EDWARD WATERS UNIVERSITY

CENTER FOR UNDERGRADUATE RESEARCH PRESENTS:

EDWARD WATERS UNIVERSITY

UNDERGRADUATE RESEARCH CONFERENCE

2021

DATE: SEP. 17 (FRI), 2021, 10:00 A.M.–1:00 PM

VENNUE: HTTPS://ZOOM.US/J/94909623626

CONFERENCE PROGRAM

Opening	
10:00-10:05	**Opening Remarks: Welcome to Our EWU Undergraduate Conference** Dr. Hyo Kyung Woo (Director of Center for Undergraduate Research)
Student Presentations	
10:05-10:45	**Panel 1: Nature and Local Community (Panel Moderator: Prof. Miller-Jenkins)**
Jordan Oliver	A Pollen Counting Station on the Campus of Edward Waters University: Anemophilous Pollen Reached Severe Levels during the Spring Allergy Season of 2021 in Health Zone 1 of Duval County, Florida
Nathaniel Schirmer	Does Blue Crab Abundance Relate to Periwinkle Marsh Snail Predation?
Onecia Adams	Implications of Prey Density on Prey Capture Rate: How Does Prey Availability Affect Wolf Spider Foraging Rates
10:45-11:40	**Panel 2: Medical Science and Health (Panel Moderator: Prof. Landrum)**
Andreza Anderson	A Review of Internet Use by Cancer Patients and Cancer Survivors.
Tiara Taylor	The Impact of Patient Characteristics, Mood Disorder, and Anxiety on Access to Health Care Post-Surgical Radical Cystectomy of Bladder Cancer
J'len Brown	A systematic review and meta-analysis to assess the geographic differences to treatment response in therapeutic trials of cholangiocarcinoma
Caytlin Willis	Breast Cancer Health Disparities in Black Women
Break	
11:40-11:50	**10 Minute Break (Please complete survey)**
11:50-12:40	**Panel 3: Biology, Wonderful Body! (Panel Moderator: Dr. Seymour)**
Brianna Pendergrass	Metabolic Reprogramming: Targeting the Hexosamine Biosynthesis Pathway
Caleb Ramirez Rivera	Characterization of the Innermost and Outermost Regions of Glioblastoma (GBM)
Jada Harvey	MPRIP Effects in Cell Migration of Glioblastomas
Shaneaka Anderson	Prostate Specific Membrane Antigen (PSMA) shedding contributes to Tumor Escape in CAR-T cell Therapy
Closing Ceremony	
12:40-12:50	**Ending Acknowledgement and Certification Award** Dr. Brian Seymour (Director of the Center for the Prevention of Health Disparities)
12:50-12:55	**Closing Remark** Dr. Julius E. Scipio (Interim Associate Provost for Academic Affairs)

GREETINGS!

Welcome to the 2021 Edward Waters University Undergraduate Research Conference!

Edward Waters University has celebrated the innovative research that our undergraduate students pursue and the academic excellence that they achieve as they create solutions to real-world challenges. Guided by our renowned faculty mentors, our students also develop important life skills in problem solving, project management and teamwork – qualities that will serve them well as they graduate and pursue successful careers.

This year, Edward Waters University adds a new dimension to the demanding research that our students' presentations represent. In many ways, their work mirrors how academia, institutions, and societies are adapting to, and preparing for, a dynamic world that will increasingly function remotely and online after we emerge from the COVID-19 pandemic.

We encourage you to explore their engaging final projects and presentations, many of which represent years of hard work, inquiry, and experimentation. Our EWU students, along with the dedicated faculty and staff who support them, define our academic community at its very best.

Thank you for visiting the 3rd virtual Edward Waters University Undergraduate Research Conference and for supporting our wonderful academic community.

Dr. Donna H. Oliver
Provost and Senior Vice President for Academic Affairs

Dr. Julius E. Scipio
Interim Associate Provost for Academic Affairs

EWU Undergraduate Conference Committee (alphabetically): Professor Christian Bowers, Professor Jacqueline Conley, Professor Kimberly A. Davis, Professor Francis Ikeokwu, Professor G. V. Landrum, Professor Anita Mandal, Professor Prabir Mandal, Professor Aileen Miller-Jenkins, Professor Benjamin Okafor, Professor Brian Seymour, Professor Felicia Wider-Lewis, Professor Hyo Kyung Woo

STUDENT PRESENTERS

Jordan Oliver

I am Jordan Oliver, a senior biology major here at Edward Waters University. I am from Altamonte Springs, Florida. I am currently member of the Triple Threat Marching Band where I play the saxophone. I plan on getting my masters in public health and get my doctorate in immunology.

Research: A Pollen Counting Station on the Campus of Edward Waters University: Anemophilous pollen reached severe levels during the Spring allergy season of 2021 in Health Zone 1 of Duval County, Florida

EWU Mentor: Prof. B. Seymour

Abstract

Duval County, Florida is divided into 6 health zones by public health officials. Health zone 1 (HZN1) is the most urban and consist of 128,000 residents of which 83% are African Americans. It has the highest rate of emergency room visit and death from asthma when compared to the other health zones. Anemophilous pollen is the main cause of pollinosis and about 25% of allergic sensitization is attributed to exposure to pollen grains such as rye and ragweed. The aim of this study is to understand the reasons for the high rate of asthma in HZN1. We hypothesized that allergenic pollen grains are significantly elevated in the spring and contribute to the high rate of asthma in HZN 1. A Burkard spore trap was mounted on the roof of the Morris Cone dormitory. Pollen grains were collected daily and quantified. This study revealed that the 3 most prevalent anemophilous pollen grains during the spring season were the Cedar/juniper, Pinaceae family and *Quercus*. The pollen counts reached severe levels with cedar/juniper being the earliest to peak. Pine pollen, is not considered to be allergenic except at high concentration which was observed from mid February when it peaked on 2/16/21 and continued to be elevated until mid March. *Quercus*, which is considered extremely allergenic dominated the spectrum and remained elevated for most of the season. These severe levels of allergenic pollen observed over HZN1 may be partially responsible for the high rate of allergic symptoms in the community.

Nathaniel Schirmer

My name is Nate Schirmer and I am an honors student and baseball player here at EWU. I am majoring in biology and hope to be able to continue my education past my B.S. into my Masters and possibly further. I would like to focus my studies in Marine or Fisheries Ecology. General issues that interest me involve the health of marine ecosystems such as seagrass meadows and coral reefs. After my internship this summer I have gained an interest in studying the characteristics of relationships between organisms in an ecosystem.

Research: Does Blue Crab Abundance Relate to Periwinkle Marsh Snail Predation?

EWU Mentor: Prof. C. Bowers

Abstract

Balanced predator-prey interactions are vital to the health and functions of ecosystems. When these relationships become unbalanced due to disturbance, it can initiate a negative cascading effect impacting all trophic levels, a phenomenon termed a trophic cascade. In the salt marshes of the Atlantic and Gulf of Mexico, one such trophic cascade has been proposed involving Atlantic blue crab (Callinectes sapidus) and the periwinkle marsh snail (Littoraria Irrorata). Specifically, it is theorized that the predatory blue crab exerts top-down control on periwinkle snails, allowing Spartina grasses to dominate the ecosystem. However, when blue crab populations decline due to anthropogenic (overfishing) or natural (drought) disturbances, snail populations can increase rapidly, transforming once dense salt marsh into barren mudflats through overgrazing. To date; however, there have not been many directed investigations testing the strength of this predator-prey relationship, particularly in the salt marshes of Northeast Florida. The goal of this research is to gain a better understanding of this relationship by determining if blue crab abundance and predation rates on L. irrorata are correlated. Marsh Ecosystems remain vulnerable to anthropogenic stressors such as overfishing and habitat loss, and further understanding these predator-prey relationships will allow us to make informed decisions moving forward on how to limit our impact on the marsh.

Onecia Admas

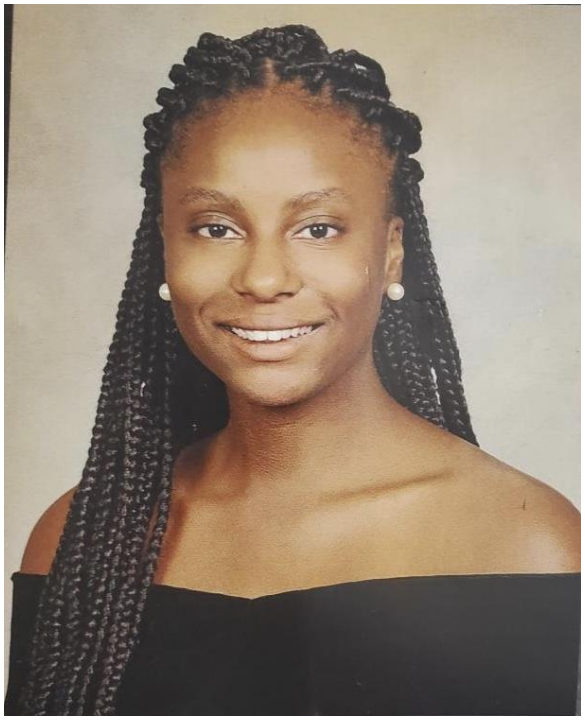
My name is Onecia Adams and I am a junior biology scholar at Edward Waters University. I have been blessed to have a few opportunities where I was able to explore my research interests. I am interested in animal behavior, ecology, ornithology and most elements of the natural world. I am also passionate about the conservation and preservation of the natural world, specifically the preservation of wildlife biodiversity. It is my dream to be able to work closely with birds and big cats someday.

Research: Implications of Prey Density on Prey Capture Rate: How Does Prey Availability Affect Wolf Spider Foraging Rates

EWU Mentor: Prof. B. Seymour

Abstract

The interactions between predator and prey are affected by a lot of factors in their specific habitat. One of the factors that has a large impact on the hunting abilities of the predator is prey density. Prey density varies temporally. The more a predator captures prey, the more prey density is reduced. This means that prey density is constantly changing and as it changes, the foraging rate of the predator is predicted to be affected. To understand the relationship between prey density and foraging rate, functional response experiments were conducted with wolf spiders (Lycosidae) as the predator and fruit flies (Drosophila) as the prey. These experiments were designed to observe the rate at which a spider is able to capture its first and second prey at different densities or amounts of prey. Fifty-five spiders were run in experimental trials, divided into groups that received 2,3,4,6, 9, 20, 30, and 40 fruit flies, providing a gamut of prey densities that match natural conditions. We video recorded fifteen-minute trials and reported the time of first and second prey capture. The results obtained confirmed that varying prey densities affects successful capture rate. As spiders are a primary consumer of pests, both agricultural and medical, it is important to understand the rate at which spiders can control prey densities in their habitats.



Andreza Anderson

My name is Andreza Anderson from Titusville, Florida and I am a first generation college student. I am a senior at Edward Waters University majoring in psychology. I want to be a child psychologist in the future and be able to work and help children and adolescents that are going through some trauma or issues. My research interests would include anything that is related to psychology, a criminal's mind, and sociology. I love learning about topics like this because it always makes me think and want to learn more.

Research: A Review of Internet Use by Cancer Patients and Cancer Survivors.

EWU Mentor: Prof. N. Islam

Abstract

My research is on the review of internet and virtual use by cancer patients and cancer survivors. I found at least 15 journal articles about the internet, virtual reality, and telehealth being used for cancer research, cancer treatment, health solutions, and doctor recommendations. From those 15 journal articles, I narrowed it down to 6 and put it into a literature review chart to make it easier to organize everything. Finally, I chose three articles I thought were best fitted to explain what I wanted to say. Those three articles were able to give a good representation of why cancer patients and cancer survivors use the internet. I then went into further detail of what each article was saying one by one. I made sure I was thorough and clear with my reviews. From the readings and reviews, I was able to answer my research question: How do cancer patients navigate health information from internet sources?

Tiara Taylor

I am Tiara Taylor, a current senior, and student at the Illustrious Edward Waters College now University with experience in providing group and one-on-one instruction with personal support in educational-based areas. As well as having the expertise to organize data, explore issues and trends, and solve problems by looking and conducting studies from a psychological perspective. My goal is to explore health disparities, as well as under-researched psychological factors associated with cancer and abnormalities in my future career path.

Research: The Impact of Patient Characteristics, Mood Disorder, and Anxiety on Access to Health Care PostSurgical Radical Cystectomy of Bladder Cancer

EWU Mentor: Prof. V. Landrum

Abstract

Objectives: Gender/Sex, racial, and health disparities through socioeconomical and demographical factors that affect treatment of patients with preexistent psychological mood disorders that undergone a radical cystectomy. Population Studied: Bladder Cancer Patients who received a radical cystectomy and had psychiatric diagnosis (N=4369) with identifiers of ICD-9 and ICD-10 codes. Study Design: Retrospective cohort study with patients from a database of Florida Impatient Discharge Data Set (2013-2019) and patient discharges with radical cystectomies of the State of Florida reports. Negative Binomial regression used to identify length of stay (LOS) of post-surgical radical cystectomy in patients with mood or anxiety disorders. Principal Findings: Factors that increased length of stay: Patients with Mood or Anxiety and Anxiety disorders, age of or at surgery, Black or African Americans and other races (not Hispanic) have longer LOS, payer/insurance method of commercial, Medicaid, and other medical groups. Factors that decreased length of stay: facility yearly cystectomy volume (5-13 years and 13 or more cystectomies per year), patient region (Northwest, Southwest, and West), year of surgery, and surgical approach (MIS). Conclusion: Patients with mood and anxiety disorders have longer LOS, and hospitals and doctors should seek pre- and post-operative psych services to help patients maintain their disorders.

J'len Brown

I am J'len Brown, a junior biology scholar hailing from Tampa, Fl and I currently am Mr. Junior for The Edward Waters University. I recently became interested in research. When I performed research this summer with the ReTOOL program, it opened up my mind so much about information and topics that I was once clueless to. I don't have many research interests, but I am interested in cancer and mental illnesses.

Research: A systematic review and meta-analysis to assess the geographic differences to treatment response in therapeutic trials of cholangiocarcinoma

EWU Mentor: Prof. P. Mandal

Abstract

Cholangiocarcinomas is a rare and primary malignant cancer that occurs in the liver and bile duct. The underlying causes of CCA are unknown, but there are quite a few gene mutations that are precursors for CCA such as TP53, KRAS, IDH1, ARID1A, and CDKN2A. Risk factors such as drinking alcohol, bile duct stones, hepatitis B and C, aging, obesity, primary sclerosing cholangitis, abnormalities where the bile duct and pancreatic duct meets, choledochal cysts, and diabetes aids in developing cholangiocarcinomas. CCA can develop and is categorized into 3 groups; intrahepatic (iCCA), extrahepatic (eCCA), and distal (dCCA).

I extracted data from 30 clinical trials that ranged from 1999-2020. There was a total number of 1,863 participants from the clinical trials. The median age of the studies was 62 years old. The total number of males and females of the studies were 788 males and 942 females with the exclusion of males and females in 2 of the studies. The clinical studies had a median progression free survival of 6.1 months and an average progression free survival of 5.6 months. The median overall survival of the trials was 10.9 months and the average overall survival was 11 months. I took the drug type of each trial and categorized the drug types into 3 categories: small molecule inhibitors, chemotherapy, and immunotherapy. Immunotherapy had the best overall response rate(25%) of the trials while chemotherapy had the best average progression free survival(7 months) and overall survival(13 months) of the trials. The trials were performed in 3 main regions: North America, Europe, and Asia. There were 11 trials that were performed only in North America, 6 performed only in Europe, and 3 performed only in Asia. Four of the trials were performed in all 3 regions. Out of the trials of the geographic regions, trials in North America and Europe had the best average overall response rate, 30%. Trials in North America, Europe, and Asia had the best average progression free survival(6.5 months) and overall survival(17 months).

There are geographical differences in response to treatment for cholangiocarcinoma. Overall response is best in immunotherapy trials and trials performed in North America and Europe. Progression free survival and overall survival is best in chemotherapy trials and trials performed in all 3 regions.

Caytlin Willis

I am Caytlin Willis, a rising junior and biology scholar hailing from Houston Texas. I currently attend Edward Waters University and I'm more than happy to be here today. I enjoy spoken word poetry and I'm also an athlete and student leader on my university's campus. During my internship this summer I worked on three extensive projects all relating to health disparities in the black community. I am beyond grateful to be presenting and I hope my presentation sheds light to these inadmissible conditions.

Research: Breast Cancer Health Disparities In Black Women

EWU Mentor: Prof. Anita Mandal

Abstract

Research shows non-Hispanic Black/African American ("Black") women with breast cancer experience health disparities in early diagnosis, access to experimental treatment, and treatment outcomes. Black women are 40% more likely to die of breast cancer than non-Hispanic White women ("White"). The goal of this literature review is to summarize and explore breast cancer practices that contribute to inequitable outcomes. Because of the health disparities Black women with breast cancer face, they are more likely to experience increased psychological stress, experience socioeconomic factors and breast cancer screening differences that impact outcomes relative to White women. Patterns of access to care and tumor characteristics are related to race and age, suggesting that interventions to address disparities will need to target both access and biology. The influences of socioeconomic status and marital status suggest that social determinants, support mechanisms, and access to health care are also important contributing factors.

Brianna Pendergrass

I am Brianna Pendergrass, a senior 4.0 biology scholar, Presidential Scholar, Honors College Alpha Cohort member. Additionally, I have the pleasure of serving as the first Miss Edward Waters University. In the upcoming years, I wish to purse a PhD in biomedical science. As a certified biomedical scientist, I will seek ways to prevent and treat diseases that cause illness and death in the human population.

Research: Metabolic Reprogramming: Targeting the Hexosamine Biosynthesis Pathway

EWU Mentor: Prof. E. Murage

Abstract

Glioblastoma (GBM) is the most common form of malignant primary brain cancer in adults. The standard of care for GBMs include maximal surgical resection, radiotherapy and Temozolomide. To combat the malignant nature of glioblastomas, new treatments are necessary. We intend to broaden treatments by understanding and treating perturbed in GBMs. In normal cells, only 2% of the total amount of glucose in a cell enters the Hexosamine Biosynthesis pathway (HBP). In cancer cells, however, glucose passage increases to over 10%. UAP1 is the last enzyme of this pathway and is reported to have oncogenic properties affecting tumor progression. For this reason, we have developed a small molecule called G2Bz, intending to inhibit UAP1. Preliminary data from our group has proven that G2Bz reduces total cell glcNacylation levels. Therefore, we hypothesize that G2Bz, via UAP1 inhibition, will reduce multiple tumor stimuli, resulting in significantly reduced tumor.

Caleb Ramirez-Rivera

My name is Caleb Ramirez-Rivera, I am a student at Edward Waters University pursuing a bachelor's degree in Biology with a concentration in forensic biology. Currently my research interests relate to how diseases affect the underrepresented communities of Latinos and Hispanics; I have also dabbled in issues such as mental health within these communities. I am firm believer in active representation of minorities in all biomedical and behavioral science fields.

Research: Characterization of the Innermost and Outermost Regions of Glioblastoma (GBM)

EWU Mentor: Prof. J. Pradhan

Abstract

Glioblastoma (GBM) is the deadliest primary malignant tumor, affecting mostly adults. On a molecular level, the tumors are distinct. GBM cells exhibit a wide range of phenotypic traits as well as a high degree of variability. Through a series of studies involving migration and proliferation of cell lines 680 and 729 we want to answer our question: should tumor location be considered for cell line characterization and GBM studies? We'll investigate and categorize pairs of GBM cell lines; in the innermost region (deep core) of the tumor, as well as cells on the outermost region and surroundings of the deep core. As a result, we discovered that the cells on the tumor's outermost region are more aggressive than those on the tumor's innermost region; Proliferation of these outermost cells are higher, its ability to form spheres is quicker and aggressive.

Jada Harvey

I am Jada Harvey, a junior biology major here at Edward Waters University. I am from The Good Life City of Albany, Georgia. I am a Presidential scholar and a member of the Alpha Honors Cohort. Also, I am a member of the Triple Threat Marching Band and an admissions ambassador. I aspire to go to grad school and become a medical scientist.

Research: MPRIP Effects in Cell Migration of Glioblastomas

EWU Mentor: Prof. C. Bowers

Abstract

Glioblastomas(GBM) are a very aggressive type of brain cancer that can spread very quickly. Due to glioblastomas growing so fast, the traditional treatments of the cancer do not provide a cure. We must understand the factors that contribute to the migration of glioblastoma cells. MPRIP is a cytoskeletal protein that plays a vital role in aiding glioblastoma cells in migration. Studies have found that through suppression of the MPRIP protein, glioblastoma cells cannot migrate and present with an a-polar phenotype. Through this project we intend to study three proteins, UACA,RAI14, and ANKRD24, that interact with the MPRIP protein.This potentially establishes an important link between MPRIP and UACA, RAI14, or ANKRD24 to the cell migration of glioblastomas.

Shaneaka Anderson

I am Shaneaka Anderson, a senior Biology Major from Portland Jamaica, and I aspire to pursue a PhD in Immunology or Cell and Molecular Biology. I live by the motto, “For every flower that blooms, it takes a lot of dirt for it to get there”.

Research: Prostate Specific Membrane Antigen (PSMA) shedding contributes to Tumor Escape in CAR-T cell Therapy

EWU Mentor: Prof. B. Seymour

Abstract

The use of chimeric antigen receptor (CAR)-engineered T cells heralds a breakthrough in personalized medicine. In this strategy, a patient’s own T lymphocytes are genetically reprogrammed to encode a synthetic receptor that binds a tumor antigen, allowing T cells to recognize and kill antigen-expressing cancer cells (Long et al. 2018). However, one of the major challenges impacting the durability of CAR-T cell therapy is the emergence of tumors with loss or downregulation of the target antigen (Majzner et al. 2018). The therapeutic window for their application against solid tumors manifests an even greater barrier to success. With ongoing efforts in discovering therapeutic markers for prostate cancer, prostate - specific membrane antigen (PSMA) remains a useful diagnostic and possibly therapeutic target (Chang et al. 2014). However, there's an issue of PSMA being shed from prostate tumor cells. Previous studies show that PSMA expression is gradually lost in cultured Nalm-6, PC3 and K562 cells even when these cell lines were expanded from single cell-clones. The enzymatic activities that PSMA undergoes may explain why it is shed and found in the serum of prostate fluid. If PSMA is shed, it is going to be challenging to target prostate tumor with CAR-T cells. The objective of this project is to investigate if Nalm-6 CBG/GFP cells stably expressing a PSMA mutant will abolish enzymatic activity that causes wild type (WT) PSMA to shed, hence becoming more targetable by PSMA- directed CAR-T cells (in vitro). Here, we transduce Wild Type nalm-6 cells with four (4) mutants and wild type PSMA and monitor PSMA expression. We observed that the T640A mutant has the most sustained PSMA expression. Our findings suggests that we could possibly deliver this mutant to the tumor, and this may prevent antigen shedding, rendering them targetable with CAR-T cells.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