PRISM
at JOHN JAY COLLEGE
PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH

Undergraduate Research CHRONICLE

2022

choose your future

challenge yourself

investigate

engage

PRISM

at JOHN JAY COLLEGE

PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH

network

inquire

examine

build connections

question

choose your future

Cover Shot:
Antibodies binding the novel coronavirus, Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2). The antibody-mediated immune response induced in vaccinated individuals can significantly reduce the severity and mortality of the COVID-19 disease. This has led to a steep decrease in human suffering and mortality rates during the ongoing pandemic.

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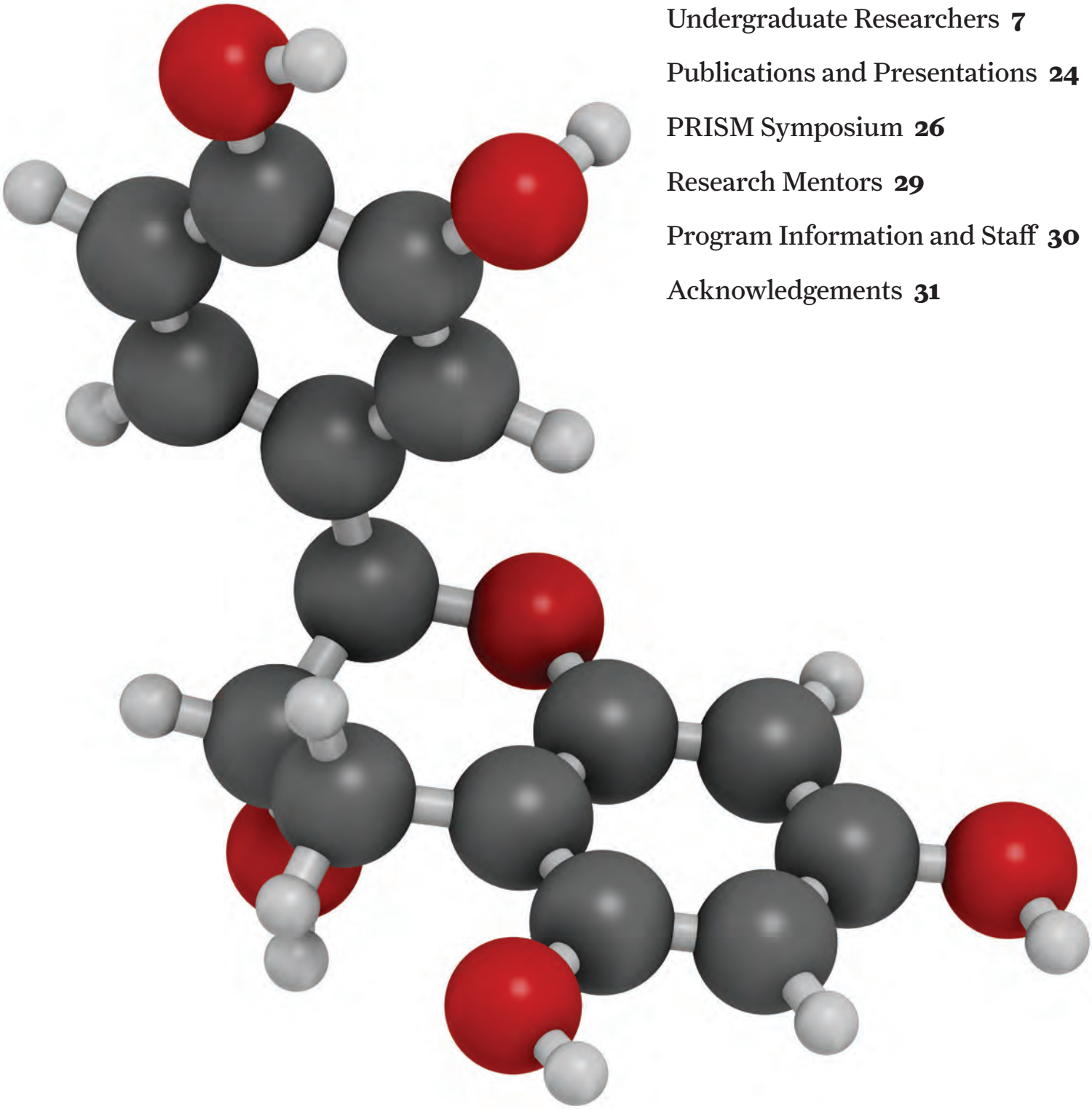
JOHN JAY COLLEGE OF CRIMINAL JUSTICE
CUNY

Contents



This publication was produced by the Program for Research Initiatives in Science and Math (PRISM) in collaboration with the Office of Marketing and Development at John Jay College of Criminal Justice of the City University of New York.
For more information please email the staff at **PRISM@jjay.cuny.edu**
or visit **www.jjay.cuny.edu/PRISM**

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>
> —Samy Gadi

> Joining PRISM and speaking to the faculty I was able to learn about various fields in this discipline like forensic anthropology and forensic pathology.
>
> —Brianna Phang

ANTHONY CARPI
PRISM Director

"A Tentative Return to a 'New Normal'"

EDGARDO SANABRIA-VALENTÍN
PRISM Associate Director

AFTER A WHOLE YEAR AWAY FROM CAMPUS, the re-opening of our research facilities this past year feels like a soothing balm. But going back to our 'old normal' is no longer the goal. This period of experimentation has allowed us to use our ingenuity and inspiration to figure out, together and with purpose, what our new normal will be. Virtual work has shown us how technology can advance collaborations. Bioinformatics, molecular modelling software, and virtual machines, among other tools, allow us to come up with new, boundary-pushing questions that we could only imagine before. Now that we can combine them with in-person work, we can push science and technology even further.

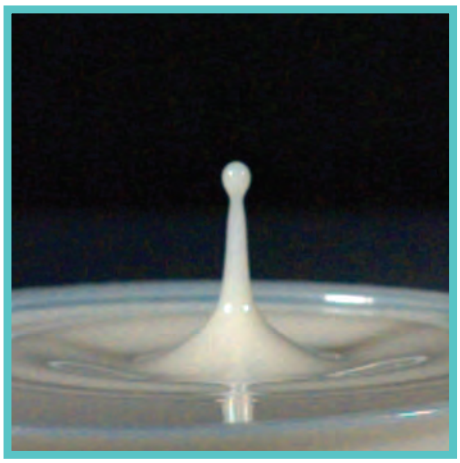
Science is inspired by the world around us. So, it is no surprise that the last two years have inspired scientific research at John Jay. Rintaro Kato (p. 14) and his mentor Dr. Angelique Corthals are involved in a project with colleagues at Yale University to look at how the morphology of bats' noses can affect how these mammals serve as a natural reservoir for coronaviruses. Because of the lab closures in 2020, our Outstanding Undergraduate Researcher Christina Gonzalez (p. 10 and 27) and her mentor Dr. Lissette Delgado-Cruzata began a new project using *in silico* molecular simulations to predict physical interactions between antioxidants derived from green tea and nucleic acids involved in the development of breast cancers. Our students' and alumni's professional aspirations have also been impacted by this period of personal exploration: Kat McKinnis (p. 18) will begin working at a biotechnology investment and advisory firm after her graduation this summer, learning how science is funded outside of academia, before applying to doctoral programs. Gabriel Gonzalez (p. 12) is leveraging his scientific training to develop YouTube content and become PRISM's first social media influencer. Samantha Vee (class of 2020) will begin doctoral studies conducting health and behavioral assessments on orangutans in human-impacted areas of rainforests in Borneo, Indonesia.

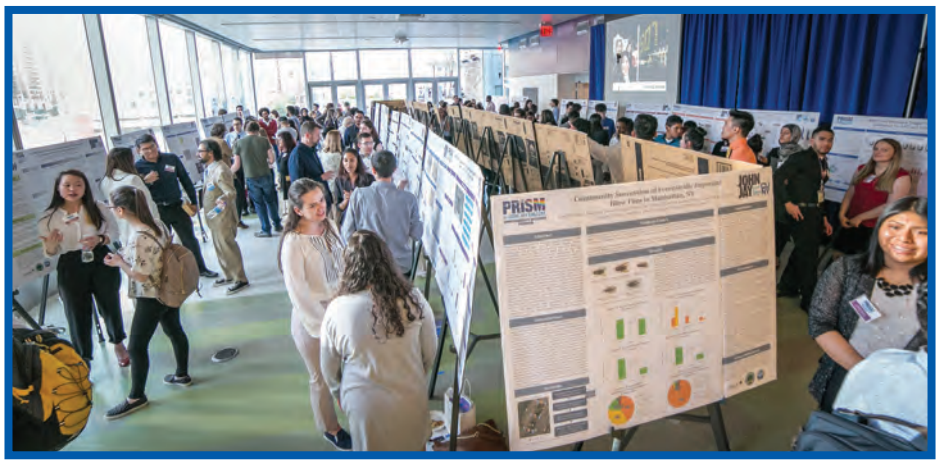
One thing that never changes is the tenacity of our students who, despite the lockdowns, Zoom fatigue, and social distancing, continue to accomplish and push the boundaries of science. Britania Walters (p. 8) was awarded the best student poster award at last fall's Northeastern Association of Forensic Science Meeting for her work with Dr. Peter Diaczuk. Their work looks at the perceptible damage caused by baton-rounds, also known as rubber bullets, used by law enforcement to target protesters and social activists. José Galván (p. 12), Kaitlyn Abshire (p. 11), and Kevin Torres (p. 15) among others, will begin graduate studies in bioinformatics, evolutionary biology, and chemistry, respectively, at institutions across the country this fall. Kimberly Nuñez (p. 15) and John Ford (p. 17) will attend summer research programs at The Woods Hole Oceanographic Institution and at Emory University, respectively.

It has been an honor and a pleasure to finally meet some of you in person over the last few months. We congratulate you on your future success and are proud of you for being FIERCE ADVOCATES FOR DIVERSITY, INCLUSION, AND JUSTICE IN SCIENCE.

“PRISM has helped me become more confident in my abilities and challenged my critical thinking skills in addition to opening different roads for me to pursue within forensics.”

—Amarelis Lava





“I plan to pursue a career in content creation and combine my love of video editing and science.”

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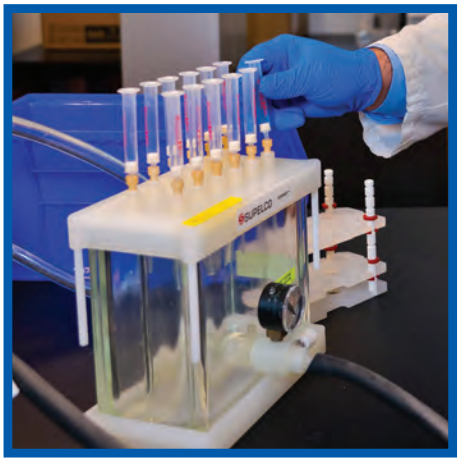


UNDERGRADUATE RESEARCHERS

John Jay PRISM Undergraduate Researchers conduct mentored research in five broad disciplines—forensic science, biomedical sciences, toxicology, organic chemistry, and computer science. Together with their Faculty Mentors, they are pushing the boundaries of science. The following pages contain more detailed information about our incredible students and the innovative research projects on which they work.

FORENSIC SCIENCES

The field of forensic science applies varied disciplines—including biology, chemistry, anthropology, and psychology—to investigate crimes related to criminal and/or civil law. A forensic scientist preserves and analyzes evidence using techniques from these scientific disciplines, while maintaining legally-mandated standards so that the evidence is allowable in court.

Criminalistics

Criminalistics uses scientific methods and principles during the criminal investigation process to analyze physical evidence—such as chemical traces, ballistic evidence, controlled substances, and marks on tools employed in a crime. PRISM students use the latest technologies to develop more sensitive methods for the detection of illicit substances and to analyze evidence found during criminal investigations.

Lessly Mendieta

Effects of Improper Handling of Prop Ammunition Used in Movies and Film (Dr. Peter Diaczuk)

In high school I was in a music program. I became interested in forensic science during my sophomore year of high school after an unfortunate event occurred; forty-three students were forcibly abducted by the local police in Iguala, Mexico on September 26, 2014. Once it came time to apply for college, I knew that I did not want to continue pursuing music. Instead, I decided to apply to John Jay's forensic science program. Transitioning from music to science was difficult at first. But after advancing through each year, my favorite classes became organic chemistry and criminalistics. I also appreciate the professional development and academic support that PRISM has provided me, along with the guidance of my mentor.

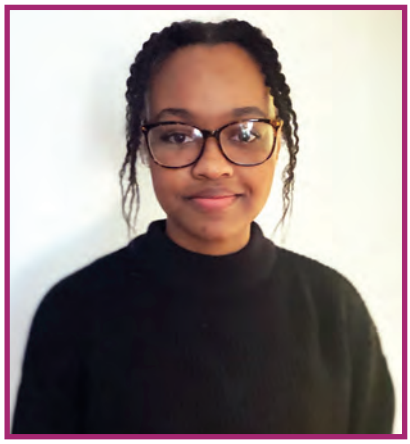
Since the 20th century, both prop ammunition and guns have been used in films and movies. Cinematographers and directors prefer to use prop guns loaded with blank cartridges to simulate the flash, noise, and recoil that a real firearm would produce. In my research, I investigate the damage that prop ammunition can create if not handled properly.

Brianna Phang

Comparing a Traditional Hollow Point Bullet to a Less Lethal Alternative (Dr. Peter Diaczuk)

Growing up I always knew I wanted to pursue science, particularly forensic science. Although this field was popularized on television, I always knew there was more to it than a rapid result closing the case. As I entered high school, I got to learn various clinical techniques such as how to draw blood, how to perform CPR, and the anatomy of the human body via multiple dissections. While taking these courses my passion for forensic science only increased. Joining PRISM and speaking to the faculty I was able to learn about various fields in this discipline like forensic anthropology and forensic pathology.

Radically Invasive Projectiles, also known as RIPs, are a new type of fragmenting, hollow point, handgun ammunition designed to create massive wounds, leading to rapid blood loss and target incapacitation. For my research, the goal is to compare the damage caused by RIPs versus less-lethal alternatives on human soft tissues.



Britania Walters

Analysis of Less-Lethal Projectiles (Dr. Peter Diaczuk)

I never had a particular interest in chemistry or biology; I was more of a math student. However, as I took more science classes in high school, I was introduced to forensic science research. Since then I have not looked back. As an undergraduate researcher, I learned how to communicate my ideas to my mentor and fellow student researchers. Also, being in PRISM and working with my mentor, an expert in his field, allowed me to become more familiar with the techniques, methods, and procedures relevant to forensic science.

My research project focuses on the different components of baton rounds, a less-lethal type of bullet. To contribute to the production and deployment of safer less-lethal ammunition, I observe the possible damage that baton rounds do to simulated body tissue.

Forensic Entomology

Entomology is a branch of biology that studies insects. Forensic scientists often use the identification of insects in or around a cadaver or other remains to determine the time of death, or whether a cadaver was moved after death. Our students are studying how environmental and ecological factors found at a crime scene affect the determination of a victim's time of death.

Amarelis Lava

Blattaria Infestation, Colonization and Connection to Injuries Postmortem/ Antemortem (Dr. Jennifer Rosati)

When young, I was obsessed with documentaries revolving around true crime and how forensics aided in crucial discoveries postmortem. I was always curious about how these discoveries were made and asked my parents questions like "how" and "why", although my parents could not give me many answers. My curiosity continued to grow, leading to my decision to pursue science to find out for myself. I want to pursue a career that involves being in the field, such as a forensic autopsy technician or a forensic medical examiner. PRISM has helped me become more confident in my abilities and challenged my critical thinking skills in addition to opening different roads for me to pursue within forensics.

My research explores cockroaches and their connection to postmortem and antemortem injuries. Since each stage of infestation and colonization takes a specific period of time, analyzing cockroach colonization and infestation patterns allows a timeline to be put together. By analyzing these patterns, a better description of cause and/or time of death can be depicted.

Lakshmi Rao

Coexistence in Carrion: How the Spatial Arrangement of Species Can Facilitate Persistence in a Resource-Limited Community (Dr. Jennifer Rosati)

I chose to study science to help me understand our world better. My goals are to develop my skills as a researcher and to gain experience and knowledge to prepare myself for a career in the laboratory. I hope that one day, my research will help our community help those that live in it. PRISM has taught me new skills that I hope I can use in the future when I design other research projects. I enjoy the support I receive from PRISM because my mentor and other students offer their guidance and teach me to become a better researcher.

I am researching the interactions between blowfly and muscid fly species to see how their relationship is affected when there is a shift in temperature. This will help us interpret the type of connection between these species and how that can influence evidence indicating the time of death of a body.

Yvonne Sandoval

Density-Dependent Effects During Larval Development of Blow Flies (Diptera: Calliphoridae) (Dr. Jennifer Rosati)

My experiences with PRISM and my involvement in the lab have helped me discover new skills and interests. I learned my passion is applying scientific knowledge to help my community. Performing undergraduate research has shown me that I can test out ideas and fill gaps in our knowledge. Through my experiences at John Jay and PRISM, I have enjoyed learning more about the world of science and the potential I have to thrive. My goal is to pursue an MD-PhD to understand how the immune system functions and to discover how components of marihuana can be used as alternative medicine.

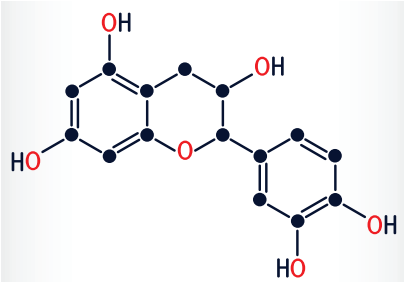
Blowfly larvae can be used to determine time of death. The objective of my research is to understand how resource scarcity (i.e., food and habitat) affects the development and behavior of blowfly larvae. This work will improve the reliability of time of death estimations based on blow fly larval development and colonization.

BIOMEDICAL SCIENCES

Biomedical scientists apply observations of the natural world along with biological and physical scientific techniques to create interventions and develop technologies that improve healthcare and public health worldwide. Biomedical sciences apply the principles of these disciplines to topics related to infectious or non-infectious diseases that affect all humans.

Cell Biology

Cell biology studies the structure and functions of cells. This discipline looks at the physiological properties, metabolic processes, signaling pathways, life cycle, and interactions between cells in an organism and between cells and their environment. At John Jay, our students are trying to understand the function of genes that control cancer development and inflammatory disorders.



Christina Gonzalez

Effect of Green Tea Catechins in the Regulation of microRNAs Important in Breast Cancer Progression (Dr. Lissette Delgado-Cruzata)

My interest in science research stems back from when I was a little girl. I was always fascinated with many different fields of sciences. I knew I wanted to be a scientist, but I never knew which type of scientist I wanted to be. Now I am a senior majoring in cellular and molecular biology and minoring in homeland security. Most importantly, I hope to use my science background to help change the world in a multitude of ways.

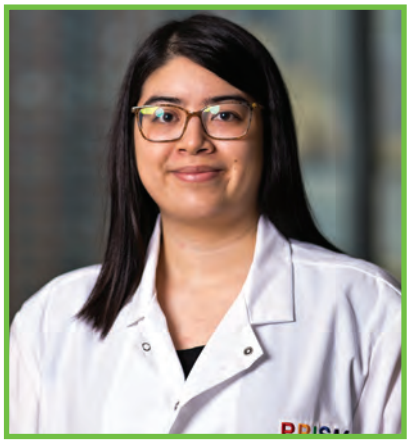
We study the interactions between microRNAs, molecules that regulate protein synthesis, and catechins, chemicals in green tea that induce cell death in breast cancer cells. By studying these interactions, potential breast cancer applications can be developed.

Genetics

Evolution results from changes in the genetic material, or genes, of a species over time. These genetic changes can provide adaptations that give an evolutionary advantage to the organism when faced with changes to its environment. Evolutionary genetics aims to identify changes in genes that lead to the evolution of species. At John Jay, our students compare the genes of primates to those of humans to understand what makes humans unique and study how urbanization affects the genetic diversity of invertebrates in NYC.

Kaitlyn M. Abshire

Geographic Isolation of Pulmonate Gastropods in the Urban Landscapes of New York City (Dr. Nathan Lents)



From the story of why vertebrate retinas are wired backwards to how fungi are more closely related to animals than plants, I never ceased to be amazed by the complex phenomena unveiled by scientific research. Gastropods are a diverse group of invertebrates found in almost every ecological niche; however, terrestrial gastropods are overlooked when it comes to research. Throughout my academic career, I aim to help unravel the evolutionary mysteries within terrestrial slugs and snails. PRISM has allowed me to become familiar with techniques relevant to evolutionary biology.

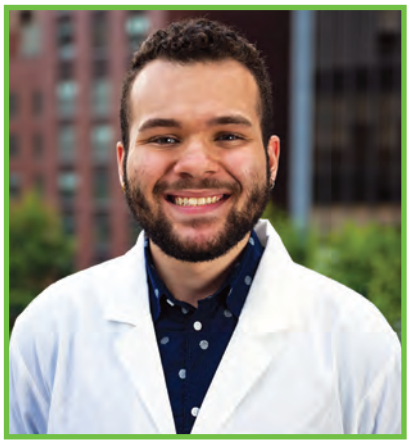
My research project examines how urbanization in New York City affects this exchange and the overall genetic diversity in populations of terrestrial snails. Urban areas are seen as a threat to biodiversity because of the high degree of habitat fragmentation caused by infrastructure, which reduces the exchange of genetic material between geographically separated populations.

Samy Gadi

Data Analysis Using Python for Identification and Evaluation of microRNA Genes in the Genomes of Ancient and Modern Primates (Dr. Hunter Johnson and Dr. Nathan Lents)

I have always wanted to learn how to conduct data analysis; I believe that it is the key to progress in most fields. Conducting research is an opportunity for me to enrich my undergraduate experience. It deepens my classroom learning, and it supports the development of my critical thinking. Once I graduate from John Jay, I plan to attend graduate school to continue my education in computer science and information security.

My research compares microRNA sequences from human genes to the genes of our closest evolutionary relatives, bonobos and chimpanzees, to understand how humans evolved. The research uses Python, a high-level general-purpose programming language, to conduct the data analysis.



José A. Galván Corona

Developing a Python Code to Uncover the Potential Evolutionary Origins of microRNA Genes in the Genomes of Ancient and Modern Primates (Dr. Hunter Johnson and Dr. Nathan Lents)

The sophistication required for our cells to communicate with each other has always boggled my mind; how can trillions of cells come together to make me? I have always been curious about how cellular mechanisms are regulated. My work in computational genomics has taught me that every cell is an immensely intricate puzzle composed of regulatory mechanisms. I plan to pursue a career where I can better study these mechanisms.

My research compares microRNA genes from the human genome to the genes of our surviving primate "cousins," as well as other extinct human species. Attempting to uncover the evolutionary origins of these genes regulating RNAs may bring us closer to understanding what makes humans unique.

Gabriel R. Gonzalez

Use of Bioinformatics to Distinguish *Homo sapiens, H. denisova,* and *H. neanderthalensis* Through the Lens of microRNA (Dr. Hunter Johnson and Dr. Nathan Lents)

Since I was a little kid, I was captivated by science. Science YouTube always caught my attention and fascinated me with science as a whole. I entered John Jay to study biology and never looked back. I plan to pursue a career in content creation and combine my love of video editing and science.

My research uses computer coding to compare microRNA gene expression in the human genome to that of Neanderthals and other primates. Our goal is to lay a foundation of information and a path for future labs to follow when looking at microRNA for gene expression in human genes.

William Higgins

The Identification and Evaluation of Orphan Genes Across Multiple Genomes through the Use of Computer Programming (Dr. Hunter Johnson and Dr. Nathan Lents)

I have lived my whole life questioning how our bodies work. Why do we get sick? How do our bodies fight these sicknesses? This curiosity fuels my love for science, more specifically biology. It has taught me that I want to pursue a PhD in a field that will help defeat chronic illnesses. Before coming to John Jay, I thought scientists worked in a lab and were always on their own. Thankfully, I have learned that being a scientist is doing research with a community of people who are interested in the same field as you, which is way better than I could have ever imagined.

My research uses computer coding to find new genes in our genome and compare them with chimpanzee and Neanderthal DNA. This will help us understand how humans evolved and how that evolution made us different from other species.

Kelliana Seeraj

Exploring Genetic Changes that Influenced Self-Domestication in Humans (Dr. Nathan Lents)

Science has always intrigued me because it provides answers to some of the most insane questions we ask. It allows for more opportunities to ask questions about life and the universe. As a researcher, I have become more patient with myself and my work. Exploring new questions and theories takes time, and the process of learning every little detail in between is beautiful. My experience in PRISM has not only improved my communication and critical thinking skills, but it has made me feel like a true scientist! I hope to obtain a PhD or MD once I graduate from John Jay.

My research compares human genes to the genes of the great apes. By looking at the human-specific changes in the genome, we hope to uncover how humans have evolved over time.

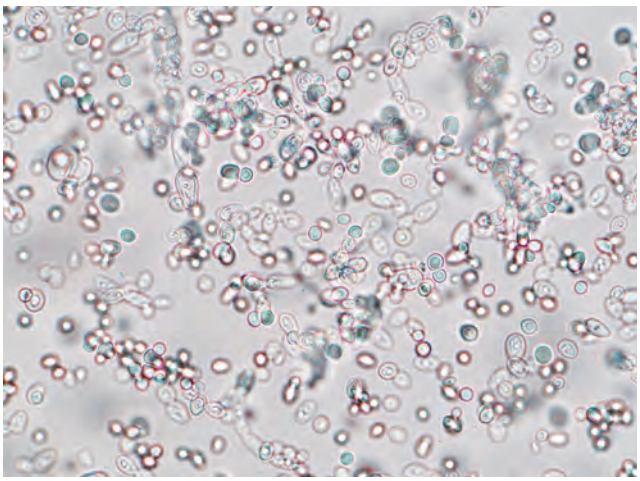
Microbiology

Microbiologists study the structure, function, and classification of microscopic organisms such as bacteria, fungi, and some parasites. The discipline also tries to understand how these microorganisms interact with humans and how they can cause, or protect us, from diseases. Our students are researching molecular processes in microorganisms that have the potential to help us find new cures to infectious diseases.

Sviatlana Filimonava

Construction of Fluorescent and Mating-Deficient *Saccharomyces cerevisiae* Strains for Biophysical Analysis of Yeast Mating (Dr. Jason Rauceo)

When I was growing up, I loved to explore the world around me. I spent every summer in the countryside observing the behavioral patterns of insects, watching their larvae grow, and making collections of bugs and dragonflies with their names identified in Latin. When I transferred to John Jay College, microbiology became one of my favorite science classes. I was lucky to join Dr. Rauceo's lab and to get quality lab training and real research experience. Being part of PRISM opened the variety of career pathways in STEM and helped me make up my mind to pursue a PhD in biological sciences.



My goal is to create a panel of genetically engineered baker's yeast strains to understand the physical forces underlying the interactions between microbes. My research can be applied to the treatment of infections caused by pathogens.

Rintaro Kato

Bat Immunity and Anatomy in SARS-CoV2 (Dr. Angelique Corthals)

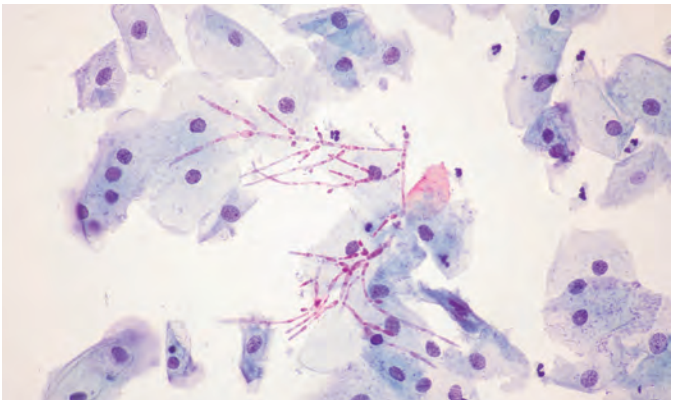
In high school, while growing up near Washington, D.C., I was exposed to a lot of the science performed by scientists at the various federal agencies in the area. This inspired me to pursue a career in science. Thanks to PRISM, I have enjoyed the extremely helpful workshops and the food. My mentors have shared their wisdom and provided me with the necessary knowledge in pathology and biomedicine to think like a researcher. PRISM has helped me determine what my academic and career goals are. As an aspiring pathologist I would most definitely like to pursue the MD/PhD or PhD route.

I joined a collaborative research opportunity in comparative nasal anatomy in bats, a likely natural reservoir for SARS-CoV2, the virus that causes COVID-19. We hypothesize that distribution of goblet cells in bats, the cells responsible for producing nasal mucus, could affect transmission of this pathogen. My role is to analyze images of histological slides from bats' noses to identify the distribution of goblet cells.

Britney Vasconcellos

Analysis of Prohibitin Ligand Treatment in the Fungus *Candida albicans* (Dr. Jason Rauceo)

I could not begin to imagine myself pursuing a career in any other field than science. My career goal has always been one in the medical field, but as I gained exposure to more science classes at John Jay, I was drawn towards the study of genetics and diseases. PRISM has provided me with the amazing opportunity to explore my interest by working in a microbiology research lab with Dr. Rauceo.



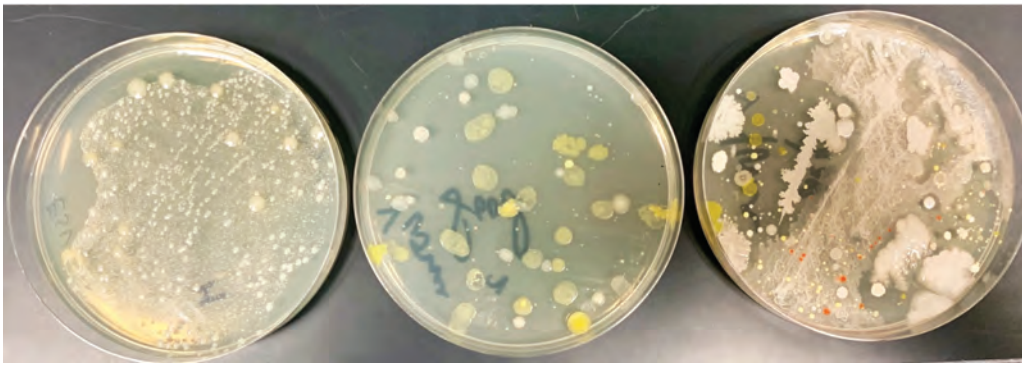
Candida albicans is a pathogen found in the human gut, oral and vaginal cavities. Our research looks at how *C. albicans* responds to chemical environmental stressors that affect mitochondrial function. The results from this research experiment can greatly enhance the future treatment of infections caused by this pathogen.

TOXICOLOGY

The field of toxicology studies the adverse effects of chemical substances on living organisms and the environment. It also concerns the detection of toxins and other harmful substances, and the diagnosis and treatment of their effects.

Environmental Toxicology

Environmental toxicology looks at how pollutants, pesticides, and some biological agents interact with the environment. PRISM students are looking at how mercury, a heavy metal that can cause severe neurological conditions in humans, is modified in the environment by physical and chemical factors that can result in this metal being present in common household products.



Kimberly Nuñez

A Biological Mechanism for the Reduction and Emission of Mercury from Soil (Dr. Anthony Carpi)

During high school, I loved my ocean science class and teacher, and wanted to continue exploring marine biology. The career exploration PRISM offers made me realize that I wish to pursue a graduate degree in marine biology so that I may work at a government or non-profit agency to ensure informed conservation policies are implemented. My research experience has taught me that science consists of the unexpected and you can never prepare for the results that you are going to get. My favorite part about my PRISM experience has been gaining more confidence in my research abilities.

My research aims to determine if microorganisms are involved in reducing and emitting mercury from soil by suppressing and stimulating them. Mercury is a global pollutant and understanding its movement in soil helps us determine what effects it has on humans and the environment.

Kevin J. Torres

Analysis of Mercury Chloride Spiked Soil Microbial Activity (Dr. Anthony Carpi)

When I began my college experience as a STEM student, I took my first general chemistry course where I was introduced to the world of science. Ever since, I have had thousands of questions as I pondered how everything we see, touch, and feel can be traced into something so small as atoms. How is it that everything we encounter daily derives from their interactions? Further, what are the limits of contemporary science and how can I build on such limits? I was intrigued and I knew that my passion for science would only grow as would my curiosity as a scientist. Next fall I will be pursuing a graduate degree in chemistry.

My research project focuses on how microorganisms that reside in soil can affect mercury emissions from contaminated soils. By observing differences in mercury emission between soils with and without microorganisms, we can see if these microbes affect the release of mercury into the environment.

Forensic Toxicology

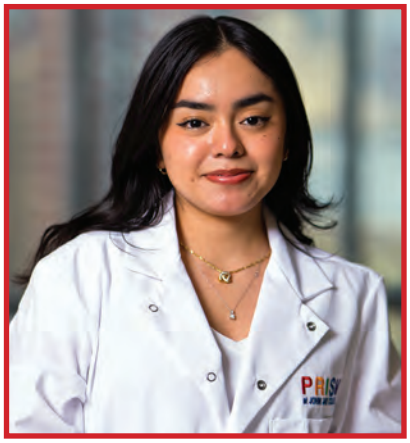
Forensic toxicology analyzes samples for the presence of toxins and illegal drugs in cases related to the judicial and medical systems. At John Jay, our students develop more sensitive methods for drug detection in biological specimens.

Daniel Aguilar

Development of a Fast and Comprehensive Procedure for the Analysis of Benzodiazepines and their Metabolites in Urine by LC-MS/MS (Dr. Marta Concheiro-Guisan)

My interest in science started to develop when I became a biology tutor my freshman year of high school. This experience helped me improve my communication skills, and it made me enjoy learning about science. I did not think another subject would stimulate me like this until I took chemistry the following year. Being able to understand the physical world and making scientific advancements by studying the infinitesimally small fascinates me. My passion for chemistry led to me enroll in the forensic science major at John Jay to acquire the necessary skills to do just that.

Using the analytical technique, LC-MS/MS, I am detecting the breakdown components of benzodiazepines, a type of drug, in urine. My goal is to develop a simplified version of existing analytical methods where the samples are prepared and processed in under 15 minutes.



Anabel Bermejo

Determination of Cannabidiol (CBD) and Metabolites in Umbilical Cord and Placenta to Detect CBD use During Pregnancy (Dr. Marta Concheiro-Guisan)

As a freshman, I failed my introductory science courses and thought of switching my major. However, I did not let failure stop me—I retook my classes and excelled. While studying for chemistry courses, I found a love for science. The more I studied, the more chemistry made sense. Science allowed me to strengthen my weaknesses and better myself as a student. Conducting research has revealed uncertainties I had as a science student. I felt vulnerable in the beginning stages and still do at times, but the more I push myself into my project the more confidence I gain as a scientist.

Cannabis use is becoming increasingly popular and cannabidiol (CBD), the second most prevalent active ingredient in cannabis, can be found in an array of products. My project is focused on cannabis and CBD use during pregnancy. We are working on a method that can extract CBD from the umbilical cord to detect prenatal cannabis exposure.

Viviana Chavez

Pharmaceuticals and Drugs of Abuse in the New York/New Jersey Harbor Estuary Water (Dr. Marta Concheiro-Guisan)

I want to be one of the scientists that helps our world be better every day by doing what I am passionate about. At first, I was not sure of my abilities to carry out a scientific investigation of anything; however, I am one of those people who first tries and then decides my path based on my experience. Working with my mentor and my peers has taught me new procedures, how to review data, and the importance of reading research papers, which have helped me to be more patient. I am sure that all that I learned in my research will help me become an excellent student in graduate school and pursue a career as a professional toxicologist.

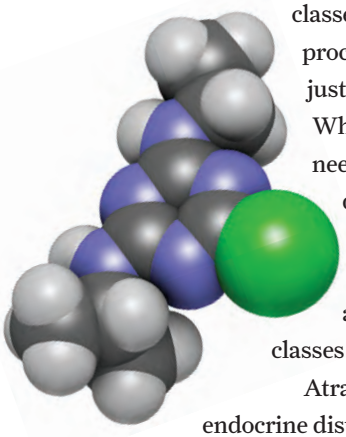
Our research work focuses on the detection of drugs, such as cannabinoids and opioids, in the New York/New Jersey Harbor to estimate the level of drug consumption in different regions. Specific areas of the city's waterways that get contaminated with wastewater from sewers are tested to see where the drugs are being used. This work will inform public health strategies to prevent the use of harmful illegal drugs.

Molecular Toxicology

Molecular toxicology studies the way that toxins work: how these toxins interact with biological molecules inside of cells and the effect of these toxins at molecular levels. PRISM students are researching how pesticides containing the heavy metal manganese affect neurons and how some psychoactive drugs are distributed throughout the body.

Antonio Aviles

Effect of Curcumin on Atrazine-Triggered NF-kappa B Activation in PC12 Cells (Dr. Shu-Yuan Cheng)



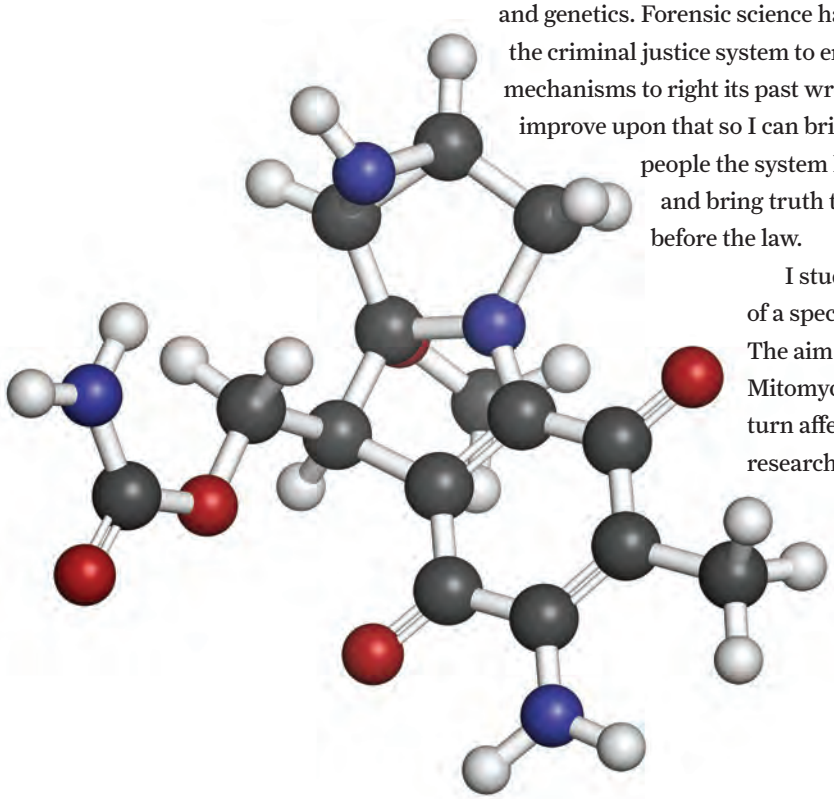
I chose to go into science since math and science were my higher-performing classes in high school. Through PRISM, I have learned about the research process as a whole and how much goes into it. I thought this would just be an extension of a normal lab class, but it is much more than that. When I first started, my hands would shake to the point that I would need to use two hands to pipette any solvent. My anxiousness has decreased a lot since I began working with my mentor. I have enjoyed the technical aspects of research the most because it is very fulfilling when you finish your experiments and feel confident about your results. I was missing this fulfillment in my online lab classes and now despite the stress, I would not want to switch back to online.

Atrazine, an herbicide that can be found in contaminated drinking water, belongs to a chemical class known as endocrine disturbers, molecules which are linked to chronic inflammation. We hypothesize that the antioxidant curcumin can nullify atrazine's inflammatory properties since curcumin is known to have anti-inflammatory properties.

John Ford

Effect of Mitomycin C on HDAC1 Expression in MCF-7 Breast Cancer Cells and K562 Leukemia Cells (Dr. Shu-Yuan Cheng)

I am an aspiring forensic science major, where I can combine my love for science with my goals of improving the criminal justice system. Forensic science has drastically evolved within the past 20 to 30 years alongside our understanding of molecular biology and genetics. Forensic science has empowered the criminal justice system to employ precise mechanisms to right its past wrongs. I hope to improve upon that so I can bring justice for the people the system has falsely convicted and bring truth to any investigation before the law.



I study how an anti-tumor drug, Mitomycin C, affects expression of a specific epigenetic modification protein, HDAC1, in *in-vitro* models. The aim of my research is to figure out how altering the dosage of Mitomycin C can modify the expression of HDAC1, and how this in turn affects cell growth in cancerous cells. The significance of my research is to give a possible avenue to help treat cancer.

Kat McKinnis

Effects of Metal Toxicity on *Drosophila melanogaster* with Genetic Predispositions to Parkinson's Disease (Dr. Jennifer Rosati and Dr. Gist Croft from The New York Stem Cell Foundation)

I was always outside as a kid, building bug houses and collecting data about the weather. I would pester everyone with "why" questions, being equal parts curious and skeptical. From research experience, I have discovered it is better to learn from mistakes than to be a perfectionist. I am considering pursuing a PhD in neuroimmunology, but I plan to work in biotech and potentially pursue a master's degree before applying to PhD programs. PRISM has challenged me to be a better researcher and to become a scientific thinker—to ask questions rather than focus solely on answers.

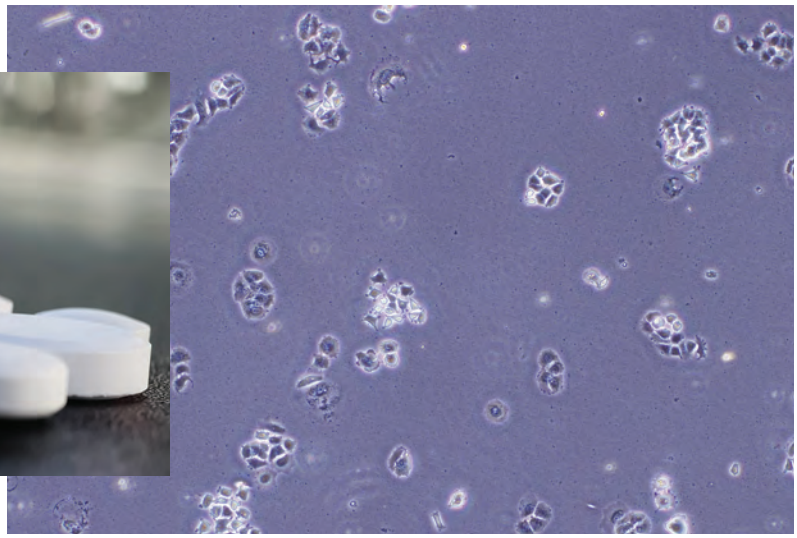
My research focuses on how exposure to metals such as aluminum and iron may affect the mechanisms of Parkinson's disease (PD). We use genetically modified flies carrying familial mutations linked to the development of PD to test the toxicity of these metals, which has been implicated in neurodegeneration. We hypothesize that it will intensify PD symptoms.

Vanietha Singh

Effect of Metformin on Cell Proliferation of MCF-7 Cells and MDA-MB-468 Cells (Dr. Shu-Yuan Cheng)

From a young age I was always interested in science and the human body. I would walk around the house with a medical kit and a white coat. I was always fascinated with how the body was able to heal itself. This interest led me to pursue a degree in science. I am currently debating whether to pursue graduate or medical school. I want to pursue a career in cardiology, conducting research on disorders and helping others in need of answers. Being a part of PRISM has taught me to challenge myself always and to assess a situation with a scientific brain.

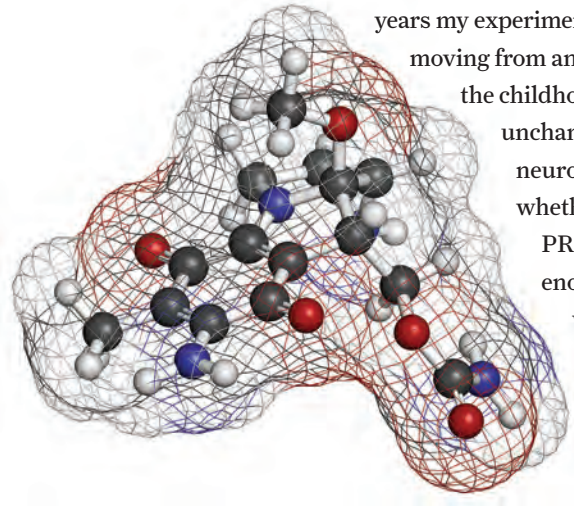
My research focuses on finding alternatives for cancer treatments. These alternatives are often hidden in drugs prescribed to help treat common diseases. Patients with diabetes are given metformin to help balance their insulin levels. We suspect that metformin also could combat cancer cells.



Hannah Tetreault

Effect of Mitomycin C and its Analog on Cell Cycle Progression in MCF-7 and MDA-MB 468 Cells (Dr. Shu-Yuan Cheng)

I loved experiments as a kid, mixing things together to try to make something new or trying to see if I could throw something at my siblings and hide before they caught me. Over the years my experiments have become more sophisticated, moving from annoying siblings to neuroscience, but the childhood fascination with experimenting is unchanged. I know I want to research neurogenetic disorders, but I have not decided whether that will be with a PhD or an MD. PRISM has helped me realize I am strong enough to handle whatever challenging work I want to pursue, and it is always okay to ask for help.



Mitomycin C and its chemical analog are two drugs used to fight off several types of cancer through different pathways. My research explores the effect these drugs have on the cell cycle, specifically the phase of the cell cycle where DNA replication takes place.

Tyra Volney

The Effects of Coenzyme Q_{10} on Reactive Oxygen Species Production Induced by Propazine (Dr. Shu-Yuan Cheng)

My path in research began by chance, and since getting involved it has pushed me to think independently, helping me realize my potential to be well-versed in several fields of science. I have also learned my way around the lab and how to use instruments that I had never used before. I aspire to become an all-rounder in the forensic science field. I hope to earn my PhD and gain a lot of experience through research. So far, being a part of PRISM has allowed me to build on my knowledge outside the classroom, formulate my own research methods, and perform hands-on experiments.

My research project aims to test whether natural antioxidant coenzyme Q_{10} reduces oxidative stress from cells affected by propazine to prevent degenerative diseases. Propazine is an herbicide frequently detected in groundwater, and has been linked to increased oxidative stress associated with these diseases.

ORGANIC CHEMISTRY

Organic chemists work with chemical molecules that contain carbon, the backbone of all biological substances. Organic chemistry looks specifically at the structure, reactivity and synthesis of these molecules. Our students are developing new reagents to run environmentally-friendly chemical reactions in the lab. They are also studying the chemistry of chemotherapeutic agents in the human body.

Melissa Rosas

Synthesis and Characterization of DNA Interstrand Crosslinks Formed by a Mitomycin C Derivative (Dr. Elise Champeil and Dr. Shu-Yuan Cheng)

Throughout high school, I was always interested in why things occur, especially why our bodies reacts a certain way after a chemical enters it. Once I entered the research field, I learned how much I enjoy hands-on technical work and connecting what I have learned from my classes to my research. After the pandemic, I did not feel prepared to go into any of my classes, but after my research experience I am more confident. I have also realized I want to go into more clinical work and focus on toxicology. After I graduate from John Jay, I hope to pursue a masters in toxicology.

Mitomycin C is a known antitumor drug. My research focuses on a derivative of Mitomycin C and how it might target cancer cells by interacting with their DNA. In the lab, we synthesize the derivatives and crosslink them to small DNA molecules to study their effects on cancer cells. Our work will help us find new ways to treat cancer.

COMPUTER SCIENCE AND SOFTWARE DEVELOPMENT

From smart phones to the "internet of things," technology plays a critical role in our lives. At John Jay, our students are improving the safety of computer networks, and developing new ways to use smart technology in our everyday lives.

Ayesha Akhter

Cyber Security and the Design of Cyber Threat Intelligence (Dr. Aftab Ahmad)

Curiosity has always led my way. As a kid, I was always deeply passionate about understanding the unknown and solving any issue, even if it was complex. Taking science courses in high school led me to pursue a career in science and technology, especially in neuroinformatics. I am majoring in computer science and information security. In the future, I would like to work in the field of neural networks to identify and manage cyberthreat intelligence. PRISM has offered me the opportunity to learn how research is performed through practice and to build a network with my teammates, mentor, and other faculty members. Also, working with my mentor Prof. Ahmad has been a great resource to gain more skills and experience in neuroinformatics.

Our work will allow us to identify and classify potential malware using neural networks to prevent cyber threats. Once a blueprint of the malware is created, it helps us define and categorize the threat. Our classification and identification will be helpful to prevent future cyberattacks.

SCIENTIFIC COMMUNICATION AND EDUCATION

It has never been more important for scientists to develop new ways to communicate their disciplines to the masses and to improve the ways we teach science. An informed populace makes better decisions, lives longer, and can lead better lives. At John Jay, our students and faculty are taking novel approaches to the teaching of physics to undergraduate students.

Justin Colón

Unmasking Physics: An Experimental Education Tool (Dr. Daniel Yaverbaum)

I fell in love with science when I was in the 6th grade. I was assigned a project on blood spatter analysis and since then, forensic science was the only career for me. As a child, I was always curious about the world around me. I asked questions to the point where people became annoyed with me but I was never satisfied with the answers; I needed more. Now as an adult, I am still not satisfied. Not only do I want to find the answers of our universe for myself, but I want to answer them for all those little kids like me. STEM education has become one of the greatest passions of my life.

My personal goals tie directly to my research. This passion project was designed to educate various age groups on selected STEM topics. A graphic novel is being created to make physics concepts like relativity and waves not only understandable, but easily accessible and fun for the public.

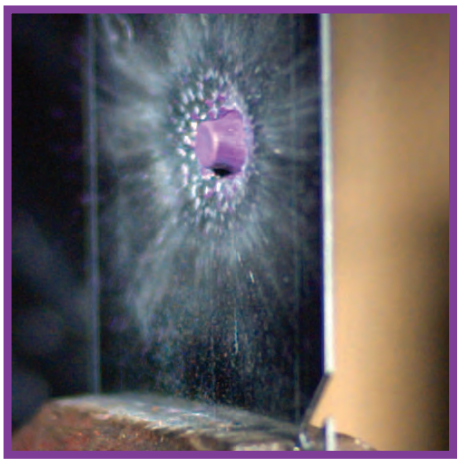
Alyssa Reynolds

Unmasking Physics: An Experimental Education Method (Dr. Daniel Yaverbaum)

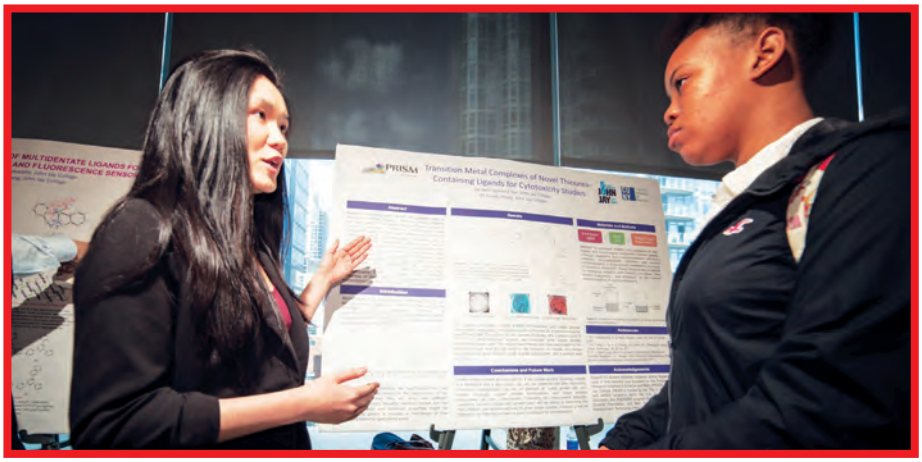
I have been interested in science for as long as I can remember whether it be observing insects and plant life in elementary school or solving physics problems in high school. Science was able to engage my critical thinking skills in ways other topics could not. My research has allowed me to gain a better understanding of how I want to impact the world through science. Working with PRISM has allowed me to understand that there are endless possibilities when pursuing a career in STEM.

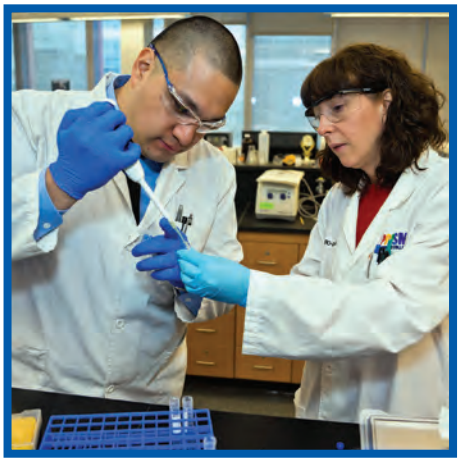
In my research project, we are focusing on new ways to teach both physics and forensic science to a wider audience and bring awareness to the world of STEM. Our goal is to educate people of all different age groups and backgrounds in a more engaging way.











> **“I appreciate the professional development and academic support that PRISM has provided me, along with the guidance of my mentor.”**
>
> **—Lessly Mendieta**

"PRISM has allowed me to become familiar with techniques relevant to evolutionary biology."

—Kaitlyn M. Abshire

PRISM at JOHN JAY COLLEGE

PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH

"As an undergraduate researcher, I learned how to communicate my ideas to my mentor and fellow student researchers."

—Britania Walters

PUBLICATIONS AND PRESENTATIONS

IN ADDITION TO OUR Annual Symposium, PRISM students regularly present their research to their peers on CUNY campuses and at scientific conferences and professional events. Below are a few of the many professional accomplishments our student researchers achieved this past academic year (2020-2021).

Publications

Centazzo, Nicole*, Michael R. Chojnacki, Joshua S. Elmore, Raider Rodriguez*, Teeshavi Acosta, Masaki Suzuki, Kenner C. Rice, Michael H. Baumann, and Marta Concheiro-Guisán. "Brain Concentrations of Methylone and Its Metabolites after Systemic Methylone Administration: Relationship to Pharmacodynamic Effects." *Journal of Pharmacology and Experimental Therapeutics* 377, no. 3 (June 2021): 398-406.

Heredia, Marienela Y*., Deepika Gunasekaran, Mélanie AC Ikeh, Clarissa J. Nobile, and Jason M. Rauceo. "Transcriptional regulation of the caspofungin-induced cell wall damage response in Candida albicans." *Current Genetics* 66, no. 6 (September 2020): 1059-1068.

Heredia, Marienela Y*., Mélanie AC Ikeh, Deepika Gunasekaran, Karen A. Conrad*, Sviatlana Filimonava*, Dawn H. Marotta, Clarissa J. Nobile, and Jason M. Rauceo. "An expanded cell wall damage signaling network is comprised of the transcription factors Rlm1 and Sko1 in *Candida albicans*." *PLoS Genetics* 16, no. 7 (July 2020): e1008908.

Mathelié-Guinlet, Marion, Felipe Viela, Jérôme Dehullu, Sviatlana Filimonava*, Jason M. Rauceo, Peter N. Lipke, and Yves F. Dufrêne. "Single-cell fluidic force microscopy reveals stress-dependent molecular interactions in yeast mating." *Communications Biology* 4, no. 1 (January 2021): 1-8.

Obaidat, Muath A., and Joseph Brown*. "Perspectives of Blockchain in Cybersecurity: Applications and Future Developments." In *Industry Use Cases on Blockchain Technology Applications in IoT and the Financial Sector*, pp. 109-131. IGI Global, 2021.

Obaidat, Muath, Joseph Brown*, Suhaib Obeidat, and Majdi Rawashdeh. "A hybrid dynamic encryption scheme for multi-factor verification: A novel paradigm for remote authentication." *Sensors* 20, no. 15 (January 2020): 4212.

Rice, Malaysha, Bokey Wong*, Mare Oja, Kelley Samuels*, Alicia K. Williams, Jenny Fong*, Anne-Marie Sapse, Uko Maran, and Ekaterina A. Korobkova. "A role of flavonoids in cytochrome c-cardiolipin interactions." *Bioorganic & Medicinal Chemistry* 33 (March 2021): 116043.

Towler, Steven*, Marta Concheiro-Guisán, Sue Pearring, and Luke N. Rodda. "Evaluation and applicability of Alere iCup DX 14 for rapid postmortem urine drug screening at autopsy." *Journal of Forensic Sciences* 66, no. 1 (October 2020): 375-382.

Zhang, Guoqi, Haisu Zeng, Sihan Li, Jahvon Johnson*, Zixuan Mo*, Michelle C. Neary, and Shengping Zheng. "1-D manganese (ii)-terpyridine coordination polymers as precatalysts for hydrofunctionalisation of carbonyl compounds." *Dalton Transactions* 49, no. 8 (January 2020): 2610-2615.

Conferences

Gonzalez, Christina*, Scarlet Cardoze, Luis Barrera*, Chanté Guy*, Yoel Rodríguez, Lissette Delgado-Cruzata. "Green tea catechins can potentially regulate miR-125b-5p in breast cancer cells." *Annual Biomedical Research Conference for Minority Students (ABRCMS)*; November 9-13, 2020.

Gonzalez, Christina*, Scarlet Cardoze, Luis Barrera*, Chanté Guy*, Yoel Rodríguez, Lissette Delgado-Cruzata. "Green tea catechins can potentially regulate miR-125b-5p in breast cancer cells." *Bronx-Manhattan STEP & CSTEP Research Expo*; April 17, 2021.

Gonzalez, Christina*, Yoel Rodríguez, Lissette Delgado-Cruzata. "Bioinformatic prediction of green tea catechin interactions with miRNAs important in breast carcinogenesis," *Westchester Undergraduate Research Conference*; April 30, 2021.

Lents, Nathan H., Hunter Johnson, Beatriz Mercado*, José Galván*, Jessica Blandino, Samantha Vee*, Willaim Higgins*. "Evolution of de novo microRNA Genes in the Human Lineage." *90th Annual Meeting of the American Association of Physical Anthropology*. Baltimore, MD; April 23, 2021.

Lents, Nathan H., Hunter Johnson, Beatriz Mercado*, Jessica Blandino, José Galván*, Samantha Vee*, And William Higgins*. "A New Approach Toward Discovering and Characterizing Orphan Genes in the Human and Neanderthal Genomes." *American Association of Physical Anthropology (AAPA)*, Los Angeles, CA; April 18, 2020.

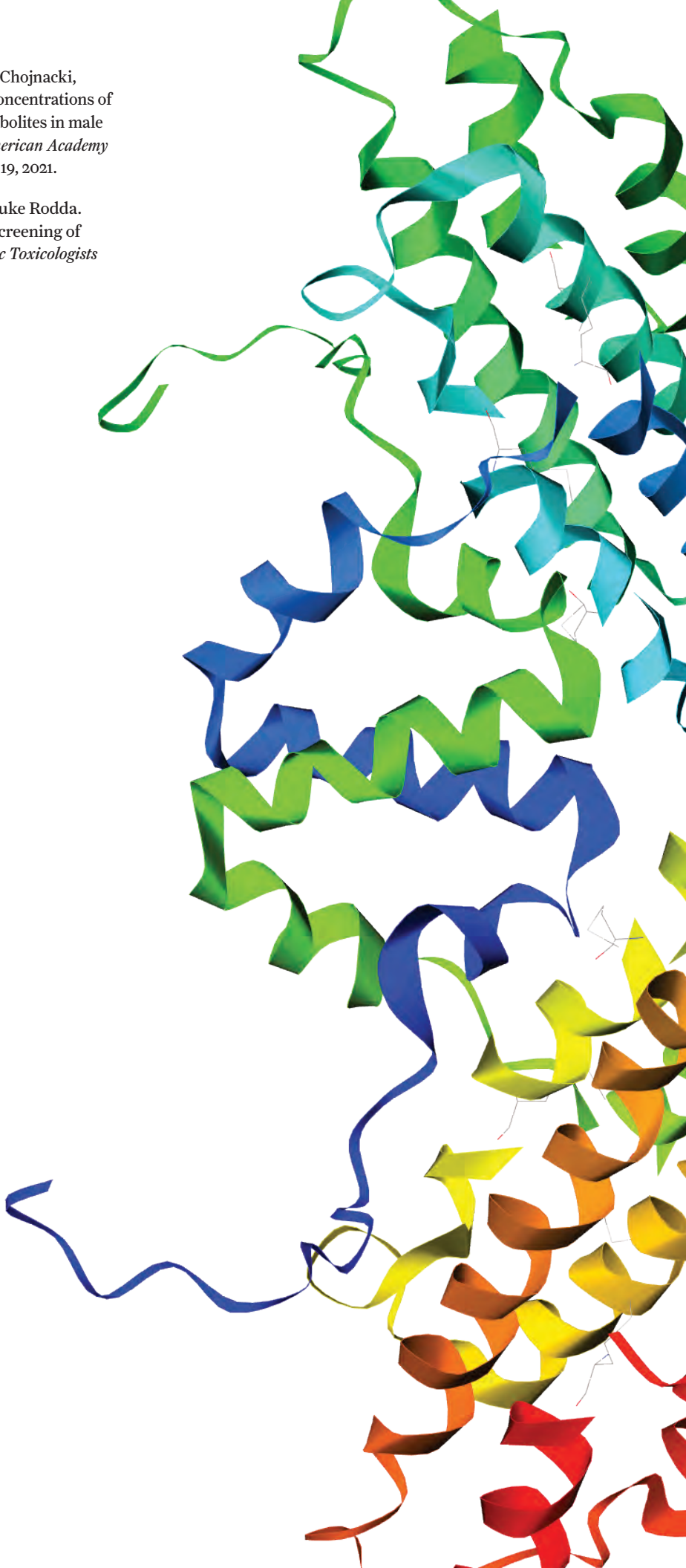
Obaidat, Muath, Joseph Brown*, and Abdullah Al Hayajneh. "Web Browser Extension User-Script XSS Vulnerabilities." *2020 IEEE Intl Conf on Dependable, Autonomic and Secure Computing, Intl Conf on Pervasive Intelligence and Computing, Intl Conf on Cloud and Big Data Computing, Intl Conf on Cyber Science and Technology Congress (DASC/PiCom/CBDCom/CyberSciTech)*, August 17-24, 2020.

Obaidat, Muath, and Joseph Brown*. "Two Factor Hash Verification (TFHV): A Novel Paradigm for Remote Authentication." *2020 International Symposium on Networks, Computers and Communications (ISNCC)*, August 17-24, 2020.

Paredes, Isaac*, and Nathan H. Lents. "An Evolution and Bioinformatics Exploration of Vitamin B12 Absorption." *Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS)*, October 22 - 24, 2020.

Towler, Steven*, Teeshavi Acosta, Joshua S. Elmore, Michael Chojnacki, Michael Baumann, Marta Concheiro-Guisán. "Brain concentrations of 3,4-methylenedioxypyrovalerone (MDPV) and its metabolites in male rats: the relationship to pharmacodynamic effects". *American Academy of Forensic Sciences (AAFS) Virtual Meeting,* February 15-19, 2021.

Towler, Steven*, Marta Concheiro-Guisán, Sue Pearring, Luke Rodda. "Evaluation and applicability of rapid point-of-care screening of postmortem urine at autopsy". *2020 Society of Forensic Toxicologists (SOFT) Meeting,* September 8-20, 2020.



***Denotes PRISM student or alumnus.**

2022 PRISM SYMPOSIUM

ESTABLISHED FORMALLY IN 2006, but building on the foundations of a program that began as early as 2000, the Program for Research Initiatives in Science and Math (PRISM) strives to promote research achievement among John Jay students and prepare them for professional careers as scientists. By establishing and supporting close mentoring relationships between students and faculty, PRISM embraces the apprenticeship model of science.

The Program not only seeks to train students in the language of science, but to immerse them in its practice. Students participate in all aspects of scientific exploration, from the formation of research questions to the presentation and publication of new research studies. Along the way, they learn from their successes, and they learn to appreciate their failures. Exposed to the culture of the scientific community, many students find themselves irresistibly drawn to the profession. To date, more than 150 students have moved on from PRISM to post-graduate training in the sciences, a path that will lead to them becoming scientists themselves.

The Annual Research Symposium is a celebration of this year's student researchers and the work that they have accomplished over the past academic year.

2022 PRISM Keynote Speaker: Dr. Lauren Weidner

DR. LAUREN WEIDNER was a PRISM undergraduate researcher from 2009 to 2010. Under the mentorship of Dr. Nathan Lents, Dr. Weidner focused on determining the role of the human transcription factor Myeloid Zinc Finger 1 (MZF-1) in hematopoiesis, the development of blood cells. Transcription factors are proteins that bind to specific DNA sequences in the cell nucleus and direct the expression of genes. At the time, Dr. Lent's lab looked at how MZF-1 affected the expression of specific genes known to be involved in hematopoiesis in the human bone marrow. During those years, she also completed her honor's thesis at the Suffolk County Crime Lab.

In 2010, after graduating from John Jay with a bachelor of science degree in forensic science and a concentration in molecular biology, Dr. Weidner began her doctoral studies at Rutgers, The State University of New Jersey in New Brunswick. At Rutgers, Dr. Weidner worked on her dissertation with her advisor Dr. George Hamilton. Her dissertation focused on the biology and ecology of forensically important blow flies in New Jersey. Through her work in Dr. Hamilton's lab, she got to study how *Phormia regina*'s development from egg to larva to fly varies geographically through New Jersey, and how day and night conditions affect the colonization of piglet carcasses by this forensically important fly.

During her training, Dr. Weidner received many recognitions and travel awards to present her work from organizations like the Entomological Society of America, the North American Forensic Entomology Association (NAFEA), and Rutgers University. In 2017 she was an Instruction Matters: Purdue Academic Course Transformation (IMPACT) Fellow at Purdue University, in West Lafayette, Indiana. As an IMPACT fellow, she worked with Dr. Trevor Stamper and focused on the development of classroom assessments for forensic entomology education, studying how incorporating active learning activities centered around inclusivity and autonomy of the students improved their academic performance.

Currently, Dr. Weidner is an Assistant Professor of Forensic Science at Arizona State University (ASU). There, she serves as the program lead of the university's forensic science undergraduate program. Her research at ASU focuses on decomposition ecology and entomology by looking at the identity and roles of forensically relevant insects in the southwestern United States. She honors PRISM's tradition of mentored research by working with undergraduate students in projects that look at the role of diet and temperature on fly development in the American Southwest. She also continues to work on improving the identification of forensically relevant insects by combining traditional morphological approaches with computerized image analysis and fluorescent microscopy.

Throughout her career, Dr. Weidner has presented her research at more than 25 conferences and has over a dozen first-author scientific publications. In 2021 she was inducted as a Member of the American Academy of Forensic Science. She is one of only 20 board-certified forensic entomologists in North America and a forensic entomology consultant for various criminal justice agencies. At the Symposium, Dr. Weidner will discuss how her John Jay experiences have influenced her professional path and her research.

2022 PRISM Outstanding Undergraduate Researcher

2022 PRISM Outstanding Undergraduate Researcher: Christina Gonzalez

This year, Ms. Christina Gonzalez has been selected as PRISM's Outstanding Undergraduate Researcher. This award recognizes the exceptional progress and the level of commitment to research displayed by one of our students, and their development as a scientist.

Christina joined John Jay as a transfer student in 2019. She was selected to be part of our Undergraduate Research Program during the spring of 2020, as CUNY underwent its first lockdown period caused by the pandemic. Prior to that, she was already working under the mentorship of Dr. Lissette Delgado-Cruzata. Their research project investigates catechins - natural antioxidants found in food and medicinal plants - and the catechins' potential role as chemopreventative breast cancer drugs. Together with other members of the Delgado-Cruzata lab and in collaboration with Dr. Yoel Rodriguez's research group at Hostos Community College, Christina is studying whether the action of catechins, commonly present in green tea, is mediated by specific microRNAs, small oligonucleotides that can control gene expression inside each cell's nucleus. The goal of their project is to better understand the mechanisms through which these compounds might impact breast cancer cells using computational models and biological experiments.

In her nomination letter, Dr. Delgado-Cruzata noted that Christina "joined my research group because she has a strong interest in clinically applied research... Due to the COVID-19 lab closures, Christina conducted a large part of her work virtually" using cutting-edge molecular modeling software. "As we returned to in person lab work, she has become very proficient in the laboratory and carries out most work independently." Dr. Delgado-Cruzata added that Christina has received various presentation awards at national research conferences "for the quality of the science presented and her ability to clearly communicate her findings and their relevance." In addition, "she is one of the authors of a research article recently accepted for publication in the journal *Bioorganic Chemistry*."

Christina, who completed her undergraduate degree last December, continues to work in Dr. Delgado-Cruzata's lab. During her time at John Jay, she has also been committed to working with younger scholars and mentoring high school and other undergraduate students interested in research. She will be applying to medical school in the upcoming year.

The PRISM Outstanding Undergraduate Researcher Selection Committee evaluates nominees based on their research mentors' nomination letters, as well as their current research progress. Reaching a decision is never a simple task as all nominees demonstrate outstanding research skills. In addition, each mentor submits a nomination letter that is not only impressive but also heartfelt, highlighting the close working relationship between mentor and student.

Top left: PRISM Graduating class of 2018. Top Right: 2018 Keynote Speaker Dr. Zuleyma Peralta addresses our students.

Former PRISM Symposium Speakers and Outstanding Undergraduate Researcher Award Recipients

2021
Keynote: Eugene Gonzalez-Lopez, PhD (Penn State University School of Medicine)
John Jay classes of 2012 (BS) and 2014 (MS)
Award Recipient: The Entire Class of 2021

2020
Keynote: Olivia R. Orta, PhD (Harvard University)
John Jay Class of 2007
Award Recipient: Alejandro Ocampo, currently at John Jay College

2019
Keynote: Roselynn Cordero, PhD (Cornell University)
John Jay Class of 2012
Award Recipient: Marienela Heredia, currently at University of Wisconsin at Madison

2018
Keynote: Zuleyma Peralta, PhD (Icahn School of Medicine at Mount Sinai)
John Jay Class of 2009
Award Recipient: Lisset A. Duran, currently at Princeton University

2017
Keynote: Christopher Pedigo, PhD (Yale School of Medicine)
John Jay Class of 2009
Award Recipient: Ronal Peralta, currently at University of Pittsburgh School of Medicine

2016
Keynote: Anastasiya Yermakova, PhD (University at Albany's School of Public Health)
John Jay Class of 2008
Award Recipient: David Rodriguez, currently at BASF

2015
Keynote: Daniel Cocris, DMD (Rutgers School of Dental Medicine)
John Jay Class of 2006
Award Recipient: Yessenia Lopez, currently at Weill Cornell Graduate School of Medical Sciences

2014
Keynote: Alison Keenan, PhD (University of CA-Davis)
John Jay Class of 2007
Award Recipient: Eugenia Salcedo, PhD, currently at IAVI

2013
Keynote: Lisa DeWald, PhD (Stony Brook University)
John Jay Class of 2004
Award Recipient: Anna Stoll, currently at Michigan State University

2012
Keynote: Damon Borg, PhD (St. John's University)
John Jay Class of 2005
Award Recipient: Roselynn Cordero, PhD, currently at 3M

2011
Keynote: Kimberly Papadantonakis, PhD (California Institute of Technology)
John Jay Class of 2002
Award Recipient: Richard Piszczatowski, currently at Albert Einstein College of Medicine

2010
Keynote: Julie Layshock, PhD (Oregon State University)
John Jay Class of 2005
Award Recipient: Jason Quiñones, PhD, currently at Synchrogenix, a Certara company

2009
Keynote: Bladimir Ovando, PhD (SUNY—Buffalo)
John Jay Class of 2002
Award Recipient: Kana Noro

2008
Keynote: Marcel Roberts, PhD (Boston College)
John Jay Class of 2002
Award Recipient: Nicole DeLuca

RESEARCH MENTORS

Faculty Member	Area of Expertise
Aftab Ahmad, DSc	Object-oriented programming, computer architecture, and data communications and forensic security
Anthony Carpi, PhD	Environmental chemistry and science education
Leslie Chandrakantha, PhD	Statistics, regression analysis and logistic regression, time series analysis, and computer simulation
Elise Champeil, PhD	Synthetic chemistry and bioorganic chemistry
Shu-Yuan Cheng, PhD	Toxicology, pharmacology, molecular biology, and neuroscience
Marta Concheiro-Guisan, PhD	Forensic and clinical toxicology
Angelique Corthals, PhD	Pathology, biomedical and physical anthropology, and archeology
Lissette Delgado-Cruzata, PhD, MPH	Epigenetics and cancer epidemiology
Peter Diaczuk, PhD	Ballistics, trace analysis, blood splatter, microscopy, image analysis, and evidence examination.
Artem Domashevskiy, PhD	Biochemistry, biophysics, and molecular biology
Sam Graff, PhD	Computer science
Yi He, PhD	Analytical chemistry and environmental sciences
Shweta Jain, PhD	Wireless and social networks and delay tolerant networks
Hunter Johnson, PhD	Mathematical logic
Matluba Khodjaeva, PhD	Cryptography; security and privacy; securely outsourcing computations to the cloud
Ekaterina Korobkova, PhD	Biochemistry, biophysics, and physical chemistry
Thomas Kubic, JD, PhD	Light and electron microscopy, vibrational spectroscopy, and image analysis to physical evidence examinations
Nathan Lents, PhD	Cell biology, forensic biology, genetics, and bioinformatics
Richard Li, PhD	Forensic DNA analysis, forensic molecular biology, and forensic genetics
Mauth Obaidat, PhD	Computer and mobile networks, wireless and mobile security, network security and forensics, IoT security and privacy
Ana Pego, PhD	Forensic, *postmortem*, and analytic toxicology.
Mechthild Prinz, PhD	Forensic biology and forensic genetics
Gloria Proni, PhD	Supramolecular and molecular chirality, optical spectroscopy, and synthesis and characterization of small molecules
Jason Rauceo, PhD	Molecular biology, molecular genetics, and mycology
John Reffner, PhD	Microscopy, molecular spectroscopy, and materials science
Marcel Roberts, PhD	Electrochemistry, spectroscopy, and analytical chemistry
Jennifer Rosati, PhD	Forensic entomology, biology, entomology, ecology, entomotoxicology, and insect behavior
Daniel Yaverbaum, MS, MPhil	Physics education and cognition, Galilean and special relativity, and astronomy
Guoqi Zhang, PhD	Inorganic/organometallic chemistry, chemical catalysis, forensic chemistry, and metallic anticancer drugs

PROGRAM INFORMATION AND STAFF

Anthony Carpi, PhD
Director &
John Jay's Dean of Research

Edgardo Sanabria-Valentín, PhD
Associate Director &
Pre-Professional Advisor

Rosemarie Chan, MA
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PRISM at JOHN JAY COLLEGE
PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH

PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH (PRISM) groups various initiatives aimed to support science and math students at John Jay College. The PRISM Undergraduate Research Program provides students with the opportunity to engage in long-term, close mentoring relationships with faculty who provide training, personal and career advisement, and professional encouragement. Our newest initiative, The Junior Scholars Program, offers academic advisement, tutoring, and professional development activities to an additional 60+ science and math students per year. In addition, we support the CUNY Justice Academy (CJA), a series of articulation agreements with partner CUNY Community Colleges, by providing academic advisement and outreach activities to CJA students transitioning to our forensic science major.

By building a relationship between the students and John Jay, PRISM has significantly reduced attrition from STEM majors and helps underserved students to see themselves as scientists, rather than outsiders in the discipline. The program relies on these relationships, as well as peer cohort building and professional development to engage students in science and prepare them for success in science careers. Importantly, it does this in an environment that explicitly considers the backgrounds of the underserved populations that participate.

Since its founding in 2006, over 325 students have participated in PRISM, of whom more than 99% graduate. More than 150 students have moved on to post-graduate programs, almost half from underrepresented minority groups and the majority of whom are women. And 65 PRISM students have gained admission into doctoral programs in STEM fields, half of whom come from underrepresented groups. PRISM has been recognized by CUNY, the National Science Foundation, and the National Academy of Sciences as a model of excellence for improving diversity in the STEM pipeline.

For more information about PRISM and our incredible students, visit:
www.jjay.cuny.edu/PRISM
Follow us on Twitter and Instagram **@JJCPRISM**

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PROGRAM FOR RESEARCH INITIATIVES IN SCIENCE AND MATH

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For information about the Program for Research Initiatives in Math and Science, please email the staff at PRISM@jjay.cuny.edu or visit **www.jjay.cuny.edu/PRISM**

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PRISM at JOHN JAY COLLEGE

or to apply to our programs, scan the QR code below!

To scan, just point your smartphone camera at the QR code, or visit

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