

2021

Collegiate Science & Technology Entry Program (CSTEP)



2021 CSTEP Research Interns on UB North Campus

**SUMMER RESEARCH PROGRAM
RESEARCH SYMPOSIUM & LUNCHEON**



Thursday, July 29, 2021
11:00 am – 1:30 pm
University at Buffalo
Newman Center

PROGRAM ORDER



WELCOME

SHANNA CRUMP-OWENS

Director, Collegiate Science & Technology Entry Program (CSTEP)

STUDENT PERSPECTIVES

JUSTIN KELLIER, Biological Sciences

DANIA SALAH, Biomedical Sciences

HOLLIDAY SIMS, Computer Sciences

IYOBOSA EKHATOR, Public Health

POSTER COMPETITION & JUDGES PRESENTATION

LAVONE RODOLPH

Doctoral Student, Computer Science & Engineering

FACULTY MENTOR & STUDENT AWARD PRESENTATION

SHANNA CRUMP-OWENS

Director, Collegiate Science & Technology Entry Program (CSTEP)

CLOSING REMARKS

SHANNA CRUMP-OWENS

Director, Collegiate Science & Technology Entry Program (CSTEP)



University at Buffalo

Collegiate Science and
Technology Entry Program

Undergraduate Education

CSTEP MOTTO: "TO WHOM MUCH IS GIVEN, MUCH IS EXPECTED"

CSTEP DIRECTOR'S MESSAGE



Welcome to the 13th Annual CSTEP Summer Research Symposium! Our 8.5-week Summer Research Program enhances the competitiveness of talented underrepresented students pursuing STEM and the allied health professions. I congratulate their dedication to scholarly excellence and research – they are exemplars among their peers. Today, we celebrate the fruition of their hard work as they present their research to peers, faculty and staff; they can look back on their efforts with pride.

Our goal was to structure a holistic, engaging, and transformative experience which provided our students with a fundamental understanding of how research plays an important role in tackling complex societal challenges. I am confident that the structure of our program deepened their understanding of research and how much their respective fields will gain from their knowledge, skills, and experiences.

A significant and effective tool in increasing the enrollment of underrepresented students in graduate programs is to provide them with opportunities to conduct research early in their undergraduate careers. Our research interns have broadened their knowledge and gained insight into critical issues, while developing analytic, leadership, and problem solving skills. In addition, this summer experience allowed them to gain a better perspective of research and its role in society. They also learned the value of teamwork and collaboration which are both essential in today's research and work environments.

To our faculty research mentors, workshop facilitators, judges and research methods seminar instructor which number 40 – thank you for your time, and expertise. We could not successfully execute the summer research program and create community among this diverse group of talented students without the contributions from UB faculty and staff. We value our collaborations with you and look forward to continued collaborations.

We are confident that the research experience, research methods course, seminars, and fieldtrips fostered a sense of community while enhancing undergraduate experiences. I encourage each CSTEP Scholar to continue taking advantage of the resources, opportunities, and services offered by CSTEP to make your UB experience more personal. We hope you found the support, guidance, and nurturing environment we provided to be beneficial. Also, remember the CSTEP motto: "To whom much is given, much is required." It is a pleasure to work with you.

SHANNA CRUMP-OWENS
CSTEP Director

WHAT'S IN IT FOR ME? THE PERKS OF JOINING UB CSTEP

CSTEP offers valuable tools: advisement, tutoring, paid research internships, scholarships, service learning, specialized courses and travel to conferences and workshops, which empower students to become successful in their chosen profession. Our alumni have made major contributions in both their careers and communities. Many of these same graduates report that CSTEP played a key role in helping to develop the confidence and skills necessary to navigate through their college years and into the profession of their dreams.

UB CSTEP offers the following programs and services for our students:

PAID RESEARCH & INTERNSHIP OPPORTUNITIES

Paid research and internships are an integral part of CSTEP - to introduce talented underrepresented students to the culture of research, provide insight related to their major and expose students to the rigors of graduate study. The CSTEP Research Internship Program exposes selected students to research and career opportunities in their major. CSTEP works with students to identify faculty research mentors or internship supervisors.

ACADEMIC YEAR RESEARCH/INTERNSHIP PROGRAM

During the academic year, interns work for 12 weeks per semester under the guidance of a research mentor or internship supervisor. Students are assigned a research project for up to 10 hours per week, at the discretion of the research or internship supervisor. Students are awarded a research stipend from CSTEP during their research or internship experience.

SUMMER RESEARCH PROGRAM

The CSTEP Summer Research Program is an intensive 8.5-week program designed to enhance the competitiveness of talented underrepresented students pursuing STEM and the allied health professions. The program strengthens participants' research skills and exposes them to the rigors of graduate study. Students are matched with faculty to conduct research for 30 hours per week. In addition to gaining research experience, students participate in a research methods course, seminars, and field trips. As a capstone, at the end of the program, students present their research to their peers, faculty and the University community during our Annual Research Symposium. The summer program takes place from the beginning of June through the end of July. Applications are due in March of each year.

TUTORING

CSTEP students have access to the CPMC Academic Resource Center (ARC) which offers tutoring in courses identified as consistent challenges for students such as anatomy, biology, calculus, chemistry, pharmacology, physiology, physics, and engineering.

FUNDING OPPORTUNITIES FOR CONFERENCES

CSTEP covers travel expenses for selected academic, career, and graduate school conferences and enrichment programs. These opportunities boost students' leadership skills, while building their resumes.

GRADUATE SCHOOL PREPARATION

CSTEP awards scholarships to students for Kaplan Review Courses, which provide preparation for standardized graduate entrance exams, including the GRE, MCAT, LSAT, GMAT, and PCAT exams. Our staff also assists with personal statement preparation and review, and provides mock interviews for students applying to graduate/professional schools. CSTEP also offers a Graduate School Fee Waiver for current CSTEP students applying to graduate or professional school. More details can be found on our website: <http://cpmc.buffalo.edu/cstep/grad-school.php>.

SERVICE LEARNING CLASS

A cohort of 25 students is selected to engage in a semester-long structured service learning project, becoming a Community Health Educator (CHE). The goal of CHE is to increase the number of individuals participating with the organ donor registry. This goal is achieved by engaging students pursuing allied health majors in service learning, and training them to conduct educational workshops for UB students, and facilitating a campus-wide organ donor registry drive. Our partner for the CHE Service Learning Project is Unyts (formerly Upstate New York Transplant Services).

CSTEP SHADOW DAY

CSTEP students serve as mentors to high school students enrolled in the Science Technology Entry Program (STEP). As mentors, CSTEP students allow STEP students to “shadow” them by attending classes with them to get a glimpse of what college classes are like.

CSTEP DAY OF SERVICE

CSTEP students visit local high schools in the Buffalo Public School System to share their collegiate experiences with students in their classrooms. This serves as a vehicle to give students from targeted high schools “college knowledge” while also introducing them to STEM fields and the licensed professions.

HABITAT FOR HUMANITY/GRASSROOTS COMMUNITY GARDENS

CSTEP students team up with Habitat for Humanity Buffalo, a non-profit charitable organization seeking to alleviate the shortage of affordable housing both within the U.S. and abroad. Through volunteer labor and donations, Habitat for Humanity Buffalo has built and rehabilitated over 225 homes for families who have difficulty obtaining a home through other means.

SUPPORT FROM THE CSTEP NETWORK OF STAFF, STUDENTS, AND ALUMNI

We offer academic, career, and personal counseling to assist students in overcoming difficulties, finding solutions, and establishing their priorities. The CSTEP Newsletter, website, and Student Recognition Dinner recognize the achievements of our students and help build the camaraderie that our students have come to rely on.

MONTHLY EVENTS, WORKSHOPS, AND ENRICHMENT ACTIVITIES

Monthly meetings help build the community our students have come to rely upon. Students who attend our monthly meetings gain invaluable advice as they have the opportunity to learn from each other’s experiences and receive professional advice from alumni and guest speakers. Below is a list of several of this year’s workshops and enrichment activities:

CSTEP Welcome Back BBQ
ABC’s of Graduate School
CSTEP Shadow Day
Maximize Your Potential
Rx for Success Seminar (Pharmacy School)
CSTEP’s Day of Service
Effective Study Skills
Time Management

Graduate School Panel
Money Management
Rx for Success Seminar (Medical School)
Blueprint for Success
Statewide Student Conference
Student Recognition Dinner
Student Research Luncheon
Summer Research Program

CSTEP CAREERS

Architect • Audiologist • Biologist • Dietitian • Certified Public Accountant • Chemist • Chiropractor • Computer Scientist • Dentist • Geologist • Engineer • Lawyer • Mathematician • Medical Doctor • Midwife • Nurse Practitioner • Occupational Therapist • Occupational Therapy Assistant • Optometrist • Pharmacist • Physical Therapist • Physicist • Podiatrist • Psychologist • Physician Assistant • Registered Nurse • Respiratory Therapist • Social Worker • Speech-Language Pathologist • Veterinarian

MAKING A DIFFERENCE IN WNY: UB CSTEP HIGHLIGHTS

CSTEP addresses the shortages of underrepresented students both in the Science, Technology, Engineering, Mathematics (STEM) and the licensed professions. Resources available to CSTEP students include: paid research with faculty, internships, graduate school preparation, scholarships for standardized test preparation, academic and career advisement, tutorial services, monthly seminars, travel to professional conferences, and a support network to assist promising students in achieving their academic and professional goals.

During our previous grant cycle, CSTEP received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM). This award, administered by the National Science Foundation, recognizes individuals and organizations that have demonstrated a commitment to mentoring students and increasing the participation of minorities and women in Science, Technology, Engineering, and Mathematics (STEM). Awardees serve as exemplars to their colleagues in the national effort to develop the nation's human resources in the STEM professions.

Did You Know...?

- More than 90% of UB CSTEP students have entered into the CSTEP targeted professions or attended graduate school after obtaining their bachelor's degree.
- More than half of all CSTEP Students possess overall GPA's above 3.0.
- Our current enrollment is 374 students.
- Since the program's inception, UB CSTEP has awarded over 170 CSTEP/Kaplan scholarships to students in preparation for standardized graduate school exams (PCAT, MCAT, GMAT, LSAT, and GRE).
- This year, CSTEP and CURCA sponsored 15 students, staff, and alumni, including 3 students who presented their research at the 27th Annual CSTEP Statewide Conference: Journey's Beyond Excellence in Lake George, NY.
- This year, 35 CSTEP students were placed in funded research internships and completed over 7,000 hours.
- To help provide service to our students, CSTEP has hired a cadre of approximately 97 Graduate and Student Assistants to work within our office. This provides funding for the staff during their time as graduate and undergraduate students at UB.

WHY DO RESEARCH? STUDENT PERSPECTIVES

Written by the 2019 Summer Research Cohort

Research exists in many forms. Whether it is a child turning over rocks to look for bugs, or a NASA scientist combing the night sky in search of extraterrestrial life, research and understanding are integral facets of human behavior. For many students, it is an essential part of the undergraduate experience. The Collegiate Science and Technology Entry Program (CSTEP) Summer Research Program is a comprehensive experience which aims to present students with an opportunity to learn from experts in their fields. For eight weeks, we worked closely under the guidance of a faculty mentor, while also receiving interpersonal enrichment and professional development. The program prepares students for the laboratory environment and serves as a catalyst for their future endeavors.

Students of the CSTEP Summer Research Program are engaging in research for a medley of reasons. Many of them saw it as an opportunity to learn about their desired fields. Research intern [Jenny Moya](#), a junior majoring in Biomedical Engineering, indicated, "Students should engage in undergraduate research because it is a learning and life experience that can help them learn more about their desired field and themselves as a person." [Jose Carassco Ramon](#), a junior majoring in Civil Engineering, similarly states, "Engaging in undergraduate research is one of the best preparations when it comes to pursuing higher education, especially if considering to pursue a masters or Ph.D. It also helps you explore possibilities for future careers and to do further investigation about a topic in your major. [Sara Cruz](#), a sophomore majoring in Psychology, also talks about the other benefits of undergraduate research by stating, "It can be beneficial in building strong relationships with experienced individuals. Having a mentor with more experience can help answer questions you may have which can then help you understand things better and help you contribute to a bigger conversation in your chosen field." Many students are grateful for their research experiences opening up a portal of interaction with knowledgeable professionals.

The immersion of students in research has provided an opportunity for students to catch a glimpse of the day-to-day workings of experts in their fields. [Holiday Sims](#), a Freshman majoring in Computer Sciences indicated, "Research really helped me to apply what I learned in class to real life and defined my path to graduate school." Another intern, [Amarachi Kanu](#) a junior majoring in Biomedical Sciences, mentioned that, "Not only does research bring your in classroom experiences to life, it also teaches you about basic lab techniques and brings your attention to certain topics about science that you have never discussed or heard about. At the same time, you are gaining connections and building relationships with people that could help further or ease your transition to your respective field." A senior majoring in Environmental Engineering, [Lillian Baker](#) mentions, it's an amazing opportunity which allows you to "add a little more knowledge to the world."

Our research interns would like undergraduates to know that taking on research opportunities is an opportunity like no other. [Dania](#)

[Salah](#), a Biomedical Sciences major states undergraduate research mentions a deep recommendation to undergraduate students, "It is one door that opens many others, especially if students are interested in graduate/professional school. As an undergraduate researcher, I highly recommend using research to get involved and build on your experiences." [Danielle Haynes](#), sophomore majoring in Psychology, also mentions that it is a life changing opportunity, "It introduces you to a world you don't get in the classroom. It is one thing to hear about major discoveries, but when you actually see the different components that go into research, it will change your life." Other students such as [Iyobosa Ekhator](#), a junior majoring in Public Health, indicates it helps her articulate and defend positions more clearly by stating, "Through research, you're able to strengthen your critical thinking and ability to defend a position."

In addition to students being able to apply their classroom knowledge to their research, they are also able to use their research to better their own personal lives. [Maisha Rahman](#), a junior majoring in Public Health, indicates, "My research is mainly focused on development of self-regulation and preventing childhood obesity using a responsive parenting intervention. This helped me learn so much about the needs of a child and how we can help them learn to regulate their emotions and the importance of that. Not only can I use this knowledge in my career as a primary care physician but also in my personal life." [Chidalu Anameze](#), a sophomore majoring in Biomedical Sciences, is excited to mention her research experience on her resume which makes her look like a more competitive applicant. She indicates, "Undergraduate research allows students to participate in an experience that could be very beneficial for them to put on their resume when applying to different programs and post-grad opportunities." [Melina Villa](#), a junior majoring in Biomedical Sciences, mentions: "Not only have I learned hands-on techniques, but I've also learned how to manage my time in order to maintain my participation on each of my research teams and how to efficiently complete a literature review in order to write a review paper. I have been able to completely delve into a topic I am thoroughly passionate about which makes my time in the lab even more exciting. Research has truly been a great asset to my education and continues to teach me new things!"

Each student has their own reasons for conducting research. For some, it presents an opportunity to gain invaluable career experience. Others see it as a chance to gain recognition as innovators. Nonetheless, research is an integral part of the undergraduate experience. Through the enrichment of the CSTEP Summer Research program, our students learn the importance of research and gain invaluable skills to use in education, the workforce, and beyond. [-2021 CSTEP Summer Research Cohort](#)



Emmanuel Agyenim

HOMETOWN: Bronx, NY

MAJOR: Biomedical Sciences

INTERNSHIP PLACEMENT: Clinical and Translational Research Center

SUMMER MENTOR: Dr. Jessica L. Reynolds

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Medicine

SUMMER PROJECT: *Biodegradable Nanoparticles Produced By Nanoprecipitation for the Treatment of TB*

ABSTRACT: Tuberculosis (TB) – a contagious infection caused by “Mycobacterium tuberculosis” – is one of the top

10 causes of death worldwide, the leading cause of death from a single infectious agent, and estimated to infect 10 million people in 2019. Unfortunately, TB drugs such as rifampicin have numerous side effects. Developing a biodegradable polymeric nanoparticle rifampicin formulation may reduce these side effects by efficiently delivering drugs to target cells without increasing the systemic blood concentration of the drug. Nanoparticles are typically produced using water/oil/water emulsion produced through sonication. The sonication method is equipment dependent and is therefore not easily transferred between labs. To overcome this challenge, a nanoprecipitation technique, where the polymer (PLGA) and TB drug (rifampicin) are dissolved in acetone and added dropwise to a stirred solution of deionized water and the surfactant polyvinyl alcohol (PVA). Using this method, the concentration of both the polymer and drug and the rate of polymer addition can be controlled to adjust size and drug loading. This research project aims to produce a nanoparticle similar or better than the nanoparticles produced from the sonication method, a size of 230 nm and 5% drug loading capacity.

ACADEMIC AND CAREER GOALS: To become a cardiologist or oncologist and open my own clinic or hospital.

WORDS TO LIVE BY: “Do what is right, not what is easy nor what is popular.” – Roy T Bennett



Chidalu Anameze

HOMETOWN: Clifton Park, NY

MAJOR: Biomedical Sciences

INTERNSHIP PLACEMENT: UB Maternal and Child Health Program

SUMMER MENTOR: Dr. Xiaozhong Wen

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Pediatrics

SUMMER PROJECT: *The Effects of Psychological Aggression Exposure During Pregnancy on Infant Health Outcomes*

ABSTRACT: According to the Centers for Disease Control & Prevention (CDC), intimate partner violence (IPV) is

the aggression or abuse that occurs in a romantic relationship between a current/former spouse or partner and the victim. Many studies found that pregnant women experiencing IPV give birth to infants with negative health outcomes but few studies have investigated the effects of psychological IPV on infants. This study focuses on how the specific IPV of partner psychological aggression expressed towards expecting mothers affects infants' health outcomes beyond the time of their birth. The data acquired was collected by the Pregnancy Risk Assessment Monitoring System (PRAMS, 1987-present), run by the CDC. Eligible mothers, nationwide, were sent mailed questionnaires and given telephone surveys about maternal attitudes and experiences before, during, and after their pregnancies. Data analysis consists of Chi-Square tests to examine the relationship between three psychological aggression variables and the infant health outcomes of small for gestational age (SGA), well-visit 1-week postpartum, infant mortality, birth defects, ICU admission, and hospital stay length. It is anticipated that the results will exhibit significant relationships between the psychological aggression variables and infant health outcomes. This research hopes to influence the development of more interventions for abused pregnant women.

ACADEMIC AND CAREER GOALS: To attend medical school and become an Obstetrician-gynecologist.

WORDS TO LIVE BY: “One of the most courageous things you can do is identify yourself, know who you are, what you believe in, and where you want to go.” – Sheila Murray Bethel



Chidera Anameze

HOMETOWN: Clifton Park, NY

MAJOR: Biomedical Sciences

INTERNSHIP PLACEMENT: UB Maternal and Child Health Program

SUMMER MENTOR: Dr. Xiaozhong Wen

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Pediatrics

SUMMER PROJECT: *How Maternal Living Arrangements and Marital Status Affect Infant Health Outcomes*

ABSTRACT: Though the literature supports the claim that poor partner support is associated with negative infant

health outcomes, few studies have investigated how maternal living arrangements interact with maternal marital status to affect infant health. To address this research gap, this study aims to explore how these two factors together affect multiple infant health outcomes. Data for this study comes from the Pregnancy Risk Assessment Monitoring System (PRAMS, 1987-present), run by the Centers for Disease Control & Prevention (CDC). PRAMS is conducted through mailed questionnaires and telephone follow-ups sent to eligible mothers in the United States regarding their maternal attitudes and experiences before, during, and after pregnancy. 26,867 mother-child dyads are eligible for this analysis. Chi-square tests and regression models will be used to evaluate the associations of the living arrangements and marital status variables with infant health outcomes including mortality, small for gestational age (SGA), birth defects, ICU admission, hospital stay length, and vaccination. It is anticipated that these two variables will have a significant relationship with infant health outcomes. Our expected finding suggests that there could be an emphasis placed on living arrangements between parents when creating and improving interventions and support for pregnant women.

ACADEMIC AND CAREER GOALS: To attend medical school and become an Obstetrician-gynecologist.

WORDS TO LIVE BY: "Sometimes the strength within you is not a big fiery flame for all to see, it is just a tiny spark that whispers softly 'You got this, keep going.'" – Unknown



Lillian Baker

HOMETOWN: New York, NY

MAJOR: Environmental Engineering

INTERNSHIP PLACEMENT: Department of Civil, Structural, and Environmental Engineering

SUMMER MENTOR: Dr. Nirupam Aich

SUMMER MENTOR TITLE: Assistant Professor

DEPARTMENT: Civil, Structural and Environmental Engineering

SUMMER PROJECT: *Using Nano-enabled Technologies for Removal and Degradation of Per- and Polyfluoroalkyl Substances (PFASs)*

ABSTRACT: Per- and polyfluoroalkyl substances (PFASs) are a chemical contaminant known to cause thyroid complications and cancer. They are harmful at 70 parts per trillion and are incredibly stable as a result of the strong C-F bonds within their chemical structure. Nanoscale zero-valent iron (nZVI) nanomaterial is a potential technology for removal and degradation of PFAs due to the magnetic attraction and redox activity attributable to nZVI. In addition, photocatalytic titanium dioxide (TiO₂) nanoparticles that undergo light-induced transformation to create structural holes and electrons also have potential to degrade PFASs. In this study, we propose that two-dimensional reduced graphene oxide (rGO) provides an adsorption mechanism that can be utilized with combined nZVI and TiO₂. The rGO facilitates the synergistic photocatalysis and redox activity of nZVI and TiO₂ to maximize PFASs degradation. When rGO is used the adsorption mechanism can be utilized, nZVI and TiO₂ particle size decreases, and TiO₂ is used for photocatalysis under visible light irradiation. It is hypothesized that the combination of these materials and synthesis of multi-component carbon-metallic nano hybrids will have a significant impact in allowing for better adsorption, degradation, and removal of PFASs from water which can provide safer wastewater and drinking.

ACADEMIC AND CAREER GOALS: To work in engineering technologies to aid in a cleaner, equitable, and healthier environment for present and future generations.

WORDS TO LIVE BY: "Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security and women's empowerment. Solutions to one problem must be solutions for all." –Bahn ki-moon



Jose Carrasco Ramon

HOMETOWN: Bronx, NY

MAJOR: Civil Engineering

INTERNSHIP PLACEMENT: Civil Engineering

SUMMER MENTOR: Dr. Prathima Nalam

SUMMER MENTOR TITLE: Assistant Professor

DEPARTMENT: Materials Design and Innovation

SUMMER PROJECT: *Energy Dissipation Through Friction Dampers*

ABSTRACT: Friction Dampers are devices that use the mechanism of friction to dissipate energy into the structure.

The use of Friction Dampers play a role in society by providing extra safety support to the building by reducing the contribution of damping forces to the structural design. The goal of this research focuses on the methodologies of using friction dampers in earthquake situations and how material type influences the deformation behavior that impacts the stability of the building. One example of this engineering application is to increase the friction coefficient when there's a load applied in the building and how this creates hysteretic loops behaviors. The results of these loops in the hysteric curves, produces a smoother or scatter plot based on the material type used. The sliding connections made of steel help the structure to have a strong slip which means sting sliding displacement. This system uses a mechanism of "shear-flexure interaction" bolts as a connection that is the main duty id to support the fundamental behaviors of friction damper. Therefore, friction dampers have the potential in having fusion of the surfaces in contact over long periods without producing movement, due to many weathering factors.

WORDS TO LIVE BY: "You miss 100% of the shots you don't take." – Wayne Gretzky



Jeremiah Chapman

HOMETOWN: Buffalo, NY

MAJOR: Biochemistry

INTERNSHIP PLACEMENT: Roswell Park Comprehensive Cancer Center

SUMMER MENTOR: Dr. Gokul Das

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Pharmacology and Therapeutics

SUMMER PROJECT: *Effect of ER β -p53 crosstalk on therapeutic response in Triple-Negative Breast Cancer*

ABSTRACT: Triple-Negative Breast Cancer (TNBC) is one of the most aggressive subtypes of breast cancer. It results

in 50% of breast cancer deaths although it only represents 15% of the cases. At present, there are no targeted therapies for TNBC due to its lack of the 3 primary receptors Estrogen receptor (ER), Progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Although TNBC does not express ER, it frequently expresses Estrogen receptor beta (ER β). In 80% of TNBC cases tumor suppressor p53 is mutated and dysfunctional. The aim of this current study is to analyze signaling crosstalk between ER and p53 to understand mechanisms that drive TNBC necessary to develop new therapeutic strategies. Using TNBC cell models, the effect of endocrine therapy and chemotherapy on cell proliferation can be investigated. The effect of the combination of tamoxifen and doxorubicin in enabling ER β to sequester mutant-p53 and reactivate tumor suppressor p73, leading to apoptosis, is also of interest in this research. Understanding how these drugs alone, and in combination, affect TNBC cells is key to developing new therapeutic options for this most aggressive form of breast cancer.

ACADEMIC AND CAREER GOALS: To obtain a medical degree and become a surgeon.

WORDS TO LIVE BY: "Education is the passport to the future, for tomorrow belongs to those who prepare for it today." – Malcolm X



Sara Cruz

HOMETOWN: New Windsor, NY

MAJOR: Neuroscience and Psychology

INTERNSHIP PLACEMENT: Conventus Medical Center, UBMD Neuropsychology

SUMMER MENTOR: Dr. Ralph H. Benedict

SUMMER MENTOR TITLE: Professor

DEPARTMENT: Psychology and Neurology

SUMMER PROJECT: *The Auditory Test of Processing Speed (ATOPS): Testing a novel tool to assess cognition in people with multiple sclerosis*

ABSTRACT: Multiple sclerosis (MS) is a progressive disease where lesions disrupt communication throughout the nervous system. Among other cognitive deficits, MS frequently leads to slowed cognitive processing speed. Due to its high sensitivity, reliability, and validity, the Symbol Digit Modalities Test (SDMT) is considered the gold standard for assessing cognitive processing speed in MS. However, the SDMT requires visual stimuli, and because visual impairment is common in MS, cognitive processing assessment is inaccessible to many patients. The study objective is to design a brief Auditory Test of Processing Speed (ATOPS) and examine its psychometrics in MS patients and healthy individuals. Fifty healthy controls and 50 MS patients will be assessed with the SDMT and ATOPS. MS patients will also complete measures of verbal, visual, and working memory. Correlations between these tests will examine the convergent and divergent validity of ATOPS. For known-groups validity, independent t-tests will determine any statistically significant time difference between MS patients and healthy controls on ATOPS. It is expected that ATOPS' total time will correlate with SDMT's total correct, and ATOPS will discriminate between MS patients and healthy controls. Overall, ATOPS will have good convergent, divergent, and known-groups validity, and accurately assess individuals with MS.

ACADEMIC AND CAREER GOALS: To continue research and ultimately obtain an MD and PhD to become a doctor scientist, opening up a research hospital in Mexico.

WORDS TO LIVE BY: "Be strong and courageous. Do not be afraid; do not be discouraged, for the Lord your God will be with you wherever you go." - Joshua 1:9



Iyabosa Ekhator

HOMETOWN: Brooklyn, NY

MAJOR: Public Health

INTERNSHIP PLACEMENT: Department of Community Health and Health Behavior

SUMMER MENTOR: Gloria Aidoo-Frimpong, MPH, MA

SUMMER MENTOR TITLE: Graduate Assistant

DEPARTMENT: Public Health

SUMMER PROJECT: *Determinants of willingness to use different modalities of pre-exposure prophylaxis for HIV prevention among Ghanaian immigrants in the US*

ABSTRACT: Daily oral pre-exposure prophylaxis (PrEP) is an effective biomedical HIV prevention method. Despite the proven effectiveness of oral PrEP, utilization remains low especially among ethnic and racial populations, and not everyone at substantial risk will be able to effectively use oral PrEP. Little is known about the willingness to use different PrEP modalities among African immigrants in the US. Prevention gaps will remain, which could be addressed by offering more biomedical prevention choices, similar to how expanded method mix had led to greater uptake in the contraceptive field. Therefore, this study examines the determinants of willingness to use different modalities of PrEP among a sub-population of African immigrants---Ghanaians. We recruited 630 Ghanaian immigrants through WhatsApp in June 2021. Participants completed a detailed social behavioral questionnaire where they were asked about their willingness to use different PrEP delivery modalities. Data was analyzed using multilevel logistic regression models. We hypothesize that gender identity, age, sexual orientation, acculturation, marital status, level of education and primary care provider status will be associated with willingness to use different modalities of PrEP. The potential to transform HIV prevention and treatment by eliminating the need for daily adherence is crucial to ending the HIV epidemic.

ACADEMIC AND CAREER GOALS: To obtain a degree in medicine and possibly become a team doctor for the NBA..

WORDS TO LIVE BY: "Above all else, guard your heart, for everything you do flows from it." - Proverbs 4:23



Bradley Givens

HOMETOWN: Rochester, NY

MAJOR: Computer Science

INTERNSHIP PLACEMENT: Department of Physics

SUMMER MENTOR: Dr. Salvatore Rappoccio

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Physics

SUMMER PROJECT: *Classifying anomalous interactions*

ABSTRACT: Following the success of the Standard Model and the discovery of the Higgs boson in 2012 at the Large

Hadron Collider (LHC), it is important that Artificial Intelligence (AI) techniques improve to accurately classify proton-proton collisions. As of now the current model is creating its rules relying on kinetic variables. The goal is to create a model that relies less on those variables, because they could change depending on the data. Accurately classifying the decayed particles in the collisions can identify anomalies, which could lead to the discovery of new particles or new theories of particle interactions. The purpose of this research is to use adversarial networks to balance the accuracy of the classification against spurious correlations in the training sample. Training the model to limit the effect of specific variables on our results could possibly improve the accuracy of the testing. We supply the model with simulations of the momentum vectors of the particles to create a model that correctly classifies collisions, while ignoring mismodeled variables.

ACADEMIC AND CAREER GOALS: To graduate with a masters degree in my field.

WORDS TO LIVE BY: "Anything's possible, you gotta dream like you never seen obstacles, but work like you've seen all of them." – Jermaine Cole



Danielle Haynes

HOMETOWN: Queens, NY

MAJOR: Psychology

INTERNSHIP PLACEMENT: Center for Ingestive Behavior Research

SUMMER MENTOR: Dr. Derek Daniels

SUMMER MENTOR TITLE: Professor

DEPARTMENT: Psychology

SUMMER PROJECT: *Using Fos Expression to Evaluate the Effect of Dehydration and Rehydration on Neural Activation*

ABSTRACT: Maintenance of fluid balance is crucial for survival. An inadequate amount of fluids in the body can affect

the brain's circuits and functionality. Lack of fluids in the body leads to dehydration; however, how the brain responds to dehydration and rehydration is poorly understood. Studies have shown that c-Fos, an immediate early gene product, has been expressed in certain brain regions during water deprivation. Using the expression of c-Fos, this study seeks to locate specific brain regions of rats activated during water deprivation, and identify how drinking affects the timing and amount of activation. c-Fos will be detected using immunohistochemistry in the rats' brains to examine the activation pattern when rats are dehydrated and allowed to drink versus being dehydrated without subsequent drinking. Thirty-two male and female Sprague Dawley rats will be dehydrated for either 22, 24, or 26 hours and 8 of them will be allowed to drink. Studies have shown that Fos increases when an animal is dehydrated, but is significantly lower when they are rehydrated. This could be because drinking is decreasing Fos or because it is preventing the increase; it is hypothesized that rehydration is preventing the increase of c-Fos.

ACADEMIC AND CAREER GOALS: To obtain a Masters in Physician Assistant Studies and become a Physician Assistant.

WORDS TO LIVE BY: "God is within her, she will not fall." – Psalms 46:5



Amarachi Kanu

HOMETOWN: Bronx, NY

MAJOR: Biological Sciences

INTERNSHIP PLACEMENT: Clinical and Translational Research Center

SUMMER MENTOR: Dr. Supriya Mahajan

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Medicine

SUMMER PROJECT: *The Genetics of Cannabis Addiction*

ABSTRACT: Tetrahydrocannabinol (THC) is one of the most prominent cannabinoids found in the cannabis plant

that acts as a psychoactive as it changes the functions of the nervous system. In recent Center for Disease Control & Prevention reports there has been a spike in lung injury and vaping-related deaths due to a Vitamin E Acetate additive in THC. Based on genome-wide association studies, THC alters the gene expression of CHRNA2, CHRNA3, CHRNA5, CHRNA7, and CHRNB4. These changes affect the progression of lung and brain cancer. To examine the effect of Cannabidiol (CBD) and THC on lung cancer progression we used the lung cancer cell line A549, and to examine the effects of THC and CBD (a non-psychoactive) on brain cancer cells, we used the glioblastoma cell line C6. The methods of these experiments include the evaluation of gene expression using quantitative PCR (Polymerase Chain Reaction, which is done to quantitate the expression levels of the genes, and colony formation assay, which is an in-vitro cell survival assay that shows a single cell growing into a colony that examines the effect of the THC/CBD on cell growth/survival. Preliminary experiments, where we treated A549 and C6 cells with THC or CBD to examine the changes in the gene expression levels, are underway. We expect an increase in gene expression levels of CHRNA2, CHRNA3, CHRNA5, CHRNA7, and CHRNB4 on treatment with THC/CBD as compared to the untreated control. Our study will provide insight into how THC/CBD use is associated with lung/ brain cancer disease progression.

ACADEMIC AND CAREER GOALS: To obtain my Doctorate of Pharmacy and become a Long-term or Pediatric Pharmacist.

WORDS TO LIVE BY: "In order for you to be your best self, you're going to have to know and understand your worst self. Relax, and find that light amidst darkness." - personal mantra



Justin Kellier

HOMETOWN: Mount Vernon, NY

MAJOR: Biological Sciences

INTERNSHIP PLACEMENT: Cullen Lab

SUMMER MENTOR: Dr. Paul Cullen

SUMMER MENTOR TITLE: Professor

DEPARTMENT: Biological Sciences

SUMMER PROJECT: *Exploration of Temperature-Dependent Filamentous Growth in Budding Yeast*

ABSTRACT: Many fungal species cells can differentiate to filamentous / hyphal cells through a change in behavior by the action of signaling pathways. *Saccharomyces cerevisiae*, also known as budding yeast, have

two common growth patterns, yeast-form growth (axial budding) and filamentous growth. Should nutrients become limited, yeast can form filaments, characterized by elongated cells that form in tight groups. During testing in stressful environments, we observed that yeast underwent filamentous growth patterns in response to temperature and we are now conducting experiments to understand how yeast display this phenotype. It is hypothesized that this new phenotype for yeast might be controlled by signal transduction pathways. We will examine cells that lack these pathways as a means to understand what system controls the temperature response. This study may help our understanding of cell specialization including fungal infections in human tissue.

ACADEMIC AND CAREER GOALS: To obtain a PhD in biological sciences and become a genetic researcher.

WORDS TO LIVE BY: "You wish and you dream with all your heart. But remember that old star can only take you part of the way. You got to help it with some hard work of your own" - Princess and the Frog



Tyree Langley

HOMETOWN: Brooklyn, NY

MAJOR: Psychology

INTERNSHIP PLACEMENT: UB Behavioral Neuroendocrinology Lab

SUMMER MENTOR: Dr. Matthew Paul

SUMMER MENTOR TITLE: Assistant Professor

DEPARTMENT: Psychology

SUMMER PROJECT: *The Role of Vasopressin in Social Development*

ABSTRACT: Childhood and adolescence is a critical life stage during which individuals acquire the necessary skills for independence. How the brain regulates this development is not understood. The neuropeptide, vasopressin has recently been shown to influence juvenile and adolescent social behaviors such as social recognition and social play. In this study, Brattleboro rats, which lack vasopressin throughout development, were used to test the hypothesis that vasopressin regulates the preference of adolescent rats for social stimuli. Male and female Brattleboro rats will be tested in the social preference test, and their performance will be compared to wildtype control rats, which have normal levels of vasopressin. We predict that the vasopressin deficiency of the Brattleboro rats will result in a decrease in social preference compared to rats with a normal genotype. Findings from this experiment will indicate whether vasopressin modulates behavior through the motivation to seek out social stimuli. Ultimately, such experiments will help develop and optimize treatment for neurodevelopmental disorders such as schizophrenia and Autism Disorders that impacts social behavior.

ACADEMIC AND CAREER GOALS: To obtain a PhD in Clinical Psychology and become a licensed psychologist, specializing in research and clinical practice.

WORDS TO LIVE BY: "The Future belongs to the Dreamers!"



Marcos Lopez

HOMETOWN: Queens, NY

MAJOR: Biological Sciences

INTERNSHIP PLACEMENT: Clinical and Translational Research Center

SUMMER MENTOR: Dr. Jessy Alexander

SUMMER MENTOR TITLE: Research Professor

DEPARTMENT: MEDICINE

SUMMER PROJECT: *Interleukin 2 Role in the Complement System and Possible use as a Treatment for Systemic Lupus Erythematosus*

ABSTRACT: Systemic Lupus Erythematosus (S.L.E.) is a chronic autoimmune disease that can affect different organs in the body. It majorly affects women, mainly between the ages of 15 and 44. The current treatment has adverse side effects, therefore alternate treatments are an urgent need. Clinical trials have suggested that low-dose IL-2 might be an effective treatment for S.L.E. IL-2 is a cytokine normally produced by T cells, but patients with lupus have decreased levels. To understand the impact of IL-2 in these patients we used the established mouse model, MRL/LPR mice. The mice were divided into 2 groups, control (n=7) and IL-2 treatment (n=9, 1000 units/day). The treatment was begun at 8 weeks and the tissues harvested at 18 weeks (diseased, LD50). Cryosections (10 microns) were generated, fixed in paraformaldehyde and incubated with FITC (Fluorescein isothiocyanate), then labeled anti-C3 antibodies. Slides were washed and the immunofluorescence observed under the microscope. Subsequently, immunofluorescence staining will be completed, and tissues subjected to real-time PCR (Polymerase Chain Reaction) and Western Blot to better interpret future results.

ACADEMIC AND CAREER GOALS: To become a doctor of medicine and specialize in cardiology.

WORDS TO LIVE BY: "The good thing about science is that it's true whether or not you believe in it." - Neil DeGrasse Tyson



Jenny Moya

HOMETOWN: Buffalo, NY

MAJOR: Biomedical Engineering

INTERNSHIP PLACEMENT: Biomaterials and Regenerative Therapeutics Laboratory

SUMMER MENTOR: Dr. Debanjan Sarkar

SUMMER MENTOR TITLE: Research Associate Professor

DEPARTMENT: Biomedical Engineering

SUMMER PROJECT: *Characterization of colloidal gels for drug delivery purposes*

ABSTRACT: Colloidal gels are formed by aggregation of particles to independently regulate the microstructural morphology and mechanics of the gels. These gels can deliver proteins for regenerative applications. Colloidal gels prepared from positive and negative polyurethane particles were used as vehicle for the delivery of protein. Using, bovine serum albumin (BSA) as a model protein, these gels were used to encapsulate BSA and subsequently their release was analyzed. Results show that BSA can be encapsulated in colloidal gels and the encapsulation efficiency is dependent on the physicochemical and microstructural character of the gels. In addition to this drug delivery system, a novel system of aggregated particles was developed by aggregating positive polyurethane particles using with a negatively charged surfactant, sodium dodecyl sulfate (SDS) in the form of monomers. Critical Micelle Concentration (CMC) of SDS is 8 mM. Colloidal particles with 4mM SDS showed a higher rate of aggregation while 20mM in the form of micelles showed no aggregation. Further experiments and data analysis still need to be conducted to know the effectiveness of any drug with SDS mediated colloidal gels.

ACADEMIC AND CAREER GOALS: To earn a Master's Degree in Biomedical Engineering.

WORDS TO LIVE BY: "Work hard, miracles will happen!"



Marieross Navarro

HOMETOWN: Zaragose, Philippines

MAJOR: Mechanical Engineering

INTERNSHIP PLACEMENT: REN Laboratories

SUMMER MENTOR: Dr. Shenqiang Ren

SUMMER MENTOR TITLE: Professor

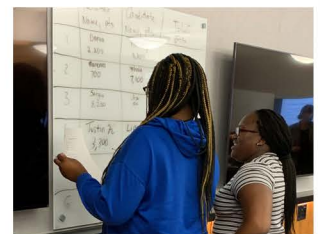
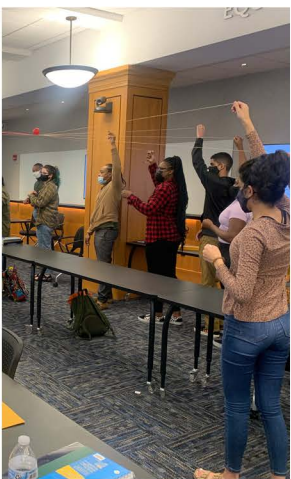
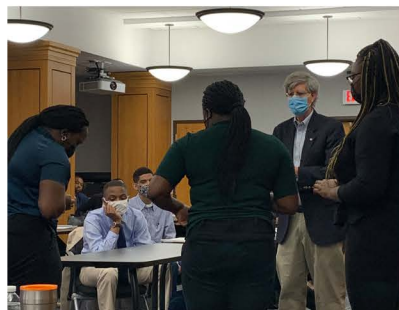
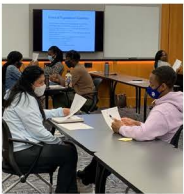
DEPARTMENT: Mechanical and Chemical Engineering

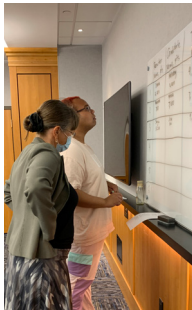
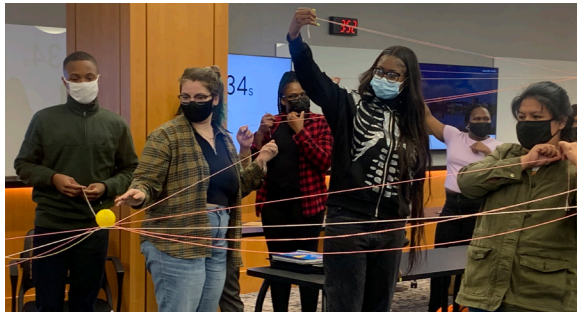
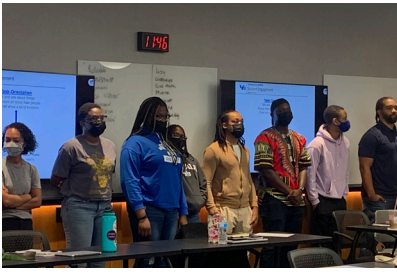
SUMMER PROJECT: *Optimization of Copper Nanoparticle Inkjet Ink for Flexible Thermal Sensors*

ABSTRACT: Recent advancements in the field of flexible electronics, for instance, smart wearables, soft robotics and health monitoring devices, have garnered immense attention in the domain of stretchable chemical and physical sensing methods. Amongst the plethora of sensors available, flexible sensors are extensively investigated for fulfilling the demand for highly sensitive adaptable, light-weight and disposable sensors. These temperature sensors can be utilized for structural-health monitoring. In the medical sector, the sensors can monitor and provide vital information regarding the physiological state of the body in a non-invasive way. Additionally, the temperature sensors' capability to detect temperature over a precise range is a highly sought-after characteristic of this sensor. The purpose of this research is to describe the copper-based molecular ink materials for printable electronics through ink-jetting. The printability, adhesion, and electronic performance of such ink materials are evaluated through a suite of electronic and mechanical characterization systems. The printed copper conductors show small layer heights and thinner widths, in comparison to other printing methods, such as direct writing and screen printing. This study opens up a pathway to utilize molecular copper ink for printable electronics and highlights the capability of additive manufacturing techniques for affordable and non-invasive discreet flexible medical electronics.

ACADEMIC AND CAREER GOALS: To continue to be at the forefront of the development of flexible and sustainable electronics through my research and to utilize my entrepreneurial drive to lead a revolutionary tech company.

WORDS TO LIVE BY: "If you're willing to step out of your safe zone...and do what you've never done, you'll give yourself the power to become someone you've never been." – Lisa Nichols







Ngowari Opuso-Jama

HOMETOWN: Buffalo, NY

MAJOR: Biochemistry

INTERNSHIP PLACEMENT: Jacobs School of Medicine and Biomedical Sciences

SUMMER MENTOR: Dr. Joshua J. Wang

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Ophthalmology

SUMMER PROJECT: *An investigation of the role of NOX4 in Angiogenesis in Diabetic Retinopathy*

ABSTRACT: Diabetic retinopathy (DR) is a leading cause of blindness and vision loss. It is caused by vascular leakages in the retina due to vascular hyperpermeability, which is caused by high blood glucose associated with diabetes. In previous studies, the membrane protein NADPH oxidase 4 (NOX 4) has been shown to correlate to the pathogenesis of DR. This research seeks to identify the pathway by which NOX 4 promotes this disease to effectively identify potential therapeutic targets. A common biomarker of DR is angiogenesis in the retina, which we predict NOX 4 is involved in. To study the effects of human NOX4 on the retinal angiogenesis of diabetic mice, this research incorporates methods such as polymerase chain reaction, genotyping, immunofluorescent staining, HE-staining, western blot, and OCT analysis. The results are expected to show an increase in pathological angiogenesis in diabetic mice with overexpressed NOX4 compared to healthy mice. These results would indicate that NOX4 is involved in the mechanisms of angiogenesis in patients with DR. These potential findings would enable the study of the specific interaction for further identification of a therapeutic target.

ACADEMIC AND CAREER GOALS: To obtain a medical degree and specialize in pediatrics. I further aim to start a business.

WORDS TO LIVE BY: "Ask yourself if what you are doing today is getting you closer to where you want to be tomorrow."



Maisha Rahman

HOMETOWN: Buffalo, NY

MAJOR: Public Health

INTERNSHIP PLACEMENT: Child Health and Behavior Lab, Jacobs School of Medicine and Biomedical Sciences

SUMMER MENTOR: Dr. Stephanie Anzman-Frasca

SUMMER MENTOR TITLE: Assistant Professor

DEPARTMENT: Pediatrics

SUMMER PROJECT: *Coding Self-Regulation Behaviors in 6 Years Olds*

ABSTRACT: Self-regulation describes one's ability to modulate emotions, thoughts, and behavior. Greater child self-regulation has been linked to positive socioemotional and health outcomes, including healthy weight. Hence, promoting self-regulation may help prevent childhood obesity. The Intervention Nurses Start Infants Growing on Healthy Trajectories (INSIGHT) obesity preventive intervention promoted responsive parenting during infancy, which in turn may support development of child self-regulation abilities. A main objective of the overarching study is to test the effects of this intervention on child self-regulation and weight status. The aim of the present analysis is to assess self-regulation abilities among participants in the INSIGHT study at age 6 years via the Transparent Box task. During this activity, children are left alone for about 4 minutes with a locked box containing a preferred toy and non-functional keys to unlock it. The task was recorded and a global behavioral coding scheme adapted from Durbin and colleagues was used to code components of self-regulation (e.g., emotion regulation, interest/engagement, attentional control, behavioral control). Analysis is ongoing; results will include inter-rater reliability. Monitoring of reliability can facilitate successful behavioral coding and analysis which may inform development of future early life interventions aiming to promote child-regulation abilities and health.

ACADEMIC AND CAREER GOALS: To obtain a MPH and DO degree with a concentration in Family Medicine and become a Primary Care Physician so that I can serve the marginalized populations. Also, aim on opening my own clinic in the US and a hospital in my village in Bangladesh.

WORDS TO LIVE BY: "He who is not conquering some fear everyday has not learned the secret of life."



Breanna Roper

HOMETOWN: Bronx, NY

MAJOR: Biotechnology

INTERNSHIP PLACEMENT: Department of Biological Sciences

SUMMER MENTOR: Dr. Shermali Gunawardena

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: Biological Sciences

SUMMER PROJECT: *The Role Of Huntingtin On Calcium Distribution*

ABSTRACT: Neurons uniquely extend long protrusions called axons and, although axons contain a continuous network of endoplasmic reticulum (ER), the mechanism by which ER is transported throughout axons remains unclear. Previously, we found that Huntingtin (HTT), the Huntington's disease (HD) protein, influences the movement and distribution of ER within axons: reduction of HTT by 70% with dHTT-RNAi expression in larval neurons led to decreased movement of ER-vesicles and disruption of the continuous ER-tubule network in axons. Since ER is a multifunctional organelle involved in calcium storage; we hypothesize that HTT loss/reduction also impairs the movement/distribution of calcium within axons. Here, we test whether HTT plays a specific role in calcium movement and/or distribution at axonal ER by comparing an ER-localized calcium sensor (UAS-ER-GCaMP6-210) with a cytosol-localized calcium sensor (UAS-RCaMP1f.A) in the context of normal (WT) and reduced (dHTT-RNAi) HTT levels. Together, this work aims to unravel a mechanism by which loss/reduction of HTT leads to calcium dysregulation in axons through disrupted transport of axonal ER.

ACADEMIC AND CAREER GOALS: To obtain a M.D.-PhD in Regenerative medicine and opening a clinic in my home town Jamaica.

WORDS TO LIVE BY: "You pray for rain, you got to deal with mud too. That's a part of it." - Denzel Washington



Dania Salah

HOMETOWN: Syracuse, NY

MAJOR: Biomedical Sciences

INTERNSHIP PLACEMENT: Department of Biological Sciences

SUMMER MENTOR: Dr. Shermali Gunawardena

SUMMER MENTOR TITLE: UB Distinguished Professor, Chair

DEPARTMENT: Biological Sciences

SUMMER PROJECT: *Huntington's Disease: The Effect of Excess HSPA and PI3K on Stress-Induced Mitochondrial Fragmentation*

ABSTRACT: More than 200,000 Americans are at risk of inheriting a fatal neurodegenerative disease called Huntington's disease (HD). HD, a genetic disorder caused by a polyQ expansion mutation in the huntingtin (HTT) protein, leads to physical and cognitive impairments that can be treated but not prevented. This research is intended to gain a better understanding of the microcellular effects of HD as a step forward to renovating future therapeutics. A main component of HD that amplifies the vulnerability of neurons and leads to their degeneration, is mitochondrial fragmentation, or the abnormal division of mitochondria. This study investigates ways to rescue mitochondrial fragmentation by inducing the overexpression of the heat shock protein (HSPA) and the phosphatidylinositol 3-kinase (PI3K) pathway. HSPA is a chaperone protein shown to decrease polyQ aggregation and the PI3K pathway is a signal transduction that promotes cell growth and survival. Stress was induced in third-instar *Drosophila* larvae using a traumatic brain injury model or pathogenic HTT and the brains were dissected and examined using immunofluorescence. Then, the sizes of the mitochondria were quantified and compared to wild-type mitochondria. The findings conclude that HSPA rescues fragmentation; it is anticipated that the PI3K pathway will follow the same trend.

ACADEMIC AND CAREER GOALS: To obtain an MD and become a physician involved in clinical research.

WORDS TO LIVE BY: "Trust the timing of it all."



Holliday Sims

HOMETOWN: Albany, NY

MAJOR: Computer Science

INTERNSHIP PLACEMENT: School of Engineering and Applied Sciences

SUMMER MENTOR: Dr. Kenneth Joseph

SUMMER MENTOR TITLE: Assistant Professor

DEPARTMENT: Computer Science & Engineering

SUMMER PROJECT: *Using Computational Methods to Provide Racially Equitable Allocation of Foster Care Services*

ABSTRACT: Each year more than 20,000 youth age out of foster care without reunifying with their families. The

outcomes for these youth are poor. By age 19, only 59% finish high school, 20% are homeless, and 27% of males are incarcerated. The John H. Chafee Foster Care Program, created by the Foster Care Independence Act of 1999, develops and organizes programs to ease the transition from foster care to independent living. The purpose of this research is to contribute to future researchers and case workers' knowledge of foster youth's needs in ways that inform a more racially equitable allocation of services. The present work will use computational methods to understand the effects of the foster care system on youth and patterns in how services are allocated, with a focus on African American youth. Specifically, this research will use data from Adoption and Foster Care Analysis and Reporting (AFCARS) and National Youth in Transition Database (NYTD) to understand how academic support services impact the higher education enrollment rate for African American youth who age out of the system.

ACADEMIC AND CAREER GOALS: To obtain a PhD in computer science and become an Artificial Intelligence researcher in China.

WORDS TO LIVE BY: "Nothing will work unless you do." - Dr. Maya Angelou



Sergio Smith

HOMETOWN: Buffalo, NY

MAJOR: Actuarial Sciences

INTERNSHIP PLACEMENT: School of Management

SUMMER MENTOR: Dr. Cristian Tiu

SUMMER MENTOR TITLE: Associate Professor

DEPARTMENT: School of Management

SUMMER PROJECT: *Searching for Innovation: A Text Analysis of Management's Discussion and Analysis*

ABSTRACT: In the world of investing, financial professionals and investors depend heavily upon the 10-K report to

make investment decisions. While most sections of the 10-K report are audited, the Management's Discussion and Analysis (MD&A) section is not held to the same standards. Due to the unregulated nature of MD&As, investors often misinterpret and/or overlook what managers write in this section because the complexity of the language used often conceals insightful information. The purpose of this study is to analyze the language that is contained within MD&A sections and to see how the language translates to investment performance. Natural Language Processing (NLP) techniques will be used to analyze MD&A sections of financial statements to identify innovative companies that will be validated by traditional investor metrics that show a correlation to strong investment performance. The goal is to show that NLP techniques can be used to successfully analyze a financial statement's MD&A section. This research will show that although the information managers include in MD&A sections is often misinterpreted, when analyzed with NLP, MD&A sections yield insightful indications about a company's financial prospects.

ACADEMIC AND CAREER GOALS: To obtain a PhD in Quantitative Finance and start my own Hedge Fund.

WORDS TO LIVE BY: "Make your life a masterpiece; imagine no limitations on what you can be, have or do."



Melina Villa

HOMETOWN: Bay Shore, NY

MAJOR: Biomedical Sciences

INTERNSHIP PLACEMENT: Clinical and Research Institute on Addictions

SUMMER MENTOR: Dr. Panayotis K. Thanos

SUMMER MENTOR TITLE: Senior Research Scientist

DEPARTMENT: Pharmacology and Toxicology

SUMMER PROJECT: *Δ FosB Effects on Exercise and Cocaine Abuse: A Review*

ABSTRACT: Δ FosB is a transcription factor found in the brain, primarily in the Nucleus Accumbens (NAc) and Dorsal

Striatum (DS)—key regions of the brain’s reward system—following the chronic administration of a drug of abuse and is responsible for increasing one’s susceptibility to relapse and drug-seeking behaviors when found in elevated concentrations. This review focused on the possible impact of exercise on Δ FosB levels, as exercise has previously been shown to decrease drug-seeking and relapse behaviors. This review explored articles that looked in-depth at Δ FosB induction following the administration of various drugs with differing durations, dosages, and methods of administration and research papers that studied how exercise affects one’s reaction to a drug of abuse, and how Δ FosB is impacted by various exercise regimens. Despite previous findings demonstrating that exercise attenuates one’s cocaine condition place preference (CPP), a decrease in breakpoints at higher cocaine dosages, and a decrease in infusions of methamphetamines, MDMA, and methylone, our results demonstrate an increase in Δ FosB following prolonged physical activity. Such results are critical as they suggest that a different neurological pathway may be at play when physical activity reduces such addictive-like behaviors.

ACADEMIC AND CAREER GOALS: To attend Medical School through the Air Force’s HPSP Scholarship in hopes of specializing in either Neurology or Emergency Medicine.

WORDS TO LIVE BY: “The future is the home of our deepest fears and our wildest hopes.” – Dr. Owen Hunt (Grey’s Anatomy)

The 2021 CSTEP Summer Research Program expresses thanks & appreciation to the following workshop & tour facilitators for their contributions & support:

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MONEY MANAGEMENT,
WEST ADVISORY GROUP

ALLEN WILLIAMS
PROGRAM COORDINATOR,
UB INTERCULTURAL
DIVERSITY CENTER

THANK YOU to our 2021 CSTEP Summer Symposium Judges!

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DR. CHANGYOU CHEN	Dept. of Computer Science and Engineering
DR. KARTHIK DANTU	Dept. of Computer Science and Engineering
DR. SREYASEE DAS BHATTACHARJEE	Dept. of Chemistry
DR. DONNA FABRY	School of Nursing
DR. MINGCHEN GAO	Dept. of Computer Science and Engineering
DR. JOHANNES HACHMANN	Dept. of Chemical and Biological Engineering
DR. ALAA ELDEEN HASSAN ALI	Dept. of Mechanical and Aerospace Engineering
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DR. ELIZABETH WOHLFERT	Dept. of Microbiology and Immunology
DR. MICHAEL YU	Dept. of Biological Sciences

WHERE ARE THEY NOW?

An Update On Previous CSTEP Summer Research Interns

First Name	Last Name	Summer Research Program Year	UB Major(s)	Where are they now?	What's their title?
Brianna	Acheampong	2007	Electrical Engineering	City of Monroe (North Carolina)	Engineer
Frank	Acheampong	2007	Pharmacy	UMass Memorial Medical Center	Clinical Pharmacist - Informatics
Geraldene	Agbasionwe	2007	Pre-Pharmacy	Live Good Pharmacy INC	Supervising Pharmacist
Ernestine	Brown	2007	Nursing	University of Rochester Medical Center	Nurse Practitioner
Dr. Corie	Ellison	2007	Pharmacology & Toxicology	Procter & Gamble	Toxicologist
Moses	Farley	2007		PPL Corporation	Engineer
Mark	Glasgow	2007	Biotechnology	Univera Healthcare	Business Process Intelligence Analyst
Dr. Richard	Linares	2007		Completed doctoral studies at SUNY at Buffalo in Mechanical and Aerospace Engineering	Aerospace Engineering
David	Louis	2007	Psychology	Canarsie Recovery Coalition	Project Director
Shiny	Thomas	2007	Pharmacy	CVS Pharmacy; Touro College	PharmD
Kevin	Bryant	2008	Electrical Engineering	Bechtel Plant Machinery, Inc	Electrical Engineering Project Manager
Toni-Shay	Chandon	2008	Pharmacy		PharmD
Dr. Daivon	Garrick	2008	Pharmacology & Toxicology	M&T Bank	VP Credit Risk Analyst
Marda	Hailu	2008	Biological Sciences	Western New England University College of Pharmacy	
Dr. Jessica	Isaac	2008	Pharmacy		PharmD
Dr. Aggrey	Jacobs	2008		UB school of engineering	Doctoral Student
Anthony	Jones	2008	Biomedical Sciences	UB Jacobs School of Medicine and Biomedical Science	Doctoral Student
Micah	McCurty	2008	Exercise Science		DPT
Hieu	Nguyen	2008	Biochemistry	UB Dental School	Dental Student
Wilberforce	Osei	2008	Chemistry/ Pharmacology		PharmD
Francis	Perez	2008	Chemical & Biological Engineering	Completed MS in Chemical Engineering from SUNY at Buffalo	Chemical Engineer
Souleymane	Sow	2008	Aerospace Engineering	Completed MS in Aerospace Engineering from Purdue University	Aerospace Engineer

Dr. Franklin	Yeboah	2008	Medical Technology	Massachusetts College of Pharmacy and Health Sciences	PharmD
Dr. Hans	Boateng	2009	Biomedical Sciences	Riverside Health System	PharmD/MBA
Corinna	Joseph	2009	Engineering	Bechtel Marine Propulsion Corporation (Bechtel Plant Machinery Inc.)	Engineer
Dr. Jean	Mandat	2009	Psychology	New York College of Osteopathic Medicine	Medical Doctor
Dr. Jasmine	May	2009	Biological Sciences	Completed MD/PhD at Northwestern University	Medical Student
Christopher	Williams	2009	Engineering	Lam Research Corp./ IBM Corp.	Field Service Engineer II, (FSE)
Bruck	Adam	2010	Mathematics	IPRO, NYS Department of Health, Office of Quality and Patient Safety, Bureau of Health Informatics	Data Analyst
Dr. Priscilla	Adjei-Baffour	2010	Pharmacy	Marshall University School of Pharmacy	PharmD
Chiamaka	Agbasionwe	2010	Biological Sciences	Biological Department	PharmD
Derek	Brim	2010	Engineering		Engineer/Professional Football Player
Joseph	Diehl	2010	Civil Engineering	MS Department of Civil, Structural, and Environmental Engineering, SUNY at Buffalo	Engineer
Ian	Duncan	2010	Mechanical Engineering	Suspension & Steering Dynamics at Honda R&D	Engineer
Christina	Garcia	2010	Biomedical Sciences	Ross University	Medical Student
Ron	Heichman	2010	Engineering	University at Buffalo	Mechanical & Aerospace Engineering PhD Student
Thao	Nguyen	2010	Engineering	University of Rochester	Engineer with Panasonic
Dr. Adonis	Pimienta-Penalver	2010	Aerospace Engineering	Completed doctoral studies at UB	Doctoral Student
Antonio	Upia	2010	Completed MS Engineering	Mass Electric Construction Co.	Electrical Field Engineer
Keelan	Chu For	2011	Mechanical and Aerospace Engineering	University at Buffalo	Engineer with Moog
Hector	Coco	2011	Mathematics	City of Buffalo Police Dept., JetBlue	Police Officer, Engineer
Belle	Cunningham	2011	Engineering	Pepsi	Project Supervisor
Jonathan	Feliciano	2011	Psychology	NBC Universal, Inc.	Research Analyst
Dr. Tavia	Garvey	2011	Pharmacy	Wegman Food Market	PharmD
Paul	Glenn	2011	Physics		Doctoral Student

Isabel	Gonzalez	2011	Civil Engineering	Completed MS Engineering	Civil Engineer
Richard	Hunte	2011		University of Florida	Doctoral Student
Jordan	Jorgensen	2011	Engineering	Global Foundries	Advanced Manufacturing Engineer
Gael	Lamothe	2011	Engineering	Hunter Roberts Construction Group	Assistant Project Manager
Millicent	Nwankwo	2011	biological Sciences	Shire Pharmaceuticals	R&D Global Health Economic, Outcomes Research, Epidemiology
Damian	Ogbonna	2011	Computer Engineering	Computer Science and Engineering	Graduate Student - University of Buffalo
Gino	An	2012	Biological Sciences	UB Dental School	Dental Student
Barinaepkee	Banuna	2012	Pre-Med/Biomedical Sciences	Hofstra Medical School	Medical Student
Sharece	Blake	2012	Electrical Engineering	Roswell Park Comprehensive Cancer Center	Research Associate
Nuris	De La Cruz	2012	Completed MS program	Columbia Presbyterian	Psychological Counseling
Dr. Keith	Dolcy	2012	Pharmacy	University at Buffalo School of Pharmacy	PharmD
Brandon	Durant	2012	Engineering	University at Buffalo	Graduate Student
Dr. Ashley	Narain	2012		University of Bridgeport College of Chiropractic	Doctor of Chiropractic
Dr. Khalif	Osson	2012	Pharmacy	Completed University at Buffalo School of Pharmacy	PharmD
Frank	Segui	2012	Engineering	Western Michigan University	Graduate Student, Electrical Engineering
Theresa	Yera	2012	Anthropology, Pre-Med	Syracuse University	Grad Student, Researcher
Yun	Zheng	2012	Biological Sciences	Albany Molecular Research, Inc. (AMRI)	Research Scientist I
Jonathan	Ahmedu	2013	Mechanical & Aerospace Engineering	Kohasa Engineering Company Ltd. in Port Harcourt, Nigeria; Cornell University	Pipeline Engineer; Masters student
Dr. Summar	Amin	2013	Biomedical Sciences	Completed University at Buffalo Dental School	Dentist
John	Brito	2013	Biological Sciences	Columbia University	Graduate Student
Dr. Nicholas	Costable	2013	Biological Sciences	UB Medical School	Doctor
Akeem	Francis	2013	Electrical Engineering	University at Buffalo	Graduate Student

Johnathan	Goodrum	2013	Electrical Engineering	Amazon	Software Engineer Internship
John	Habert	2013	Biological Sciences	United States Marine Corps	
Dr. Christ Ange	Katche	2013	Pharmacy/MBA	Completed University at Buffalo School of Pharmacy	PharmD/MBA
Muhammad	Khan	2013	Mechanical & Aerospace Engineering	Northrop Grumman	Reliability Engineer (Florida)
James	Lopez	2013	Psychology	Power U Center for Social Change (Miami, Fla)	Community Activist
Dr. Ayo	McKenzie	2013	Chemistry	Temple University	PharmD
Dr. Andrews	Obeng-Ayarkwah	2013	Pharmaceutical Sciences	Completed University at Buffalo School of Pharmacy	Pharmacy Student
Michael	Singletary	2013	Electrical Engineering (Mathematics-minor)	United States Army	Officer/ Helicopter Pilot
Alexandria	Trujillo	2013	Biological Sciences	University at Buffalo	PhD Student - Pharmacology & Toxicology
Dr. Uzoamaka	Aniagba	2014	Biological Sciences	Indiana University School of Medicine	Medical Resident
Warren	Barrett	2014	Chemistry	University at Buffalo School of Pharmacy	PharmD/MBA Student
Leatrice	Bennett	2014	Biological Sciences	UB School of Public Health	Graduate Student
David	Bratton	2014	Biological Sciences	Jacobs School of Medicine & Biomedical School	Medical Student
Kevin	Carpio	2014	Mechanical & Aerospace Engineering	Northrop Grumman (California)	Aerospace Engineer (Palmdale, California)
Kemji	Eke	2014	Biology	Roswell Park Comprehensive Cancer Center	Clinical Regulatory Associate
Robert	Ferguson	2014	Biology	University at Buffalo Dental School	Dental Student
Akunne	Kanu	2014	Public Health	University at Albany	Graduate Student - Public Health, Epidemiology
Jacob	Milling	2014	Biology	UB Jacobs School of Medicine & Biomedical Science	Medical Student
Abas	Omar	2014	Biology	Physician Assistant program at D'Youville College	PA Student
Austin	Price	2014	Biology	UB Jacobs School of Medicine & Biomedical Science	Medical Student
Timothy	Semon	2014	Anthropology	Marquette University	Dental Student
Hamlet	Spencer	2014	Mechanical Engineering	University at Buffalo	Completed MS program

Bethany	Walton	2014	English	University at Buffalo	Graduate Student - School of Social Work
Christina	Aponte	2015	Biomedical Sciences	Meharry Medical College School of Dentistry	Dental School Student
Kwame	Boakye-Yiadom	2015	Biological Sciences	University at Buffalo School of Pharmacy	PharmD/MBA Student
Kelly	Boamah	2015	Pharmacology & Toxicology	D'Youville School of Pharmacy	Pharmacy Student
Joaquin	Canay	2015	Biotechnology	Thermo Fisher Scientific	Graduate Student
Jennifer Lynn	Donato	2015	Biotechnology	Oishei Children's Hospital	Biotechnologist
Mark	Estudillo	2015	Mechanical Engineering	New York University	Graduate Student
Shawn	Gibson	2015	Biomedical Sciences	UB Jacobs School of Medicine and Biomedical Science	Medical Student
Hoda	Moussa	2015	Biological Sciences	University at Buffalo Law School	Law Student
Peter	Okorozo	2015	Pharmaceutical Sciences	University at Buffalo School of Pharmacy	PharmD/MBA Student
Folake	Olaleye	2015	Biological Sciences	D'Youville School of Pharmacy	PharmD Student
Oluwatosin	Oniyide	2015	Biological Sciences	Albert Einstein College of Medicine	Medical Student
Rasheen	Powell	2015	Pharmacology & Toxicology	University at Buffalo	PhD Student
Valeria	Prieto	2015	Civil Engineering	UB School of Engineering	Graduate Student
Zakiya	Rhodie	2015	Pharmacology & Toxicology	UB School of Pharmacy	PharmD Student
I'Yanna	Scott	2015	Biological Sciences	Chatham University	Graduate Student
Naza	Abdelrahman	2016	Biomedical Sciences	UB Graduate School Biological Sciences	Graduate Student
Ali	Al Qaraghuli	2016	Electrical Engineering	School of Engineering & Applied Sciences	PhD Student
Andrew	Alegria	2016	Mechanical Engineering	University of Minnesota Mechanical Engineering	Graduate Student
Barituziga	Banuna	2016	Chemical Engineering	Chemical Engineering at Cornell University	PhD Student
Emmanuel	Cott	2016	Computer Sciences	UB Dept. of Computer Engineering	Graduate Student
Abdul-Malik	Davies	2016	Chemical Engineering		
Tanahiry	Escamilla	2016	Chemical Engineering	University at Buffalo Chemical Engineering	Graduate Student
Alejandro	Falca	2016	Medicinal Chemistry	Applying to Medical School	
Jarrett	Franklin	2016	Electrical Engineering	University at Buffalo School of Engineering & Applied Sciences	Graduate Student

Chris	Gnam	2016	Mechanical Engineering	UB School of Engineering & Applied Sciences	Graduate Student
Dominique	Hickson	2016	Computer Engineering	UB School of Engineering & Applied Sciences	Graduate Student
Anna	Huang	2016	Social Sciences Interdisciplinary	Weill Cornell Medical College in New York City	Staff
Mohammed	Karim	2016	Biomedical Sciences	Jacobs School of Medicine & Biomedical Sciences	Medical Student
Jalisa	Kelly	2016	Biomedical Sciences	Jacobs School of Medicine & Biomedical Sciences	Medical Student
Kaytlan	LoCicero	2016	Social Sciences Interdisciplinary	University at Buffalo, School of Public Health	Graduate Student
Anthony	Lopez	2016	Biological Sciences	University at Buffalo Dept. of Biological Sciences	Graduate Student
Jillian	Naylor	2016	Biological Sciences	New York City	Dental Student
Aaron	Nimako	2016	Biomedical Sciences	Applying to Medical School	
Lee-Mary	Njoku	2016	Biomedical Sciences		
Ndidiamaka	Okoroza	2016	Biomedical Sciences	Drexel University	Medical Student
Iyamu	Osazuwa	2016	Electrical Engineering	UB School of Engineering & Applied Sciences	Engineer
Lucas	Rugar	2016	Civil Engineering	Completed Columbia University's Master of Management Science and Engineering program	Graduate Student
Diamile	Tavarez	2016	Biology/Biological Sciences	Weill Cornell Medicine	Research Technician
Douglas	Tsahey	2016	Biomedical Sciences	Applying to Medical School	
Marcus	Ashford	2017	Electrical Engineering	University at Buffalo	Continuing Student
Leon	Butcher IV	2017	Psychology	Accepted to Dental School	Dental Student
Kennedy	Colon	2017	Civil, Structural & Environmental Engineering	University at Buffalo	Engineer
Leonardo	Gobbato	2017	Chemical Engineering	MS University at Buffalo	Graduate Student
Blessing	Hunsu	2017	Chemistry	University of Binghamton School of Pharmacy	Pharmacy Student
Starr	Johnson	2017	Pharmacology & Toxicology	University at Buffalo	Continuing Student
Coral	Lopez-Jimenez	2017	Chemistry	University at Buffalo, GSE	Graduate Student
Neneyo	Mate-Kole	2017	Pharmacology & Toxicology	UB Jacobs School of Medicine and Biomedical Science	Medical Student
Lawrence	Owusu	2017	Chemistry	University at Buffalo	Continuing Student

Ariana	Roman	2017	Psychology	Chicago, IL	Graduate Student
Godfrey	Sakyi	2017	Electrical Engineering	University at Buffalo	Continuing Student
Sameer	Shakur	2017	Electrical Engineering	University at Buffalo	Continuing Student
Tyree	Singleton	2017	Industrial Engineering	University at Buffalo	Continuing Student
Ashley	Solomon	2017	Nursing	University at Buffalo	Continuing Student
Cassandra	Ware	2017	Computer Science & Engineering	New Era Cap	Computer Scientist
Makayla	Watson-Wales	2017	Speech & Hearing Science	University at Buffalo	Graduate Student
Annakay	Adamson	2018	Biological Sciences	University at Buffalo Master's student in Biological Sciences	Graduate Student
Gregory	Adams, Jr.	2018	Psychology	Applying to Graduate School in Public Health	
Abshiro	Ali	2018	Biology/Biological Sciences	University at Buffalo Master's student in Biological Sciences	Graduate Student
Deborah	Amponsah	2018	Pre-Law/Philosophy		Applying to graduate and law programs
Michael	Banjoko	2018	Biomedical Engineering	University at Buffalo	Continuing Student
Gerardo	Barrera Giron	2018	Environmental Engineering	University at Buffalo	Continuing Student
Kwaku	Bonsu	2018	Biological Sciences	University at Buffalo Master's in Biological Sciences	Graduate Student
Tanzania	Bussey	2018	Pharmacology & Toxicology	University at Buffalo	Continuing Student
Edgar	Claudio	2018	Pharmacology & Toxicology	University at Buffalo	Continuing Student
Temara	Cross	2018	Biomedical Sciences	University at Buffalo	Continuing Student
Chimaobi	Ezeilo	2018	Computer Sciences	University at Buffalo	Continuing Student
Jhanna	Flora	2018	Biological Sciences	University at Buffalo Master's student in Medical Technology	Graduate Student
Steven	Herrera	2018	Mechanical Engineering	UB School of Engineering & Applied Sciences, Master's Student	Graduate Student
Charitie	Hill	2018	Chemistry		Applying to Pharmacy School
Nasihah	Johnson	2018	Electrical Engineering	UB School of Engineering & Applied Sciences, Master's in Electrical Engineering	Graduate Student
Brianna	Kinley	2018	Psychology	University at Buffalo Master's student in Psychology	Graduate Student
Jessica	Maxwell	2018	Biochemistry	University at Buffalo	Continuing Student
Shelbi	Molin	2018	Political Sciences	UB Law School	Law Student
Keiona	Nance	2018	Exercise Science	UB School of Public Health/ MS Athletic Training Program	Graduate Student

Nailah	Oronde	2018	Nursing	University at Buffalo	Continuing Student
Priya	Persaud	2018	Aerospace Engineering	University at Buffalo	Continuing Student
William	Phillips	2018	Computer Sciences	University at Buffalo	Continuing Student
Elizabeth	Quaye	2018	Pharmacology & Toxicology	UB Jacobs School of Medicine & Biomedical Sciences	Postbaccalaureate Student
Aliaya	Williams	2018	Biological Sciences	University at Buffalo	Continuing Student

CSTEP 2021 SUMMER RESEARCH PROGRAM STAFF



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2021 CSTEP SUMMER RESEARCH INTERNS



2021 CSTEP Research Interns outside of Center for the Arts