ppm nitrogen, 34 ppm phosphorus and 193 ppm potassium. The aquaponic systems used recirculating effluent from fish rearing tanks to provide nutrients. Each treatment had three replicates. The AP systems used polystyrene rafts to support the plants above DWC troughs. The NFT system used 10-cm channels. Plant spacing in all treatments was 300 plants total at a density of 20 palnts/m^2. Four types of lettuce were planted in each of the NFT and AP systems. The types were Bibb, Leaf, Summer Crisp, and Romaine. Plants grew for 28 days until harvest.
Biomass harvested average for NFT was higher for Bibb, Leaf and Summer Crisp. NFT Romaine biomass was lower than HIGH average. Between HIGH and LOW systems, biomass was higher for Buttercrunch and Tropicana in the LOW treatment. Summer Crisp and Romaine biomass was higher in the HIGH treatment.

STX-P3

Evaluation of Hurricane Damage to Different Tree Species on St. Croix

Michael Morgan, *Staff, Agricultural Experiment Station*
Thomas W. Zimmerman, *Faculty, Agricultural Experiment Station*

Hurricane Maria struck the island of St. Croix, USVI, on September 24, 2017. Different trees and tree species were affected differently by the hurricane. It appears that different tree species were more affected by the hurricane winds than others. We took photos of various tree species at the UVI- STX campus and devised a subjective scale from 1 to 7 to estimate damage. 1 on the scale is undamaged. 7 on the scale is uprooted or completely destroyed. However, it must be mentioned that Hurricane Maria struck St. Croix in differing intensities all across the island.

STX-P4

Enhancing Tropical Conservation Tillage Cropping Systems with Sunn Hemp (*Crotalaria juncea*) Cover Crop Residue as In Situ Mulch in the Production of Organic Calabaza Pumpkin (*Cucurbita moschata*)

Stuart A. Weiss, *Faculty, Agricultural Experiment Station*
David Hensley, *Student, Agronomy Department, University of Florida*
Michael Hurak, *Staff, Agricultural Experiment Station*
Reba Dickson, *Student, Agricultural Experiment Station*

Farmers typically soil incorporate crop residue and rely upon mechanical soil disturbance to control weeds. This study evaluated sunn hemp (*Crotalaria juncea* cv. Tropic Sunn) cover crop residue as in situ surface mulch to reduce tillage and suppress weeds in vegetable cropping systems. Sunn hemp was established on two separate farms on September 16, 2016, mechanically terminated with a roller-crimper on January 18, 2017, and then direct seeded with Calabaza pumpkin (*Cucurbita moschata*). Treatments included: 1) sunn hemp mulch (SHM), 2) sunn hemp mulch plus hay (SHM+hay), and 3) sunn hemp mowed and soil incorporated that served as a check plot (SH+none). Sunn hemp yielded 5,632 kg ha-1 of above-ground biomass. Overall, there was either no difference in weed biomass across treatments or the SHM+hay treatment had less weeds than both the SHM and SH+none treatments. Total pumpkin yield differed by field, but not by treatment yielding a mean of 56,027 kg ha-1 (10.4 kg ha-1 per plant). The SHM+hay and SHM treatments in field one at 79,973 and 70,796 kg ha-1, respectively. Cropping systems that soil incorporate SH residue did not increase weed suppression compared to cropping systems using conservation tillage when planted into sunn hemp mulch.

STX-P5

St. Croix White Lambs have Improved Growth Performance when Grazing Native Pasture Improved with No-till Sunn Hemp (*Crotalaria juncea* L.) in the U.S. Virgin Islands

Reba Dickson, *Undergraduate Student, Agriculture Experiment Station*
Stuart A. Weiss, *Faculty, Agriculture Experiment Station*
Michael Hurak, *Staff, Agriculture Experiment Station*

The objective of this study was to evaluate the performance of Dorper-St. Croix white lambs in two different grazing systems. The control system, conventional grazing on low-quality native pasture (NP). The second system, similar low-quality NP improved with the tropical legume Crotalaria juncea L. cv tropic sunn (Improved Pasture; IP). Lambs were separated by weight into NP and IP treatments with three replicates (n=42). Both systems contained hurricane grass (*Boithrocloa pertusa* L.) and guinea grass (*Panicum maximum* L.). The IP treatment was improved with sunn hemp directly seeded into the hurricane grass sod by No-Till Drill at a 45 kg/ha seeding rate. Lambs were rotationally grazed on both the NP and IP for 97 days. Compared to NP lambs, IP lambs were heavier at slaughter with a mean weight of 36 kg compared to NP lambs at 33 kg. During the grazing trial IP lambs had greater total weight gain than NP lambs (4.7 vs. 3.3 kg, respectively) and higher ADG than NP lambs (48 vs. 34 g/d, respectively. Results indicate that sunn hemp added to low quality grass pastures can improve pasture quality through the inclusion of a palatable leguminous forage that withstands rotational grazing pressure.

STX-P6

The Effect of Water Restriction at Weaning on Hair Sheep Ewes and Lambs in the Tropics

Sue A. Lakos, *Staff, Agricultural Experiment Station*
Serena A. Joseph, *Undergraduate Student, Agricultural Experiment Station*
Robert W. Godfrey, *Faculty, Agricultural Experiment Station*

St. Croix White hair sheep lambs were weaned at 120 d of age with ewes having access to water (WET; n = 10 ewes and 16 lambs) or no access to water (DRY; n = 10 ewes and 14 lambs). On d 1 DRY ewes and lambs were put in a pen with no water and WET ewes and lambs were put in individual pens with water. On d 2 lambs were removed from ewes. Ewes remained in treatment pens. On d 1, 2, and 3 ewes and lambs were weighed, ewe udder volume (UDRVOL) was measured and blood samples were collected to measure packed cell volume (PCV). Daily water consumption of WET ewes was measured for d 1 and 2. Day and treatment had no effect ($P > 0.10$) on weights. Ewe PCV was greater ($P < 0.03$) in WET than in DRY ewes but there was no difference between days ($P > 0.10$). Lamb PCV was not different between treatments or days ($P > 0.10$). The UDRVOL of DRY ewes was lower than WET ewes ($P < 0.03$) and was lowest ($P < 0.03$) on d 2. Water consumption was not different ($P > 0.10$) between days. These data show that hair sheep in the tropics do not exhibit signs of dehydration from water deprivation during a 48-h weaning process.

STX-7

Establishment of Green Beans in the Virgin Islands

Imhotep Charles, *Undergraduate Student, Agricultural Experiment Statio*n
Jessica Ewer, *Staff, Agricultural Experiment Station*
Thomas W. Zimmerman, *Faculty, Agricultural Experiment Station*

Phaseolus vulgaris L., the bush green bean, is a common vegetable grown for its tasty, succulent pods. Though beans prefer to grow in pH neutral soils, the island of St. Croix has soils high in pH, usually above 7.8. The purpose of this research was to evaluate the establishment of sixteen green bean varieties on St. Croix's high pH, calcareous soils. The bean seeds were planted in rows 6.1 m long, one meter apart, with 10 cm spacing between each seed. Excessive rain this season created an environment conducive to damping off and fungal pathogens. This resulted in the need for two seed sowings twelve days apart due to low germination in the initial sowing. The variety 'Sybaris' was the most susceptible to fungal diseases with losses over 50%. 'Achiever', 'Jade II', 'Lynx', and 'Momentum' were the most tolerant of the fungal diseases with a survival rate of over 85%. As the plants were in their prime of flowering in September, research was abruptly terminated because of two devastating category 5 hurricanes. There are plans to repeat the green bean trial in 2018.

STX-P8

Pests, An Unwanted Side Effect of Tropical Storms

Amy J. Dreves, *Staff-Faculty, Cooperative Extension Service*
Stafford Crossman, *Staff-Faculty, Cooperative Extension Service*
Vanessa Forbes, *Staff, Cooperative Extension Service*
Olasee Davis, *Staff-Faculty, Cooperative Extension Service*

After two Category 5 hurricanes, Irma and Maria, made their way over the Virgin Islands in September 2017, pest populations spiked. Some reasons for pest increases include: heavy rains, decay and bad odors that support moisture-loving flies, biting midges, and mosquitoes; displaced and wandering pests seek out new grounds to live, if they survive. The Jack Spaniard showed anger and stung people as debris was being picked up, and now there is no sign of the wasp. Leafless palms and plants released chemicals of stress that attracted pests; certain environmental conditions favor pest explosions, and natural enemies were blown away so they were unable to keep pests under control. Locals reached out to the Cooperative Extension Service concerned that their plants were quickly consumed by an assortment of furry visitors; an over-abundance of fungus gnats swarmed inside homes, attracted to lights run by generators; dark-colored 'loopers' devastated newly-leafed flamboyant trees, fanciful striped caterpillars stripped frangipani; black and yellow larvae ate flowers of sunn hemp causing no seed production; and numerous cockroaches multiplied in sewer drains. As if Virgin Islands victims without roofs didn't have enough to deal with, unfortunately there were more issues added to the overall trouble brought upon by two hurricanes.

STX-P9

E**xamining the Relationship between Color and Emotion**

Alexis Camarena, *Undergraduate Student, College of Liberal Arts and Social Sciences*
Mohomodou Boncana, *Faculty, College of Liberal Arts and Social Sciences*

This study examines whether color is associated with undergraduate students' mood at the University of the Virgin Islands. The Munsell Color System (MCS) developed by Kaya (2004) will be used as instrument. Thirty undergraduate students will be tested. Each participant will be presented with three divisions of colors (e.g. primary hues, intermediate hues and achromatic). A three-way Chi-square for independence will be used as design. The data will be analyzed using the statistical Package SPSS. The results will include descriptive and inferential statistics. The implications of color and mood relations can assist in the future development of students by creating a more visually conducive environment in areas of advertising and cognitive performance.

STX-P20

CASL: The Center for Advancement of STEM Leadership

Camille McKayle, *University of the Virgin Islands*
Kelly Mack, *Association of American Colleges and Universiti*es
Goldie Byrd, *North Carolina A&T State University*
Orlando Taylor, *Fielding Graduate University*
Sandra Romano, *University of the Virgin Islands*
Kimarie Engerman, *University of the Virgin Islands*
Leila Sullivan, *University of the Virgin Islands*
Kostas Alexandridis, *University of the Virgin Islands*

The goal of Center for the Advancement of STEM Leadership (CASL) is to establish the foundational tenets of the research and practice of leadership for broadening participation in STEM. CASL will achieve this mission through: 1) research activities that will contribute to an increased knowledge base on leadership development for broadening participation in STEM; 2) knowledge translation activities that will use an evidence-based approach to leadership development to increase the number of HBCU leaders with culturally responsive competencies and capacities; and 3) outreach activities that will develop a national Community of Practice to define, codify, and promulgate design principles and practices for broadening participation and thereby increase the visibility/influence of HBCUs at the center of STEM higher education reform. This poster will introduce you to the work of CASL.

STX-P21

Perceptions and Awareness of Climate Change on Environmental Stewardship

Kimarie Engerman, *Faculty, College of Liberal Arts and Social Sciences*
Nisha Clavier, *Faculty, College of Liberal Arts and Social Sciences*
Sharon Honore*, Faculty, College of Liberal Arts and Social Sciences*

Human society is impacted by a variety of factors such as new precipitation patterns, rising temperature, and other changes. Changes in human behavior can help reduce climate change. Therefore, a challenge for humans is to maintain a standard of behavior that improves the quality of life around the world while maintaining a viable ecosystem and sustainable climate. Since human perceptions and attitudes are necessary for environmental stewardship, the purpose of this study is to examine the relationship that exists between the awareness of climate change and environmental stewardship of local residents of St. Croix, Virgin Islands. Surveys via iPads will be administered to approximately 383 individuals at two beaches. Obtaining stakeholders' perspectives contribute to knowledge on how residents can contribute to managing the Virgin Islands' environment and natural resources.

STX-P22

Is the Grass Greener? A Comparison of the Success of Virgin islanders on the Mainland Versus Virgin Islanders at Home

***Ayishih Bellew**, Staff, Eastern Caribbean Center*

A number of persons from the Virgin Islands emigrate to the U.S. mainland in search of better opportunities, an easier life and a higher standard of living. Most recently, many Virgin Islanders took advantage of the mercy voyages and FEMA relocation assistance to make their move after hurricanes Irma and Maria. This paper seeks to determine if a Virgin Islander residing in the continental U.S. is actually more successful than their counterpart who decided to stay in the USVI. Success is measured by six socio-economic factors. These factors of Virgin Islanders abroad are compared with a control group of Virgin Islanders that continue to live in the USVI. The t- test for two independent samples and the chi-square test will be used to determine the significance of the differences between the two groups.

STX-P23

Contraceptive Use Among Abused African Caribbean and African American Women

***Desiree R. Bertrand**, Faculty, School of Nursing*

Objective: The aim of this study was to investigate relationships between both contraceptive use and method selection among Black women in rural and urban populations with a history of intimate partner violence (IPV). Method: This was a secondary data analysis of a case/control study on partner abuse of 862 women aged 18-55 who reported having an intimate partner during the past two years. The chi-square test was used for data analysis. Results: Twenty-seven percent (27%) of the sample reported no contraceptive use. Women that were not abused reported contraceptive use at a slightly higher rate than abused women (28 % vs 25%, $p = .07$). Abused women were more likely to use male condoms (44%, $p=.044$) and withdrawal (18%, $p<0.001$) as forms of contraception than non-abused women. Urban women were more likely to use Depo-Provera (19%, $p<0.001$) and sterilization (15%, $p<0.001$), whereas, rural women were more likely to use birth control pills (22%, $p<0.001$) and withdrawal (19%, $p<0.001$). There were no significant differences between urban and rural women on condom use. Conclusion: Contraceptive method selection and use among abused Black women should be evaluated not only for effectiveness, but long-acting properties, which may be warranted in abusive relationships.

STX-P26

Hackers Roam the Cyber World

***Jasiem Everington**, Undergraduate Student, University of the Virgin Islands*

My research project was focused around the idea of hackers penetrating computer systems. My research questions are: What vulnerable ports on my devices are accessible to hackers?, What methods/computer commands could be used to strengthen my firewall?. Ethical hackers are responsible to secure the vulnerabilities computer databases may reveal. As my research progressed, I found out that some default settings like, for example the firewall, don't secure your computer system thoroughly. My gap of knowledge I was trying to fill before this research was: What tools/methods are used to access someone's personal information? The results I found were very valuable because it keenly helped increase my knowledge of the cyber world attacks. The implication drawn from my result is that normal/natural computer users are comfortable with default firewall settings, without knowing that encryption codes can be used to crack through their databases. For future studies, I will continue using Kali-Linux and other programming software to discover information gathered like active listening, data packets, and other miscellaneous data being sent through computer communication.

STX-P30

Creating a Closed Cybersecurity Network: Simulated Malware Attacks and Forensics Analysis

***Angie Estien**, Undergraduate Student, University of the Virgin Islands*
***Rhonda Forbes**, Undergraduate Student, University of the Virgin Islands*
***Endia Green**, Undergraduate Student, South Carolina State University*
***Leroy Matthias Jr.**, Undergraduate Student, University of the Virgin Islands*
***Jonathan Graham**, Faculty, Norfolk State University, DOD&DOE Cybersecurity Summer Internship Director*

Cybersecurity has become a major issue concerning our country. Hackers are persistently looking for innovative ways to penetrate into networks and are succeeding; each major attack being more sophisticated than the previous. However, there is a shortage of experienced professionals within this field who can defend against these hackers. The main purpose of our project is to create a virtual cybersecurity testbed which allows users to develop hands-on experience on networking, hacking, and cyber defense without infecting or damaging physical machines or networks. The testbed's framework consists of attacker machines, victim machines, servers, and a router. Users will be able to infect machines with malware using various methods. Following the simulated attacks, forensic analysis can be performed to view the damage caused by the malware on the computers and the network. The test beds also allow users to modify the work environment to further enhance training. This research project is beneficial for company technical training, military training, or even as an educational approach within institutions. This research project could be used to train and educate persons within the cybersecurity field.

STX-31

How Safe is Your Drinking Water? Integrating Research into the General Chemistry Curriculum

***Bernard Castillo II**, Faculty, College of Science and Mathematics*
***Kynoch Reale-Munroe**, Faculty, College of Science and Mathematics*

The integration of applied student research into chemistry curriculum has been shown to positively influence knowledge and attitudes of students towards science. Integrating research allows students to be engaged in applicable, hands-on experiences similar to what scientists do on a regular basis. Students (N = 105) registered in General Chemistry were introduced to simple and complex water quality experiments in the past 6 semesters. The theme, "How Safe is Your Drinking Water?" was used to integrate water quality experiments in the General Chemistry curriculum. Students brought in their individual drinking water and tested it for water hardness, nitrates, phosphates, lead, copper and arsenic. Students were asked to write a report based on their findings following the standard scientific format. Our data showed statistical difference between pre- and post-test using one-way ANOVA ($p < 0.001$). A Likert survey was also administered on their attitudes to evaluate the effectiveness of the program. Overall, students learned a lot from the experiments, and they thought that the experiments were fun and interesting.

STX-32

Urchins are Important Herbivores and Mediate Positive Effects of Sediment on Algal Turfs

***Adriane M. McDonald**, Undergraduate Student, Spelman College, Georgia*
***Maria Gasca**, Undergraduate Student, University of California, Los Angeles*
***Shamoy K. Bideau**, Undergraduate Student, University of the Virgin Islands*
***Camille Gaynus**, Graduate Student, University of California, Los Angeles*
***Caitlin Fong**, Graduate Student, California State University, Northridge*
***Sennai Habtes**, Faculty, University of the Virgin Islands*
***Peggy Fong**, Faculty, University of California, Los Angeles*
***Paul Barber**, Faculty, University of California, Los Angeles*

While the importance of herbivorous fishes in supporting the health of coral reefs has been established globally, the role of herbivorous invertebrates have only been evaluated in the Caribbean. There, urchins were found to have compensated for a long history of overfishing when a catastrophic decline in sea urchins resulted in transitions from healthy short algal turfs to long sediment-laden turfs or macro algae that prevent coral recovery after disturbance. It is unknown whether urchins can compensate for overfishing on reefs of the Tropical Pacific subjected to multiple human stressors such as increased sedimentation from developed watersheds. We conducted a two-factor field experiment varying access to urchins (+/-) and sedimentation (ambient, +3mm marine, +3mm mixed terrestrial and marine) on the algal turf community of an overfished fringing reef of Moorea, French Polynesia. In the absence of urchins, turf height increased, especially with the addition of marine sediments, possibly due to increased nutrients supplied by sediments. Comparably, mixed terrestrial sediments did not enhance turf growth. Urchins maintained short algal turf, mitigating the positive effect of marine sediments. However, urchins avoided turf covered by terrestrial sediments. Across all sediment treatments, urchin grazing removed sediments that contributed to the maintenance of healthy turf.

STX-P33

Identification of Polycyclic Aromatic Hydrocarbons in Particle-Phase Vehicle Emissions

***Tione Grant**, Undergraduate Student, College of Science and Mathematics*

Motor vehicles are well-known producers of polycyclic aromatic hydrocarbons. These mutagenic and carcinogenic compounds are products of the combustion process and are present in both gas and particle phases. Traditionally, particle-phase PAH emissions have been studied by collecting cumulative emission samples from tunnels and analyzing them via high performance liquid chromatography (HPLC). To our knowledge, there has been no investigation of vehicle-specific emissions to ascertain the dependence of PAH formation on vehicle model, age and fuel type. In this study, laser desorption time-of-flight mass spectrometry identified PAH's in the particle-phase exhaust of two vehicles. Mass spectra of pure PAH samples were collected by compressing samples and ablating them with a Nd: YAG laser in a mass spectrometer. Samples of particulate matter were collected from the tailpipes of a 2006 and 2016 Toyota 4Runner and analyzed. The results showed a presence of perylene and pyrene in both vehicular emissions, whereas, coronene and phenanthrene were found exclusively in the 2016 and 2006 models respectively. This data is interesting because it suggests vehicle-dependent PAH presence in vehicular emissions, even between vehicles of similar make and model. Future work on this project aims to expand the number and variety of vehicles sampled to reveal trends in PAH production.

STX-P34

Making Science Real Through Community Action: Integration of Service Learning in Introductory-Level Courses at the University of the Virgin Islands

***Michele Guannel**, Faculty, College of Science and Mathematics*
***Michelle Peterson**, Faculty, College of Science and Mathematics*
***Joan Ledbetter**, Staff, Center for Student Success*

Service learning can be a powerful instructional tool for freshman-level students, particularly at minority-serving institutions such as Historically Black Colleges and Universities. Students can connect more readily to fields of STEM (Science, Technology, Engineering, Mathematics), when they experience the significance of science and technology in everyday life. Therefore, in the aftermath and recovery from Hurricanes Irma and Maria, we developed and implemented a pilot project to strengthen service learning across introductory-level courses at the University of the Virgin Islands. We focused on implementing this project within Science 100, a course on natural disasters in the Caribbean. As an alternative to writing a research paper, students were given the option to conduct service learning in the form of community action related to hurricane impacts and recovery. Student projects focused on both marine systems and human communities. Learning outcomes were assessed via student attitudes towards STEM, understanding of Science 100 course content, and student self-reports of the impacts of service. This study will lay the groundwork for future service learning assignments in Science 100, inform best practices for service learning at UVI, and identify ways of moving service learning to additional courses across the UVI curriculum.

STX-P35

Planning for Students' Well-Being and Post Hurricane: A Participatory Action Research

***Mohomodou Boncana**, Faculty, College of Liberal Arts and Social Sciences*
***Jennifer Palmer Crawford**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Michelle Albany Crispin**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Verna Rivers**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*

The Virgin Islands were hit by two mammoth hurricanes within the space of two weeks in September 2017. These events tested the mettle of the institution and exposed gaps in the administrators' level of preparedness. Therefore, the purpose of this participatory action research is to engage students and staff of the University of the Virgin Islands in developing a comprehensive preparedness plan to ensure the safety and well-being of the students in the university's shelters. The research will also seek to create a response proposal or strategy that will address the needs of students following a disaster. Observation, semi-structured interviews and focus groups will be used to gather the data (Creswell, 2016, Stringer, 2014). The interview data will be tape-recorded, transcribed, coded, categorized, and integrated into emerging themes.

STX-P40

Humanitarian Efforts During Hurricanes Irma and Maria: Saving Lives and Restoring Normalcy

***Mohomodou Boncana**, Faculty, College of Liberal Arts and Social Sciences*
***Correen Celestine**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Stacy Creque**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Vijonet Demero**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Matthew King**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*
***Michell Lindo**, Graduate Student, Creative Leadership, Innovation, and Change, Ph.D. Program*
***Ilive Peltier**, Graduate Student, Creative Leadership, Innovation, and Change Ph.D. Program*

During September 2017, within 12 days, two Category 5 hurricanes devastated the United States Virgin Islands (USVI) as well as several other Caribbean islands. In the aftermath of those events, a lot of aid was received in the territory. The purpose of this participatory action research is to explore ideas that can result in a plan of action geared toward creating strategies for more effective and efficient humanitarian relief efforts in the USVI. This research will seek to develop an effective solution of how to move forward with more well-organized Humanitarian responses that will save maximum lives and bring normalcy to disaster victims. Data collection methods include descriptive observations, individual and focus groups interviews, documents and media collection and recordings and video collections (Creswell, 2014). The gathered data will be transcribed, coded, placed in categories, and then developed into themes.

STX-P41

St. Croix Roundtable Abstracts,
Albert A. Sheen Campus

Introducing Home Language in the English Classroom: A Search for Identity

***Valerie Combie**, Faculty, College of Liberal Arts and Social Sciences*

Home language embraces a variety of dialects spoken in the Caribbean. This smorgasbord of languages emphasizes the diversity in the Caribbean, but it poses a major concern for education in the region, which includes the United States Virgin Islands. Linguists identify the English spoken in the Anglophone Caribbean as a form of English-based Creole, which is not accepted in American schools; therefore, it conveys a negative impression to the students. This situation is exacerbated by the students' inability to code switch from the Caribbean Creole English (CCE)—a language that is primarily oral—to an academic register. Linguists have introduced strategies such as instrumental, accommodation, and awareness programs to bridge the gap and improve students' facility with the standard version of the English language. Proponents of these programs have reported great success in applying various aspects of the programs. Today's presentation will describe practical accommodations to help students navigate this landscape with a holistic, sociolinguistic picture of their native dialects to improve their academic and social development and identification.

STX-R1

Education, Music and Language: Researching Aspects of Culture and Traditions of St. Croix, Africa and The Caribbean Diaspora

***Jamillia Edwards**, Undergraduate Student, Virgin Islands Caribbean Cultural Center/School of Business*
***Cody Cook**, Undergraduate Student, Virgin Islands Caribbean Cultural Center/College of Liberal Arts and Social Sciences*

The roundtable presentation will investigate and inform on a) The social and cultural impact of African music, instrumentation and stylistic interpretations of heritage performance arts; and b) The cognitive development and anthropological aspects of language acquisition and the respectful use of the Crucian language as the mother tongue. Research within select Global Education Management (GEM) reports assert that children taught in their mother language are more likely to develop literacy skills. Research questions covered within this on-going comparative educational project include: 1) How have traditional African rhythms and instrumentations been integrated into modern musical genre?; 2) How does African music impact education in the Caribbean Diaspora?; 3) How would Crucian language acquisition impact educational reform in the Virgin Islands?; and 4) What methods of using mother language in education would improve literacy in St. Croix and the Virgin Islands? Guided discussions will explore cultural productivity and marketing research aspects of this project that explicate *language is to sound as sound is to music as music is to language* throughout the Caribbean Diaspora.

STX-R2

Multidisciplinary Views on Prison Re-entry and Recidivism

***Kimarie Engerman**, Faculty, College of Liberal Arts and Social Sciences*
***Kenny Hendrickson**, Faculty, College of Liberal Arts and Social Sciences*
***Dara Hamilton**, Faculty, College of Liberal Arts and Social Sciences*
***Nisha Clavier**, Faculty, College of Liberal Arts and Social Sciences*
***Sharon Honore**, Faculty, College of Liberal Arts and Social Sciences*
***Verleen McSween**, Faculty, College of Science and Mathematics*

Globally, the average rates of criminal recidivism are as high as 50% with the U.S. peaking at 76.6 % (Fazel & Wolf, 2015; BJS, 2015. Bleakly, upon release, at least half of the rearrested prisoners will again return to prison before the end of their first year. This roundtable will examine criminality from multiple perspectives. The perspectives are public administration, psychological, biological, communication, and social sciences. Arguments will be presented on prison re-entry and recidivism.

STX-R3

Innovative Humanities and Communications Research: Discourse on the "A" in STEAM

***Amber Aragi**, Undergraduate Student, Virgin Islands Caribbean Cultural Center/College of Liberal Arts and Social Sciences*
***Olinger Augustin**, Undergraduate Student, Virgin Islands Caribbean Cultural Center/College of Liberal Arts and Social Sciences*
***Reba Dickson**, Undergraduate Student, Virgin Islands Caribbean Cultural Center/College of Liberal Arts and Social Sciences*

Innovative Humanities and Communications Research: Discourse on the "A" in STEAM is a diverse comparative project that explores scientific aspects of the arts within fields of mixed-method investigative strategies for the creation of interdisciplinary resources. Discourses will be presented related to a) examining students' interest and self-expression in social reporting and journalism with original new media; b) surveying multi-cultural and behavioral impacts of Hurricanes Irma and Maria through radio interviews and documentation; and c) exploring socio-cultural behaviors of mother-daughter relationships for theatrical dramatization and intergenerational presentations. Research and development of the "WUVI Web Magazine" as an online medium for current events, campus life, and cultivation of marketing strategies will be explicated. Through investigative interviews and recordings of narratives, "Life After IrMaria" is a radio documentary designed to increase awareness and education for Americans in the 48 contiguous states and abroad on the realities of St. Croix and the Virgin Islands overlooked in mainstream media. Survey responses as data collected from a cross-section of females in St. Croix between the ages of 16 to 60 years from various ethnicities and socioeconomic backgrounds used to create the scientific content for the theatrical student production "Ti Manmay Pa Boutley" will be probed.

STX-R4

Artificial Intelligence -- Are You For Real?

***John Munro**, Faculty, School of Business*

Much attention has been centered on science-fiction robots which attempted to take over control of space exploration missions, or on helpful actions of well-trained robots which followed the rules to protect their human "co-workers." Science and technology have developed to a stage where such behavior is not merely conceptual, but can now be realized in actions, reactions, and interactions which impact humans. Repeated roundtable sessions during the Research Day will address some of these artificial intelligence concepts, concerns, and capabilities, collecting and processing information from human participants, and then creating results for input and consideration in subsequent sessions. This timely continuous collect, analyze, conclude, and feedback cycle is enabled by using existing AI assessment software, presenting (or confronting) us with the reality of artificial intelligence now.

STX-R5

St. Croix Demonstration Abstract,
Albert A. Sheen Campus

UVI Planetarium: A New Paradigm for Teaching Astronomy at UVI

***Antonino Cucchiara**, Faculty, College of Science and Mathematics*
***David Morris**, Faculty, College of Science and Mathematics*
***Jan Staff**, Faculty, College of Science and Mathematics*
***Dave Smith**, Faculty, College of Science and Mathematics*

The UVI Bachelor of Science in Physics with concentration in astronomy is now a reality. The new program aims to provide new opportunities to UVI students interested in science, from programming, to astrophysics and aerospace technology.
Integral part of this effort is the acquisition of new equipment to teaching new Astronomy classes, including General Education Astronomy (NSC104) and the Physics astronomy-centered classes (PHY271/371, PHY481/482). I will demonstrate the capability of the planetarium and some of the concepts that will be taught with it.

STX-D1

St. Thomas Poster Abstracts

Is the Grass Greener? A Comparison of the Success of Virgin islanders on the Mainland versus Virgin Islanders at Home

***Ayishih Bellew**, Staff, Eastern Caribbean Center*

A number of persons from the Virgin Islands emigrate to the U.S. mainland in search of better opportunities, an easier life and a higher standard of living. Most recently, many Virgin Islanders took advantage of the mercy voyages and FEMA relocation assistance to make their move after hurricanes Irma and Maria. This paper seeks to determine if a Virgin Islander residing in the continental U.S. is actually more successful than their counterpart who decided to stay in the USVI. Success is measured by six socio-economic factors. These factors of Virgin Islanders abroad are compared with a control group of Virgin Islanders that continue to live in the USVI. The t- test for two independent samples and the chi-square test will be used to determine the significance of the differences between the two groups.

STT-P1

How Affordable was Rent in the U.S. Virgin Islands Prior to the 2017 Hurricanes?

***Stevie Henry**, Staff, Eastern Caribbean Center*

After the direct hit of a hurricane, the repair or replacement of a community's housing stock is one of the most urgent needs in the recovery of that community. The damage to a community's housing stock affects the availability of affordable housing units to rent. Anecdotal accounts from residents displaced by the 2017 hurricanes, have revealed: being forced to compete with disaster response workers for housing and they are often outspent by the response workers who have greater resources. Historically in the United States, housing affordability as a public policy indicator is defined by percent of household income. In 1981, the current housing affordability threshold of 30 percent of household income was established (Schwartz & Wilson, 2008).
This project will analyze the housing cost burden for Virgin Islands renters prior to the 2017 IrMaria Hurricanes. The 2010 Census Gross Rent as a Percentage of Household Income in 2009 will serve as the primary source for presenting the distribution of housing cost using three levels of burden: 1) without burden (under 30% of income spent on housing cost), 2) moderate burden (30% to 49%) and 3) severe burden (50% or more). Using ArcGIS by Environmental System Research Institute, maps will display the distribution of housing cost burden by estate.

STT-P2

Mapping of Sugar Shipped from St. Croix 1835-1840 and 1850-1857

***Stevie Henry**, Staff, Eastern Caribbean Center*

Over the past two decades, the practice of historical spatial analysis has contributed significantly to research and teaching history (Knowles, 2008). This project seeks to expand access to historical resources for research and teaching Virgin Islands History. A team of students (with an instructor's guidance) of the University of the Virgin Islands – Introduction to Geographic Information Systems (GIS) course as part of their learning — will construct a database of sugar shipped from St. Croix 1835-1840 and 1850-57. The data source will be statistical tables compiled and published by the Copenhagen Royal Library of Denmark. These tables contain the quantity of shipped sugar produced by estates on St. Croix.
The database will be linked to a St. Croix estates GIS map layer. This will enable the spatial analyses of the data from the geographic level of estate to island. A series of maps will be created for presentation at a public UVI research symposium. In addition, some of the project maps will be made available to the public via a web-based mapping service for research and teaching. Combined with other information, researchers could discover existing economic opportunities by analyzing past agricultural production.

STT-P3

Prevalence of Delinquency in St. Thomas

***Sherlon Audain**, Undergraduate Student, College of Liberal Arts and Social Sciences*

A significant study on delinquency in the U.S. Virgin Islands was done in 2003, at the University of the Virgin Islands Eastern Caribbean Center. No study has been done since then. This study is being conducted to see if there has been a significant change in delinquency. The prevalence of delinquency has been documented through numerous studies. These studies show that age and crime have a pattern, which can be measured with a curve. Curves have been used over the years as a tool for developing strategies for fighting crime. The purpose for this study is to create an age crime curve for the delinquency within St. Thomas (USVI). Within this study the examination of the age ranges, where crime is most active will focus on namely; the peak age, the median age, and the age of decline. The factors that contribute to crime among youths will be examined. This research project will serve to support recommendations for the reduction of delinquency in St. Thomas (USVI).

STT-P4

Overview of the Center for Advancement of STEM Leadership

Camille McKayle, *University of the Virgin Islands*
Kelly Mack, *Association of American Colleges and Universitie*s
Goldie Byrd, *North Carolina A&T State University*
Orlando Taylor, *Fielding Graduate University*
Sandra Romano, *University of the Virgin Islands*
Kimarie Engerman, *University of the Virgin Islands*
Leila Sullivan, *University of the Virgin Islands*
Kostas Alexandridis, *University of the Virgin Islands*

The goal of Center for the Advancement of STEM Leadership (CASL) is to establish the foundational tenets of the research and practice of leadership for broadening participation in STEM. CASL will achieve this mission through: 1) research activities that will contribute to an increased knowledge base on leadership development for broadening participation in STEM; 2) knowledge translation activities that will use an evidence-based approach to leadership development to increase the number of HBCU leaders with culturally responsive competencies and capacities; and 3) outreach activities that will develop a national Community of Practice to define, codify, and promulgate design principles and practices for broadening participation and thereby increase the visibility/influence of HBCUs at the center of STEM higher education reform. This poster will introduce you to the work of CASL.

STT-P5

Holistic Green Economics Concept for Global Energy, Water and Food Security

Hosanna Solomon*, Faculty, College of Liberal Arts and Social Sciences*

The Holistic Comprehensive Approach for Energy, Water and Food Security explores the feasibility of using small, renewable integrated power units to create hydroelectric power and clean water to achieve an environmentally sustainable food production system. The holistic system calls for "Paradigm Shift" in global food production from relying on weather changes of rain and dry season and fossil-based energy, to a different system that can easily be manageable using renewable energy of the sun. This system will harness the energy of the Sun by using solar power and wind power to pump seawater up a hill to a storage facility near the coast, creating pumped-storage hydroelectricity (PSH). The stored seawater generates electricity as it flows back to the sea. The renewable energy sources will also be used to desalinate part of the seawater to produce potable fresh water using a reverse osmosis process before returning to the sea. This fresh water can be used within the domestic agriculture production system. Seawater plants can also be planted to produce a biodiesel source for industrial uses. The concept combines seawater and freshwater aquaculture farming systems to produce fish and vegetables, as well as fodder crops as feed for ruminant animals such as sheep, goats, and poultry.

STT-P6

Dialects in the Anglophone Caribbean

***Che-Raina D. Warner**, Undergraduate Student, College of Liberal Arts and Social Sciences*

The world is fast becoming a global village and cultural borders are now blurred lines. This has heightened the levels of interaction between people of different cultural backgrounds. A major outcome of this is language, more specifically West Indian dialect, the core means of communication for natives of the Anglophone Caribbean. This cultural evolution of a closely connected society has several benefits, but the neglect of West Indian dialect poses some grave shortcomings for native West Indian dialect speakers. This preliminary discourse explores how the dominant European standards of the English language are impractical in the academic, cultural and historical contexts of the Anglophone Caribbean. This study further indicates how the negative attitudes toward dialect influence students' appreciation of their own cultural heritage. Rhetoricians have often attempted to justify their arguments about dialect by privileging that which is adopted from Europe over that which is adopted from Africa. However, current research shows that that the relationship between the two speech forms is more dynamic, and can be better understood by allowing them to cohesively operate, which linguists suggest is a doubly beneficial mechanism. The author hopes to get a better understanding of how natives of the Anglophone Caribbean cope with code switching.

STT-P7

Drones as a GIS Tool for Surveillance After Disasters

***Joseph Hodge**, Undergraduate Student, School of Business*

With the advancement of photography technology, Unmanned Aerial Vehicles (UAVs) or Remotely Piloted Aerial Systems (RPASs), more commonly known as drones, are the ideal tool for performing large-scale surveys after man-made and natural disasters. Some benefits of utilizing drone technology include relatively large flight ranges, aerial photography of larger geographic areas, shorter surveying times, surveillance and security, and ease of use. The ability to take pictures or video can not only be used to document damage sustained to an area, it can also be used to determine if any persons or animals need to be recovered from a difficult-to-reach area, and if an area appears to be safe enough for rescue and emergency personnel to travel. Recording photos and videos of disaster areas, combined with a Geographic Information Systems (GIS) platform, can create a map of the disaster area and allow emergency personnel to prioritize which areas require more immediate assistance, and which areas require more manpower. The data saved can also be used to predict damage and needed response for future disasters.

STT-P30

Do UVI Undergraduate Business Students Read Assigned Course Readings?

***Lydia M. MacKenzie**, Faculty, School of Business*

In 2010, *Academically Adrift: Limited Learning on College Campuses* (Arum & Roska, 2010) caused a mild stir across U.S. colleges. Following 2,322 traditional-age students from the fall of 2005 to the spring of 2009, they examined testing data and student surveys at 24 U.S. colleges and universities. Their results indicted that 32 percent of students each semester do not take courses with more than 40 pages of reading assigned a week, and half don't take a single course in which they must write more than 20 pages over a semester. Students majoring in business, education, social work and communications showed the smallest gains (Arum & Roska, 2010). While there were critics of the findings, many authors reinforced Arum & Roska's theories. According to Gurung & Martin (2011), even in textbook-reliant intro courses, students on average read fewer than 1/3 of the assigned pages while data from bookstores across the nation suggest that 16% of students do not even buy the textbook (Kingman, 2006). This research proposal seeks to ask UVI undergraduate business students in a March, 2018 online survey, if they read, how much they read, why they don't read, and what might lead them to read more.

STT-P31

The Role of Affect and Productive Struggle in the Problem-Solving Process

***Nadia Monrose Mills**, Faculty, College of Science and Mathematics*

The ability to succeed in Science, Technology, Engineering, and Mathematics (STEM) careers is contingent on a student's ability to engage in mathematical problem solving. Much research has been conducted on mathematical problem solving, beginning with Polya's (1945) seminal work and moving towards factors that influence students' success in problem solving. However, there is a need to accumulate this research through the creation of a problem-solving theory. Schoenfeld (2011) developed such a problem-solving theory which attributes an individual's goals (personal aims to achieve), resources (knowledge available), and orientations (beliefs, values) as influential factors in the decisions made during any goal-oriented activity. In this study, two students' (incoming and returning freshmen at an HBCU participating in a summer bridge program) problem-solving process was analyzed. Data collection included the use of individual task-based interviews followed by video-stimulated response interviews. It was found that a student's belief about problem solving determined how they dealt with negative emotions during their sessions. The data indicate that affect is the driving force that moves the student through the problem-solving phases.

STT-P40

Creating a Closed Cybersecurity Network: Simulated Malware Attacks and Forensics Analysis

***Angie Estien**, Undergraduate Student, University of the Virgin Islands*
***Rhonda Forbes**, Undergraduate Student, University of the Virgin Islands*
***Endia Green**, Undergraduate Student, South Carolina State University*
***Leroy Matthias Jr.**, Undergraduate Student, University of the Virgin Islands*
***Jonathan Graham**, Faculty, Norfolk State University, DOD&DOE Cybersecurity Summer Internship Director*

Cybersecurity has become a major issue concerning our country. Hackers are persistently looking for innovative ways to penetrate into networks and are succeeding; each major attack being more sophisticated than the previous. However, there is a shortage of experienced professionals within this field who can defend against these hackers. The main purpose of our project is to create a virtual cybersecurity testbed which allows users to develop hands-on experience on networking, hacking, and cyber defense without infecting or damaging physical machines or networks. The testbed's framework consists of attacker machines, victim machines, servers, and a router. Users will be able to infect machines with malware using various methods. Following the simulated attacks, forensic analysis can be performed to view the damage caused by the malware on the computers and the network. The test beds also allow users to modify the work environment to further enhance training. This research project is beneficial for company technical training, military training, or even as an educational approach within institutions. This research project could be used to train and educate persons within the cybersecurity field.

STT-41

Talking Behind Your Back? What Your Computer Secretly Says About You

***Ronell Brunn**, Undergraduate Student, University of the Virgin Islands*
***Timothy Kentopp**, Mentor, College of Science and Mathematics*

In today's world, software is being developed to be useable on download. This feat is done by having a list of preset settings for the user. While the default settings may make life easier, many people remain unaware of what they do and how they operate. This is a dangerous concept as many of these settings may offer no benefit and may even harm the consumer. The purpose of this research is to delve into wireless household appliances and analyze how changing their default setting may affect them. By design, this research topic will lead student(s) into learning about potential risk that the devices may be exposed to and how some of the settings may hamper or help the device. This topic also comes with the flexibility for students to open and explore threats that plague the internet. Students may also explore possible protection they can use to defend themselves and others. One such avenue to explore is the examination of the open and closed ports used by a device while it is functioning.

STT-P42

Software Installation Analyzer with Automation

***Thalia Guadalupe**, Undergraduate Student, College of Science and Mathematics*
***Malik Hayes**, Undergraduate Student, College of Science and Mathematics*
***Stayce Greene**, Undergraduate Student, College of Science and Mathematics*
***Ian Lee**, Mentor, Lawrence Livermore National Laboratory*

The ability to automate everyday processes is essential in a fast-paced and ever-changing environment. Through automation, a laboratory can invest more of their energy into the dynamic needs of the work environment. The purposes of this work is to develop an automated solution to software approval. Depending on the organization, an extended period of time can be spent reviewing the software before it is deemed usable. This review process differs between alternative techniques and division to division, causing a time difference in the review process. Due to the time difference, the project implements a standardized review process using a two-tier client-server based architecture. The client-side offers a friendly web-based interface allowing users to upload their applications developed for the Red Hat Package Manager (RPM). The server-side utilizes Java to initiate the call to Vagrant with a bash script which spawns a Virtual Machine. Inside the Virtual Machine, a Python script calls Sysdig (an application that captures system calls and events on Linux kernels) during the installation of the uploaded application. The script checks against predetermined factors to decide whether a software is approved or denied. A report is then issued to the organization's designated administrator for the software along with a notification being sent to the software's submitter.

STT-P43

Network Deception

***Thalia Guadalupe**, Undergraduate Student, College of Science and Mathematics*
***Angie Estien**, Undergraduate Student, College of Science and Mathematics*
***Bashiri Smith**, Undergraduate Student, College of Science and Mathematics*
***Jason Lewis**, Mentor, College of Science and Mathematics*

Computer network defenses generally rely on network intrusion detection and prevention; however due to the reactive nature of these methods, they are not efficient against skilled adversaries or previously unseen attack methods. Research indicates that network deception may provide corporate networks with an additional layer of protection by combining host-based and network-based techniques. Our project uses a High-Fidelity Adaptive Deception & Emulation System (HADES) which duplicates the network infrastructure, giving adversaries the impression that the attack is occurring on the actual network. Once an intrusion is detected, the emulation system switches over and sends the adversary to a replica of the network with false information that is generated as the attack is occurring. Trapping the adversary in this environment allows us to learn the adversary's strategies, capabilities, and intent. The findings of this research will assist researchers to develop more efficient systems that can be used to deceive the adversary and protect networks against attacks.

STT-P44

Recovery with Renewable Energy: Project-Based Learning in the Mathematics Classroom

***Tameca F. White**, Graduate Student, College of Science and Mathematics*
***Cleopatra. J. Skerrit**, Graduate Student, College of Science and Mathematics*
***Nadia Monrose Mills**, Faculty, College of Science and Mathematics*

Students can strongly connect to the study of mathematics if they can see how math exists in their everyday lives. In two mathematics classrooms at Charlotte Amalie High School and All Saints Cathedral School, we incorporated our electricity challenges related to the impacts of two recent Category Five hurricanes. The major source of power is derived from fossil fuels; however fuel was in high demand but limited during the aftermath of the hurricanes. These challenges showed the need for renewable energy sources and technology in the VI. Using project-based learning (PBL), students engineered renewable energy methods to investigate, which renewable energy would be best for the VI. Students were tasked to make connections with their math curriculum such as integers, statistics, data interpretation, and data representation with tables and graphs. Throughout the developmental phase of this project, students learned about the different forms of renewable energy, energy conservation, and energy use. UVI faculty through VI-ESPCoR has provided support for both students and teachers via presentations and resources. Ultimately, we seek to use the PBL approach so that students can express their diverse strengths and talents by working together in an environment where each individual can flourish.

STT-P45

The Application of Random Walks to Build Probabilistic Models of the Habitats of Species

***Robert Stolz**, Faculty, College of Science and Mathematics*
***Kelvin Dover**, Undergraduate Student, College of Science and Mathematics*

Mapping and or tracking different species in their environments has been a difficult task for many researchers. The purpose of this project is to build a probabilistic model to find the areas on any given map that a species might be at any point in time. The simulation can then be used to find a single fish that may be going extinct and has been seen wandering around or to find a school of a specific species of fishes for fishing purposes. Multiple random walks will be used to get a more accurate probabilistic location and mapping of given areas. Data collected from small-scale observations will also be used to fine-tune the accuracy of the probabilistic model.

STT-P46

The Ties That Bind Us: Campus Wide Experiences Facilitating School Connectedness

***Samah Abdallah**, Undergraduate Student, College of Science and Mathematics*
***Lawanda Cummings**, COMmunity-Metrics, LLC*
***Nastassia Jones**, Visiting Scholar, Center for Social Justice, Human and Civil Rights, University of Georgia*

Campus Wide Experiences (CWEs) are extracurricular events, offered by the Science 100 course, that facilitate students experiential learning with their peers and professors, developing school connectedness through institutional structures. Within a university in the Caribbean, the faculty created a space where research and learning are aligned within a course that reinforces science content with applied experiences and context connections. In Blum's article, students with higher levels of positive school connectedness showed higher levels of positive outcomes and emotional well-being. School connectedness also increases retention, promotes success in academics, and facilitates future career efficacy. The Science 100 course allows deep processing and learning of material by intertwining the science of Caribbean natural hazards/systems and the socio-political differences that influence community resilience. In this phenomenological study, place-based, cultural and regionally congruent curricula in a general science course and its impact on students' school connectedness is explored. For 100 students, reflections were transcribed and coded with six emergent themes including: 1) establishment of positive peer-networks, 2) value of participation in extracurricular activities on campus, 3) positive attachment to school, 4) academic motivation and academic self concept, 5) future orientation in academics and social life, and 6) learning applied and career-focused content.

STT-P47

What Does Sugar Have To Do With It: Project-Based Instruction in a High School Biology Course

***Michealrose Ravalier**, Graduate Student, College of Science and Mathematics*
***Nadia Monrose Mills**, Faculty, College of Science and Mathematics*
***Michele Guannel**, Faculty, College of Science and Mathematics*

Adolescents and adults alike find many excuses to adopt a diet high in sugar. However, excess sugar consumption is linked to weight gain, obesity, type 2 diabetes, hypertension, and blood vessel disease. In the U.S. Virgin Islands, a limited range of restaurants and affordable high-quality food sources can contribute to high levels of such disease. Education can be an effective tool in combating this. In an eleventh grade biology classroom at Ivanna Eudora Kean High School, Project-Based Instruction allowed students to evaluate their sugar consumption and the underlying dangers closely. During the six-week-long unit on sugar, students engaged in activities including two field trips. Students visited a local restaurant that serves many healthy options and afterwards created MyPlate models of healthy meals. Students then utilized these models in peer teaching in a science classroom at Addelita Cancryn Junior High School. Guided by these student leaders, junior high school students measured the amounts of sugar in snacks and soda. We evaluated the success of this education through pre- and post-surveys and student reflections. In conclusion, engaging and inviting students into this discussion is an avenue that should be explored.

STT-P48

The White Plague: A Glimpse Into the Future

***Robert Stolz**, Faculty, College of Science and Mathematics*
***Marilyn Brandt**, Faculty, College of Science and Mathematics*
***Harmonie Hanley**, Undergraduate Student, College of Science and Mathematics*
***Hairol Breton**, Undergraduate Student, College of Science and Mathematics*

Many environmental factors are causing reefs in the Caribbean to experience bleaching events making them more susceptible to diseases such as the white plague. Fortunately, cellular automata, CA, can be used to assist in addressing this issue. With the usage of cellular automata, scientists will now be able to determine if disease among corals will continue to spread. In our first CA, we created a very simple model which included the following: the Von Neumann Neighborhood consisting of only four neighbors which could be either healthy or diseased, and four simple rules that determined the outcome of the initial cell. From this model, we observed that 17% of diseased corals is the "tipping point" of whether the reef will remain relatively healthy or become sick altogether. In our second model, we incorporated 8 neighbors using the Moore Neighborhood which now included a neighbor that can be empty/dead. In this model, we saw that the new "tipping point" was 30% to 35% of diseased corals. In the future, our goal is to make a third version in which we will create probabilistic rules and find different time periods where scientists' intervention would create the best outcomes for our reefs.

STT-P49

Investigation of the Medicinal Properties of Different Solvent Extracts of *Tillandsia recurvata* L. (L.) (Old Man's Beard)

***Hairol Breton**, Undergraduate Student, College of Science and Mathematics*
***Neelam Buxani**, Faculty, College of Science and Mathematics*

The plants of the Virgin Islands have been used for centuries by its locals due to their medicinal properties, which have been known to treat illnesses such as arthritis, diabetes, fever, headaches, sores, and inflammation. *Tillandsia recurvata* L. commonly known as "Old Man's Beard" has been used by locals to treat arthritis, diabetes, hemorrhoids, emmenagogue, gall bladder complaints, and leucorrhea. In current study, the three solvent extracts n-hexane, acetone, and methanol of this plant are being studied for their antioxidant caliber via DPPH and ABTS assays, while antibacterial activity is assessed via agar plate assay.

STT-P50

Disposition of Neurotoxic Pcb 136 and its Metabolites in Cyp1a Knockout Mice

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Polychlorinated Biphenyls (PCBs) are environmental contaminants that are associated with adverse human health effects. PCBs are metabolized by cytochrome P450 enzymes in the liver to hydroxylated metabolites (HO-PCBs) that are potentially more toxic than the parent PCBs. Hydroxylated PCBs are further metabolized to PCB glucuronide and/or sulfate conjugates, which are excreted through urine and feces. In this project, we hypothesize that the knockout of specific P450 isoforms affect the urinary excretion of PCB 136 and its metabolites. To test this hypothesis, Cyp1a1 and Cyp1a2 knockout mice and congenic wildtype mice were exposed to a single dose of PCB 136 (30 mg/kg body weight). Levels of PCB 136 and four metabolites, 5-OH PCB 136, 4-OH PCB 136, 4,5-diOH PCB 136 and 3′-OH PCB 150 were measured using gas chromatography with electron capture detection. PCB 136, 5-OH PCB 136, 4-OH-PCB 136 and 4,5-diOH PCB 136 were detected in all urine samples. Urinary levels of PCB 136 and its metabolites decreased from day 1 to day 3. Profiles of OH-PCBs showed differences based on genotype. Results demonstrate that the knockout of isoform affects the urinary elimination of metabolites, a fact that needs to be considered when studying the toxicity of PCBs in transgenic animals.

STT-P52

Making Science Real Through Community Action: Integration of Service Learning in Introductory-Level Courses at the University of the Virgin Islands

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Service learning can be a powerful instructional tool for freshman-level students, particularly at minority-serving institutions such as Historically Black Colleges and Universities. Students can connect more readily to fields of STEM (Science, Technology, Engineering, Mathematics), when they experience the significance of science and technology in everyday life. Therefore, in the aftermath and recovery from Hurricanes Irma and Maria, we developed and implemented a pilot project to strengthen service learning across introductory-level courses at the University of the Virgin Islands. We focused on implementing this project within Science 100, a course on natural disasters in the Caribbean. As an alternative to writing a research paper, students were given the option to conduct service learning in the form of community action related to hurricane impacts and recovery. Student projects focused on both marine systems and human communities. Learning outcomes were assessed via student attitudes towards STEM, understanding of Science 100 course content, and student self-reports of the impacts of service. This study will lay the groundwork for future service learning assignments in Science 100, inform best practices for service learning at UVI, and identify ways of moving service learning to additional courses across the UVI curriculum.

STX-P53

DNA Extraction of *Halophila stipulacea* Plants for Genetic Variability around the Virgin Islands

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Invasive species, such as the seagrass *Halophila stipulacea*, pose a threat to the ecosystems that they invade by outcompeting native species for resources. The goal of this project is to determine the genetic variability of H. stipulacea and to use that information to help create an invasion history model. In order to achieve this goal, we used the 2bRAD method to identify single nucleotide polymorphisms (SNPs), and analyzed genetic structure and clonal diversity. Approximately 8 samples were analyzed from Magen's, John Brewers, and Lindbergh bay on St. Thomas. From this, we noted 3 different genotypes. Samples collected from John Brewers and a Magen's Bay sample were clones, while the Lindbergh and 2nd Magen's Bay samples differed from all other samples. We found the richness of diversity (R) to be 0.28571 over 4 loci. Since this species is known to reproduce clonally outside of its native habitat, this implies that multiple invasions have occurred throughout the Virgin Islands. Currently, we are assessing genetic diversity of 56 additional samples from different bays around St. Thomas, Water Island and St. John, and in the future, we will determine whether environmental factors such as depth are associated with particular clones in Brewers Bay.

STT-P54

Silanediol and Copper Co-Catalysis in the Addition of Indole to Arylidene Malonates

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In the addition reaction of indole to arylidene malonate, silanediol is used in conjunction with the anion, copper (II) triflate, to yield an optically active product. The best result obtained from this reaction was a 99% yield and 49% enantiomer excess (ee) using the solvent toluene. The purpose of this research was to understand the mechanistic pathway for the addition. This reaction can proceed in two pathways: (1) silanediol anion binding catalyst to triflate, (2) silanediol binds as a ligand to copper. To determine the specific pathway for this addition reaction, experimental processes were conducted using different laboratory instruments. The in-situ react IR studies showed that the silanediol interacted with triflate in a 1:1 ratio, proving that hydrogen bonding occurred. However, in the reaction with silanediol and copper (II) triflate there is a 2:1 ratio, which suggested possible interaction between silanediol and copper. When the mixture is heterogeneous the probe would not detect any interaction. Furthermore, solubility studies were then conducted to find a solvent that dissolved all reactants and produce product. These studies showed that this reaction have to be synthesized under heterogeneous conditions. Overall, these instrumental studies suggest that both mechanistic pathways for this reaction are possible.

STT-P55

Common E-cigarette Flavorings Activate the Nrf2 Antioxidant Pathway in Airway Epithelial Cells

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Electronic cigarettes have gained popularity, particularly with young adults who perceive these products as a safe alternative to smoking. However, recent studies have demonstrated that some flavored e-liquids contain high concentrations of reactive flavoring agents which have not been evaluated for inhalation toxicity. Some flavoring compounds activate Nrf2, a master regulator of antioxidant responses, in cells lining the GI tract and in the liver, but whether inhalation of flavoring agents stimulates lung antioxidant responses is unclear. Here we investigate whether flavoring agents commonly used in e-liquid formulations activate the Nrf2 antioxidant pathway in airway epithelial cells. An e-liquid toxicity database was used to identify common flavoring agents in the top 50 most cytotoxic e-liquids. Eight of the most common flavoring agents (cinnamaldehyde, guaiacol, eugenol, isoamyl acetate, limonene, linalool, menthol, and benzaldehyde) were purchased and used to challenge Beas-2B cells, a human bronchial epithelial cell line, over a range of concentrations (10nM to 10mM). Cells were exposed for 24 hours and dose-dependent effects on viability and Nrf2 antioxidant pathway activation were assessed. All of the compounds tested caused significant cell death at the 10mM concentration except for guaiacol, benzaldehyde, and isoamyl acetate, which were not cytotoxic at any of the doses tested. Cinnamaldehyde (0.001mM and 0.01mM), guaiacol (0.1mM and 1mM), and eugenol (0.1mM) significantly activated the Nrf2 pathway as compared to the media only control. These data indicate that some common e-cig flavoring agents activate Nrf2 in lung epithelial cells at relevant concentrations; however, further work is needed to elucidate the mechanism of Nrf2 pathway activation.

STT-P56

Promoting Transition Metal Hydride Formation with Visible Light

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Molecular transition metal hydride complexes play roles in numerous chemical reactions and catalytic processes. Promoting and controlling the reactivity of transition metal hydrides with photons represents an opportunity to integrate solar energy for these important transformations. To determine if upon light-promoted cleavage of a metal-metal bond, subsequent protonation could be achieved to trap a metal-hydride complex, we chose to explore the photoinduced reactivity of tungsten dimers which are known to undergo photo-induced W-W bond cleavage, followed by intramolecular electron transfer to form a pair of cationic and anionic W monomers. In this experiment, a tungsten dimer ([CpW(CO)2(PMe3)]2) was reacted with weak acids (pyridinium or dimethylaminopyridine (DMAPH+)) and exposed to visible light ($\lambda ex = 475nm$) to investigate whether tungsten hydride ([CpW(CO)2PMe3H]) would form upon photolysis. Upon irradiation, consumption of the W-W dimer and formation of tungsten hydride (CpW(CO)2(PMe3)H) were observed, which were confirmed by UV/Vis absorbance and 1H-NMR spectroscopies. Control experiments showed no hydride formation when light or acid were absent. Interestingly, the rate of hydride formation is slower than consumption rates of W-W dimer, suggesting non-trivial mechanism may be associated with the hydride formation. This research was funded by NSF REU program (CHE-1460874) and MARC program (5T34GM008422).

STT-P57

Making Blood Ex Vivo: Erythropoiesis from Human Embryonic Stem Cells

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Scientists would like to embryonic stem cells (ESC) as a source of blood cells for transfusions as well as to study erythropoiesis. However, during maturation in the mouse embryo overlapping waves of primitive and definitive erythroid cells are observed which express different globin genes. Our lab has evidence that both primitive and definitive erythroid cells are formed in overlapping waves in murine ESC, but globin analysis of one of the most well characterized systems of human ESC differentiation only looked at very late stages of maturation. Based on literature and our findings, we hypothesize that human ESC differentiation will produce both primitive and definitive erythroid cells. We aimed to answer the following questions in this study: 1) can we observe globin gene expression changes during ESC maturation similar to what is observed in embryos and 2) can we identify specific progenitors (CFC) that have a primitive or definitive globin expression patterns and do they change in prevalence during ESC development? Human ESC were differentiated and globin gene expression was analyzed at early and late time points. Changes in globin expression were found that support an overlap in the primitive and definitive erythroid waves, similar to that in the mammalian embryo. Additionally cells were sorted based on immunophenotype, and assayed for erythroid progenitors by being plated in methylcellulose at Day 7 & Day 14, where they will grow and form colonies. Progenitor colonies were plucked according to morphology and assayed to determine globin expression using qPCR. No correlation between colony morphology or tested immunophenotype and progenitor colony globin expression was found. However, there is a significant difference between the expression of embryonic globins on day 7 versus day 14 colonies (P values= 0.0001 and 0.0003, respectively). Thus, globin expression of single progenitor colonies also supports overlapping primitive and definitive erythroid waves during ESC differentiation.

STT-P58

Home Range Characteristics and Diel Changes in Space Use of Mutton Snapper, *Lutjanus analis*, in St. Thomas, U.S. Virgin Islands

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Coral reef fish live in highly heterogeneous environments and move between habitat types to find necessary resources. One species likely to show diel movement patterns is the mutton snapper, *Lutjanus analis*, a large solitary species of economic and ecological importance in the USVI. This study describes daily movements of *L. analis* using passive acoustic telemetry. Six individuals ranging from 37.5 cm to 58.2 cm total length were tracked for 313 ± 136 days using an array of 43 omnidirectional acoustic receivers located in Brewers Bay, St. Thomas. Most individuals were detected every day during their tracked period, except two that were detected elsewhere at a known spawning site. Home range sizes varied considerably, but all were less than 0.32 km2 and centered in a different area of the bay. Home ranges were dominated by seagrass habitats but included some proportion of coral reefs. Movement patterns differed across diel periods, with nighttime activity spaces smaller than daytime ones, but the two were highly overlapping and had similar habitat compositions. Understanding fish movements, including home range size and habitat requirements, can inform the planning of marine protected areas that will best protect economically and ecologically important species like *L. analis*.

STT-P65

Changes to a Critical Fish Nursery Habitat on St. Croix, USVI: Replication of a Twenty-Year-Old Study in Great Salt Pond

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***Caroline Pott**, Director, St. Croix East End Marine Park*
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In St. Croix, USVI, Great Pond contains one of three remaining prominent mangrove systems open to the ocean. A 1995-97 study established it as a nursery to ecologically- and economically-important reef fin-fish. Over the past three decades, mangroves have encroached upon the pond and ocean channel, raising concerns that the nursery was compromised. Therefore, re-assessment of the health of the pond is required. We replicated historical fin-fish monthly sampling using standardized fish traps and seine net hauls. Results show an increase in abundance of trap-caught fish and a decrease in seine-caught fish compared to historical data. Declines in the biological diversity were found: we caught 8 distinct fish species compared to 27 present in historical samples, with only 5 species of overlap. Most notable is the spike in invasive tilapia (*Oreochromis* sp.) and disappearance of snapper species (*Lutjanids*). Our results demonstrate how structural shifts in a coastal environment can lead to dramatic changes in the biological community over relatively brief time-scales. Because St. Croix is isolated from other Caribbean islands, it may rely heavily on self-seeding for the replenishment of its fish populations. This study aims to provide policy makers with data needed for holistic management approaches for Great Pond.

STT-P66

Impacts of Hurricanes Irma and Maria on Coral Restoration and Associated Fish Diversity in St. Thomas, USVI

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Coral reefs provide shelter and resources for a wide variety of ecologically and economically important fish species. Coral nurseries and out-planting are popular methods of reef habitat restoration in the Caribbean. In St. Thomas, USVI, thousands of threatened corals grown in nurseries have been out-planted around the island in an effort to restore natural populations. Two category 5 hurricanes, Irma and Maria, passed by St. Thomas in September 2017 causing a change in coral reef habitat, and possibly altering fish community structure. This study assessed changes to natural and out-planted *Acropora cervicornis* reef structural complexity and fish communities between 2017 and 2018. Fish community response relative to changing reef complexity and current coral health will allow for a greater understanding of how the reef communities, both natural and restored, respond to future storm events and other stressors.

STT-P67

Development of PCR Assay for the Detection of Haemohormidium-like Parasites in *Stegastes* damselfish

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A recent study of Caribbean parasitic biodiversity by Cook et al. (2015) found that fourteen species of Caribbean reef fish become infected with eight distinct previously undiscovered blood parasites. For my research, I have chosen to focus on the Haemohormidium-like apicomplexan parasite infecting the *Stegastes adustus* damselfish due to its high incidence of infection within this species (as noted in the Cook et al. 2015 study). Parasites typically derive nutrients from their host, and by definition have a negative impact on infected organisms, influencing population dynamics, biodiversity, community structure and food web connectivity. For example, certain fish parasites have been shown to cause changes in host habitat selection, foraging efficiency, mate choice, competitive behavior, time budget and predator-prey relationships (Barber et al. 2000). Increasing our understanding of these Haemohormidium-like parasites in *Stegastes* damselfish will answer questions about the ecological and economic impacts of these organisms. To begin to improve upon our current methods of detecting these parasitic infections, a PCR assay was developed using previously designed primers as well primers develop during Summer 2017.

STT-P68

Techniques for Understanding Symbiosis

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***Monica Medina**, Department of Biology, Pennsylvania State University*
***Roberto Iglesias-Prieto**, Department of Biology, Pennsylvania State University*

Symbiosis has been an important part of the evolutionary history of Eukaryotes from the acquisition of mitochondria billions of years ago to the use of zooxanthellae in corals today. Thus understanding these symbiotic interactions has become an imperative aspect of scientific inquiry today. As a SEAS Your Tommorrow Bridge Program student, I spent 8 weeks at Penn State working in the labs of Dr. Iliana Baums, Dr. Monica Medina and Dr. Roberto Iglesias-Prieto. In these labs I learned techniques for understanding symbiosis such as determining Symbiodinium clades, In situ hybridization and measuring photochemical efficiency.

STT-P69

Factors Influencing Activity Space of Juvenile Hawksbill Sea Turtles in St. Thomas, U.S. Virgin Islands

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Hawksbill sea turtles (*Eretmochelys imbricata*) promote reef health and diversity by foraging on coral competitors. Populations have declined dramatically in the past 100 years due to threats such as harvest, bycatch, and destruction of nesting and foraging habitats. To protect this Critically Endangered species, it is essential to understand the drivers of home ranges within these foraging habitats, particularly for juvenile hawksbills, which feed in coastal zones. Although many studies have quantified juvenile hawksbill home ranges, drivers of this range remain unknown. Previous literature suggests that body condition and structural complexity of the habitat may influence the spatial use of juvenile hawksbills. We suspect that hawksbills with greater body condition factors will have larger home ranges. Similarly, habitats with greater structural complexity could provide more hideouts for turtles and increased potential prey availability/diversity, decreasing the turtles' need to move and leading to smaller home ranges. Using passive acoustic telemetry, morphometric data from turtle captures, we will investigate if these three factors influence the spatial use of juvenile hawksbills in Brewer's Bay, St. Thomas, U.S. Virgin Islands, which can ultimately help improve conservation plans locally and in the greater Caribbean region.

STT-P70

Microplastics Abundance in St. Thomas Coastal Environments

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As plastic waste is exposed to UV radiation, high temperatures, and mechanical weathering, it breaks down into smaller pieces. Microplastics are plastics that are less than 5 mm. Microplastics can enter the marine environments through waste water discharge and rain water run-off. They are often mistaken for food and ingested by sea birds, fish, and corals, causing physical harm. Additionally, chemical pollutants present in the environment tend to stick to plastic surfaces, providing the opportunity to bioaccumulate in the food web if ingested. Many studies have quantified microplastics in coastal environments around the world. However, very few studies have quantified them in the Caribbean, and only at regional scales. This study quantifies microplastics on beaches and surface waters in embayments around St. Thomas, USVI, and tests whether microplastics are more abundant in bays with greater anthropogenic activity in associated watersheds. Results show that microplastics and microfibers (between 0.3mm - 1mm) are present in beach sediment and surface waters on St. Thomas, and are more abundant in embayments experiencing high anthropogenic activity in associated watersheds. These results provide a foundation for research on microplastic impacts within the USVI territory, and baseline data for research conducted after the 2017 hurricanes.

STT-P71

Investigation of Blue Carbon Storage in Native and Invasive Seagrass Habitats in St. Thomas, U.S. Virgin Islands

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Seagrass habitats provide the ecosystem service of capturing and storing carbon in the sediment. In the U.S. Virgin Islands no studies to-date quantify sediment carbon content of seagrass beds or test meadow properties (percent cover, shoot height, shoot density) as predictors of sediment carbon. This study measured sediment organic carbon, with loss-on-ignition (LOI) and elemental analysis techniques, from cores (20 cm long) in native seagrasses (*Thalassia testudinum, Syringodium filiforme*), invasive seagrass (*Halophila stipulacea*), and un-vegetated sand, at three sites around St. Thomas. We hypothesized sediment carbon density would increase with rooting depth: *T. testudinum* > *S. filiforme* > *H. stipulacea* > sand. Average sediment carbon density per core was low, 2.56-14.55 mg C cm3, and a 3-way ANOVA revealed a significant interaction between benthic habitat and site. Sediment organic carbon and LOI were correlated, yet different from published calibration curves for seagrasses. A multiple linear regression revealed seagrass percent cover and average shoot height as significant predictors of carbon density, implying aboveground morphology may influence sediment carbon more than root depth. Findings suggest that easily-measured seagrass characteristics (LOI, percent cover, average shoot height) can be used to estimate sediment carbon density, which may be useful for data-poor or resource-limited locations.

STT-P72

Vertical Distribution of Larval Fish (Genera *Scarus* and *Sparisoma*) in The U.S. Virgin Islands

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Large-bodied parrotfish populations (genera *Scarus* and *Sparisoma*) in the U.S. Virgin Islands (USVI) have declined due to overexploitation. An unanticipated consequence of population declines is macroalgae proliferation at the expense of coral growth, contributing to the degradation of reef complexity. Most marine larvae undergo ontogenetic vertical migration; However, species-specific patterns are largely understudied. Identification of species-specific vertical distribution can assist in the precision of larval dispersal models used in management. Vertical distribution of *Scarus* and *Sparisoma* larvae were analyzed using samples collected during ichthyoplankton surveys in the spring of 2007-2009. Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) hauls preformed vertically stratified sampling for 25m vertical depth strata between 0-100m in the USVI. Ontogenetic stage-specific shifts were explored using a non-parametric Scheirer-Ray-Hare-Test, which revealed the greatest abundance of all ontogenetic stages of *Sparisoma* were represented in the 25-50m bin and *Scarus* showed an increase in abundance towards the surface of all stages, especially pre-flexion individuals (3-7 days old). However, no significant relationship between stage-specific abundance and depth were identified for *Scarus*. Understanding vertical distribution of different life stages can be used to develop stage-specific connectivity models which can be used in fisheries-independent resource management for improvement in stock recruitment.

STT-P73

Organizational Analysis: U.S.V.I. Department of Human Services

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The Innovative Investigators, Inc. (Team i3), seven Ph.D. students from the University of the Virgin Islands engaged in a class project to facilitate an Appreciative Sharing of Knowledge, (ASK) process within the Department of Human Services (DHS). The Team i3 brought various perspectives, levels of expertise, and experience in both government and corporate settings. The goal of the ASK model is to collect data by group sessions and interviews, analyze the data and report on the process and findings. Recommendations move the organization from a retrospective to a prospective approach of sharing knowledge. After three sessions, the selected teams developed four knowledge enablers, teamwork, compassion, communication, and service. The knowledge enablers paired with knowledge infrastructure factors to create an interview guide collecting stories and experiences, to gain a deeper understanding of the knowledge enablers. The output from the interviews was synthesized and served as the foundation of ten future present scenarios or recommendations. The final four recommendations selected will enhance knowledge sharing with an affirmative mindset within the DHS.

STT-P75

Providing Basic Health Services to the United States Virgin Islands' Population Post Natural Disasters: A Participatory Action Research

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The availability of a well-functioning healthcare system is paramount to any community or society and the Virgin Islands is no exception (Israel, Shulz, & Parker, 2013). During September 2017, the U.S. Virgin Islands was dealt several devastating blows caused by Hurricanes Irma and Maria which resulted in the massive devastation of the infrastructure of its healthcare system (Gilbert, 2017). Thus, the purpose of this participatory action research is to share the lived experiences of the healthcare professionals and patients and to explore the disaster risk management plan as it relates to the availability of health practitioners, resources, and facilities. The intent of such an effort is to determine how an adequate and equitable healthcare services can be provided to the people of the Virgin Islands post natural disasters. The data for this study will be collected using semi-structured interviews and focus groups. The interview data will be tape-recorded, transcribed, coded, categorized and integrated into emerging themes.

STT-P76

Language Disorders and Academic Performance: For a New Understanding of the Over-Age Phenomenon in Haiti

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Studies suggest a causal link between language disorders and academic performance. The hypothesis of the study is: 1- the use of an uncontrolled language in educational activities has a negative impact on students' academic performance; 2- language disorders lead to learning disabilities and this has a considerable influence on students' academic performance; 3- the phenomenon of over-age is not only related to late schooling, but also to the spectrum of continuous repetition and unmonitored pedagogical bilingualism that dominates schools in Haiti. The data came from observations in 39 schools and the use of an instrument to collect student performance data from 39 schools, representing 12,295 primary and secondary students. Field observations and analysis of data collected from school principals indicate that language impairment has a significant impact on students' academic performance. Student failure is due to institutional and educational factors. Then, the phenomenon of over age is not only related to late schooling, but also to the spectrum of continuous repetition and non-mastered educational bilingualism observed in schools. It is also important to note that language development is fundamental to the academic performance of Haitian students. To improve their achievement, it is necessary to build a language to learn.

STT-P77

St. Thomas Roundtable Abstract

What Will the Effect of the Invasive Seagrass *Halophila stipulacea* be in the Virgin Islands?

***Kyle G. Jerris**, Graduate Student, University of the Virgin Islands*
***Antonio Farchette**, Graduate Student, University of the Virgin Islands*
***Ashley Thomas**, Undergraduate Student, University of the Virgin Islands*
***Lennon Bruney**, Undergraduate Student, University of the Virgin Islands*
***Teresa Turner**, Faculty, University of the Virgin Islands*

Halophila stipulacea is a seagrass from the Indo-Pacific and the Red Sea. Through the opening of the Suez Canal, *H. stipulacea* was able to invade and dominate the large portions of the Mediterranean Sea. Since then, *H. stipulacea* has spread to the Caribbean, first being sighted on Grenada in 2002. *H. stipulacea* now dominates seagrass meadows in most of the Lesser Antilles, including the United States Virgin Islands. *H. stipulacea* is shorter and more fragile than the native seagrasses but also grows faster and deeper than native seagrasses do. It also supports a different fish community structure from the native seagrasses, but supports similar invertebrate communities to the natives. Green sea turtles, sea urchins, and other animals eat *H. stipulacea* but its potential as a food source is still unknown. Studies have shown that *H. stipulacea* has the capacity to displace native seagrasses. With the passing of Hurricanes Irma and Maria, seagrass meadows were left barren and are quickly being taken up by *H. stipulacea*. This roundtable will discuss what the possible effects of this invasion might be, what management strategies might be employed, and what research should be done to investigate this invasion.

STT-R1

St. Thomas Demonstration Abstracts

UVI Planetarium: A New Paradigm for Teaching Astronomy at UVI

***Antonino Cucchiara**, Faculty, College of Science and Mathematics*
***David Morris**, Faculty, College of Science and Mathematics*
***Jan Staff**, Faculty, College of Science and Mathematics*
***Dave Smith**, Faculty, College of Science and Mathematics*

The UVI Bachelor of Science in Physics with concentration in astronomy is now a reality. The new program aims to provide new opportunities to UVI students interested in science, from programming, to astrophysics and aerospace technology.
Integral part of this effort is the acquisition of new equipment to teaching new Astronomy classes, including General Education Astronomy (NSC104) and the Physics astronomy-centered classes (PHY271/371, PHY481/482). I will demonstrate the capability of the planetarium and some of the concepts that will be taught with it.

STT-D1

Mud: More Than Just a Mess. How Sediment Cores Help Us Understand Coastal Ecosystems

***Kristin Wilson Grimes**, Faculty, Center for Marine and Environmental Studies*
***Sydney Nick**, Staff, Center for Marine and Environmental Studies*
***Allie Durdall**, Graduate Student, Center for Marine and Environmental Studies*
***Amelie Jensen**, Graduate Student, Center for Marine and Environmental Studies*
***P. Owen Clower**, Graduate Student, Center for Marine and Environmental Studies*

Blue carbon ecosystems (mangroves, seagrass meadows, and salt marshes) remove significant amounts of carbon from the atmosphere and store most of this carbon belowground in their roots and in the sediment. Additionally, mangroves may have the ability to capture contaminants before they enter bays or lagoons. This demonstration will show the methods we use to collect and measure sediment carbon and test for contaminants from geologic cores, and will feature sediment samples from some of these habitats for participants to touch and explore. The demonstration will also feature a game that will ask participants to rank habitats by the total carbon stored, which will assist participants in discovering how blue carbon habitats compare to each other and to other ecosystems like, temperate forests and rainforests.

STT-D2

Marine Botany

***Howard Forbes Jr**., Staff, Center for Marine and Environmental Studies*

The red mangrove (*Rhizophora mangle*) provides ecosystem services that are essential both ecologically and economically. At our table, visitors will be presented with interactive stations, from which they will learn about the many roles that red mangroves have within our territory. These will include: 1) how mangroves protect our shorelines, 2) an in depth look at the similarities and differences between lagoon and beach sediment, 3) the variation of physical features amongst mangrove species, 4) and ways that the community can do their part to help reestablish these ecosystem engineers in the wild.

STT-D3

Highlighting Careers in STEAM: A Focus on the Diversity of Careers in Marine and Environmental Science

***Jarvon Stout**, College of Science and Mathematics*

In the Virgin Islands, there is a growing lack of interest among local youth regarding STEAM (Science, Technology, Engineering, Art, Mathematics) as a possible career path. This demonstration table aims to bolster student interest in STEAM related disciplines through informative and interactive displays. Our display will highlight careers that students can pursue with a Bachelor's or Master's Degree in marine environmental science from the University of the Virgin Islands. Careers that will be showcased include Oceanography, Terrestrial Botany, Ecotourism, Coral Reef Ecology, Wetlands Ecology and Water Quality Monitoring.

STT-D4