



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



Undergraduate Research **CHRONICLE**

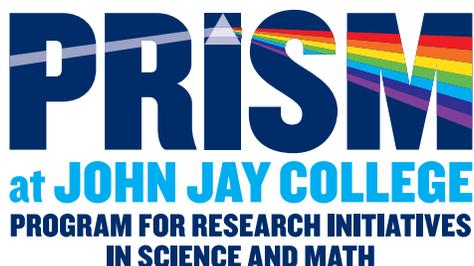
2021

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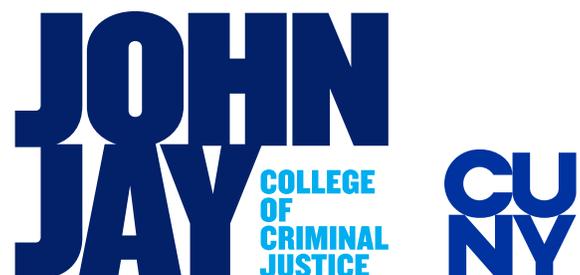
Microscopic view of the novel coronavirus, Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2). The illness caused by this virus is named coronavirus disease 2019 (COVID-19).

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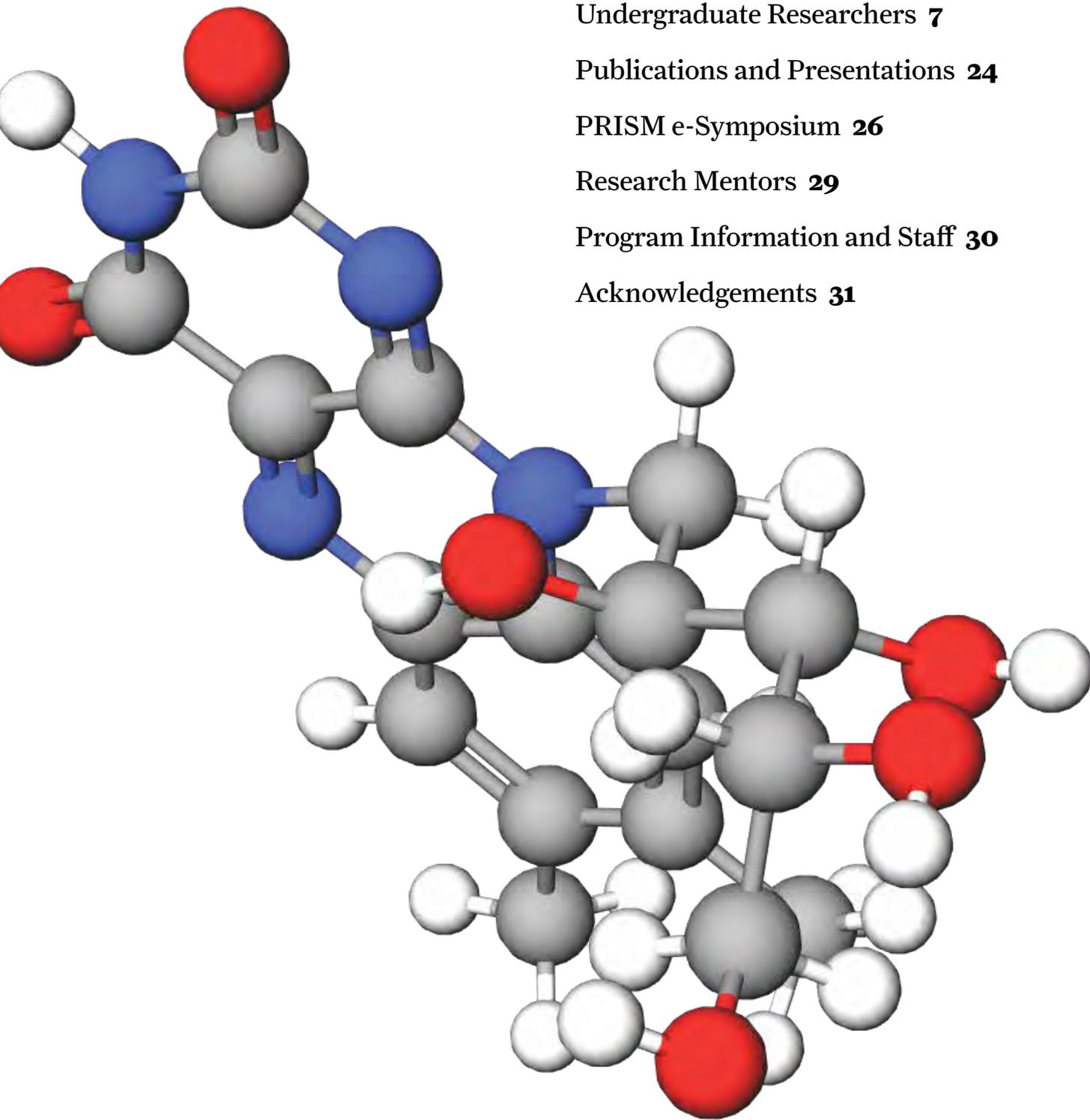
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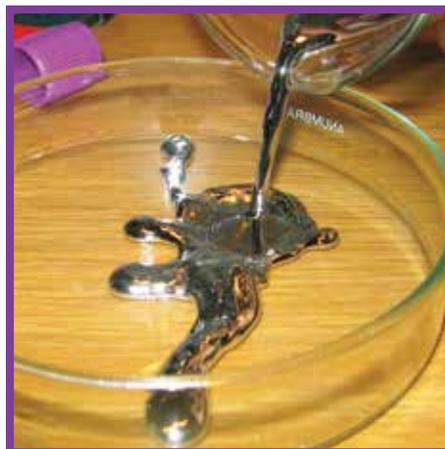
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“ Being in PRISM and working with my mentor, an expert in his field, allowed me to become more familiar with the techniques, methods, and procedures relevant to forensic science. ”

—Britania Walters



“ My experience in PRISM broadened my perspectives and gave me the opportunities to be a part of the scientific community and to learn how research can make a positive impact on society. ”

—Ai (Aila) Inaba





ANTHONY CARPI
PRISM Director

“ It is said that
“joy cometh in
the morning” and
we wait, hopeful,
for a return to a
new normal in the
days to come. ”



EDGARDO SANABRIA-VALENTÍN
PRISM Associate Director

THE PAST ACADEMIC YEAR HAS BEEN A DIFFICULT ONE for all of us, but the resiliency and grace you have shown inspires us. It is said that “joy cometh in the morning” and we wait, hopeful, for a return to a new normal in the days to come. This hope must acknowledge the hardships and sacrifices that have allowed us to continue learning, teaching, and pushing the frontiers of scientific research while we hold on to the memory of our lost ones, celebrate the recoveries, and keep in our thoughts those currently afflicted by the COVID-19 epidemic.

Although many things remain uncertain, the one thing that is clear is that you have demonstrated an outstanding commitment to your education and rising careers as science professionals. As such, this year we have decided to grant all of you our Outstanding Undergraduate Researcher Award. Why? Because throughout the uncertainty, Zoom fatigue, and the isolation of social distancing you have all risen to the challenge. You have continued to attend virtual lab meetings. You have worked on your proposals, you have gotten published in peer-reviewed journals, and have gotten jobs and secured acceptances to post-graduate programs. Frank Gutierrez (p. 16), Marina Vega (part of PRISM's Junior Scholar's Program) and PRISM alumnus, Atera Alam (class of 2020) are using their technical skills to help more New Yorkers get tested for COVID-19. Next fall, Liana Albano (p. 7), Isaac Paredes (p. 14), Andrew Candia (p. 15), Keiann Simon (p.17), Hunter Kearney (p. 20), and Rose Wong (p. 21), among others, will begin doctorate and master's programs at institutions across the US (from CUNY to the University of Washington), in fields ranging from computer science to ecology and evolution. Kat McKinnis (p. 9) will spend her summer at the Molecular Imaging Summer Program at Memorial Sloan Kettering to help her prepare for her future.

JOY COMETH IN THE MORNING, and we wait for its sunrise on a new day when we can all be together again on campus to celebrate your great achievements and to remain inspired by your dedication. As always, we remain incredibly proud of you as you develop into FIERCE ADVOCATES FOR DIVERSITY, INCLUSION, AND JUSTICE IN SCIENCE.

“ Being part of PRISM opened the variety of career pathways in STEM and helped me to make up my mind to pursue a PhD in biological sciences. ”

—Sviatlana Filimonava



“ PRISM has challenged me to be a better researcher and scientific thinker. ”

—Kat McKinnis

“ 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. ”

—Kimberly Nuñez



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.



Liana R. Albano

Analysis of Polymer-Coated Bullets Using Spectroscopic Methods (Dr. Diaczuk)

From a young age I was fascinated by science. It was always my favorite subject in school. I chose to major in science in college because of my forensic science teacher in high school. She thoroughly appreciated teaching forensic science which made me want to learn more and even pursue a career in it. From my research experience, I have learned that science is a process. There are many steps that need to be followed to produce a solution. My goals for the future are to receive a master's degree in forensic science and pursue a career as a criminalist.

Traditional bullets
leave residual lead on

impact holes. The industry now offers polymer-coated bullets, with each manufacturer using distinct polymers. When polymer-coated bullets are used, lead cannot be detected in the impact holes. I am determining the composition and properties of polymer-coated bullets by studying the residue left at impact holes. The presence of residue can link evidence from a crime scene to known polymer bullets.





Derek Casarrubias

Artificial and Natural Chamois Skin as a Human Skin Stimulant (Dr. Diaczuk)

I have always been enamored by the fact that science could be used to analyze evidence found at a crime scene. However, it was not until I saw an episode of *Forensic Files* that I knew I wanted to pursue science. In the episode, a picture containing a woman's shadow and the sun's position were utilized to determine her height. I was amazed and fascinated! Through my research in ballistics, I have learned about the interactions between a projectile, such as a bullet, and animal skin which mimics human skin. I am not entirely sure what my post-graduation goals are, but I do have an interest in attending graduate school.

Gelatin and pig skin are human tissue substitutes commonly used to study ballistic wounds. Unfortunately, these substitutes have a short shelf life. In my research, I use cost-effective artificial and natural animal skin to determine their efficiency as substitutes for human tissue.



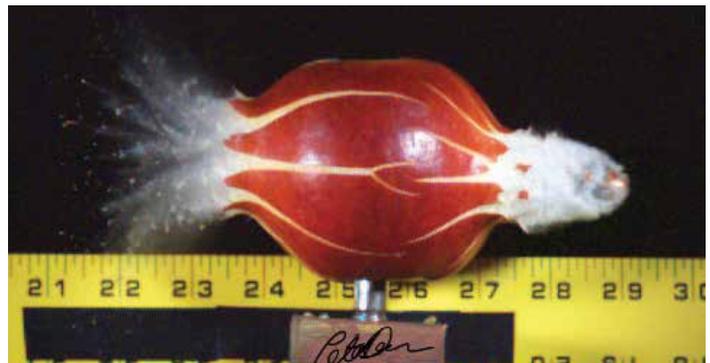
Britania Walters

Analysis of Less-Lethal Projectiles (Dr. 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 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.

Kat McKinnis

Effects of Aluminum Exposure on Recruitment Behaviors of *Monomorium Pharaonis* (Dr. Rosati)

I was always outside as a kid, building bug houses and collecting data about the weather. I would pester everyone with “why” questions. I have always been equal parts curious and skeptical, which led me to pursue science. From research experience, I have discovered it is better to learn than to be a perfectionist. I am currently in the midst of deciding between graduate or medical school. I want to pursue a career in neuroscience and work with children, doing research involving learning disorders, cognition, and behavior. PRISM has challenged me to be a better researcher and scientific thinker.

My research explores how aluminum affects ant recruitment, a form of mass communication used to find food and habitats. Observing recruitment is a way to study communication systems, memory, and developmental logic. Since aluminum is a neurotoxin, we suspect it disrupts neural pathways associated with recruitment.



Yvonne Sandoval

Density-Dependent Effects during Larval Development of Blow Flies (Diptera: Calliphoridae) (Dr. 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 marijuana 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.



Physical and Forensic Anthropology

Physical and forensic anthropology, scientific sub-disciplines of anthropology, study the biological basis of the human form and structure, as well as human behavior. This can help law enforcement identify and analyze human remains. Our students are developing or improving methods to aid in these investigations.





Hilary Menes

Structure from Motion 3D Rendering of Bone Traumas and Pathologies (Dr. Corthals)

As a child, I would bother my parents with endless questions about the world around me. I was fascinated by everything, and I would not stop asking questions until I was satisfied with the answer I received.

This curiosity led me to become an avid reader growing up, and this is what led me to the path of science. My experience in research has increased my fascination

and curiosity in the world around us. I plan to pursue a PhD in forensic anthropology. Thanks to PRISM, I am able to have hands-on experience in research.

The focus of my research is to create a software program that turns pictures of human bones into 3D models of these bones. The final program will allow forensic anthropologists to use the 3D model to quickly analyze specific features of the human bones.



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.



Luis Barrera

Investigating Mitomycin C Interactions with miRNA miR-503-5p (Dr. Delgado-Cruzata)

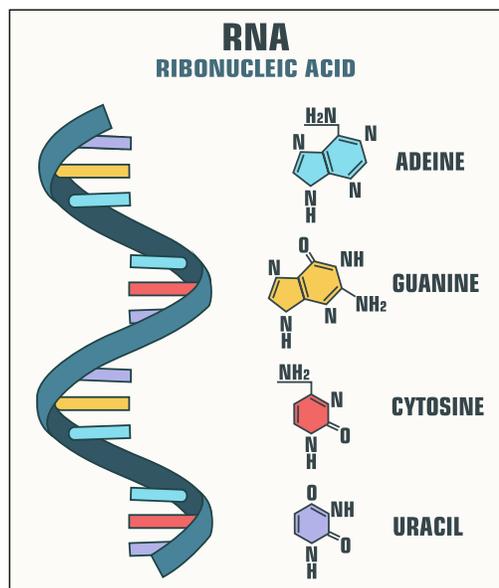
My motto has always been, "Let's try, you never know." The scientific world is exactly that, we do not know what we are going to find until we tackle it with our curious minds. Undergraduate research has allowed me to explore my curiosity in the field of biology. PRISM, along with my mentor and research partners, have encouraged me to exercise my scientific skills in a professional environment. Now, I can proudly say that I have expanded my knowledge, and it is all because I have tried it. Heading into bigger things now!

I am investigating how Mitomycin C, an antitumor chemotherapy drug, can contribute to our knowledge of how mitomycins work as chemotherapeutic drugs.



John François

Determining miRNA Levels in the Serum of Rheumatoid Arthritis Patients (Dr. Delgado-Cruzata)



Originally from St. Lucia in the Caribbean, I am a senior majoring in cell and molecular biology. Biology and math were always subjects that came easily to me growing up, so it was easy to decide what I wanted to study in college. I appreciate the fact that PRISM has provided me with first-hand research experience, and I love how eager my mentor and the PRISM staff are to support me in the pursuit of my career goals. I plan to pursue a PhD in biological sciences and eventually conduct independent research on lymphoid malignancies in the human body.



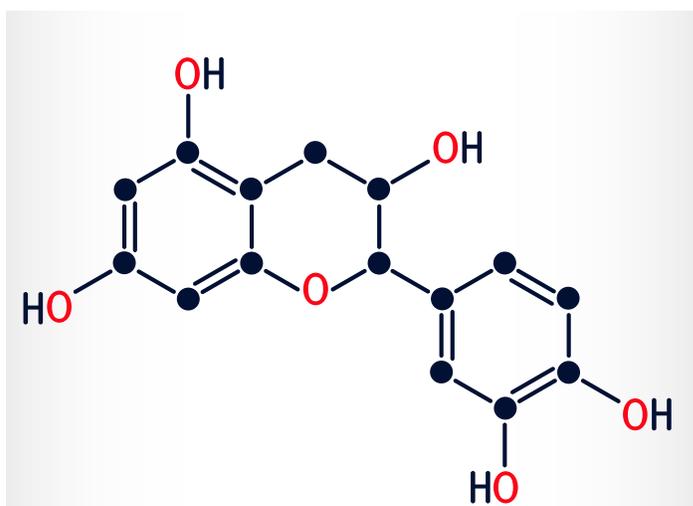
RNA molecules occur naturally in human blood. I am determining the quantities of various kinds of RNA molecules in individuals suffering from rheumatoid arthritis. This work will allow us to determine if there are specific RNAs that are involved in the development of this disease.

Christina Gonzalez

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

I am a senior majoring in cellular and molecular biology and minoring in homeland security. My interest in science research stems back from when I was a little girl. I was always fascinated with many different fields of sciences, especially biology and forensics. I always wanted to be a scientist, but I never knew which type of scientist I wanted to be. 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.





Leslie J. Ramirez-Medrano

The Growth of the MDA-MB-468, but not the MCF-7 Breast Cancer Cell Line, is Inhibited by (-)-Catechin Hydrate (Dr. Delgado-Cruzata)

My career goal is to become a physician scientist and specialize in pathology. I have learned that research can be stressful and sometimes you do not get the answer you are expecting. In my research group, we all work together to improve our critical thinking with weekly virtual meetings to peer-review articles. A memorable experience was the 2018 PRISM Symposium where the year's Outstanding Undergraduate Researcher, Lisset Duran, presented her research. I was inspired, and now I am conducting my own research with my mentor.

My research studies have suggested that consumption of green tea, which contains catechins, may prevent breast cancer development. Multiple studies have investigated the effect of the catechin, ECGC, but fewer experiments have investigated how exposure to another catechin, (-)-catechin hydrate, can affect the growth of breast cancer cell lines, MDA-MB 468 and MCF-7.

Biochemistry

Biochemistry, also known as biological chemistry, looks at chemical processes at the molecular level in living organisms. Biochemists often use chemical and biological techniques to understand health and disease and/or develop technologies. At John Jay, our students use biochemical methods to develop inhibitors of potent poisons.

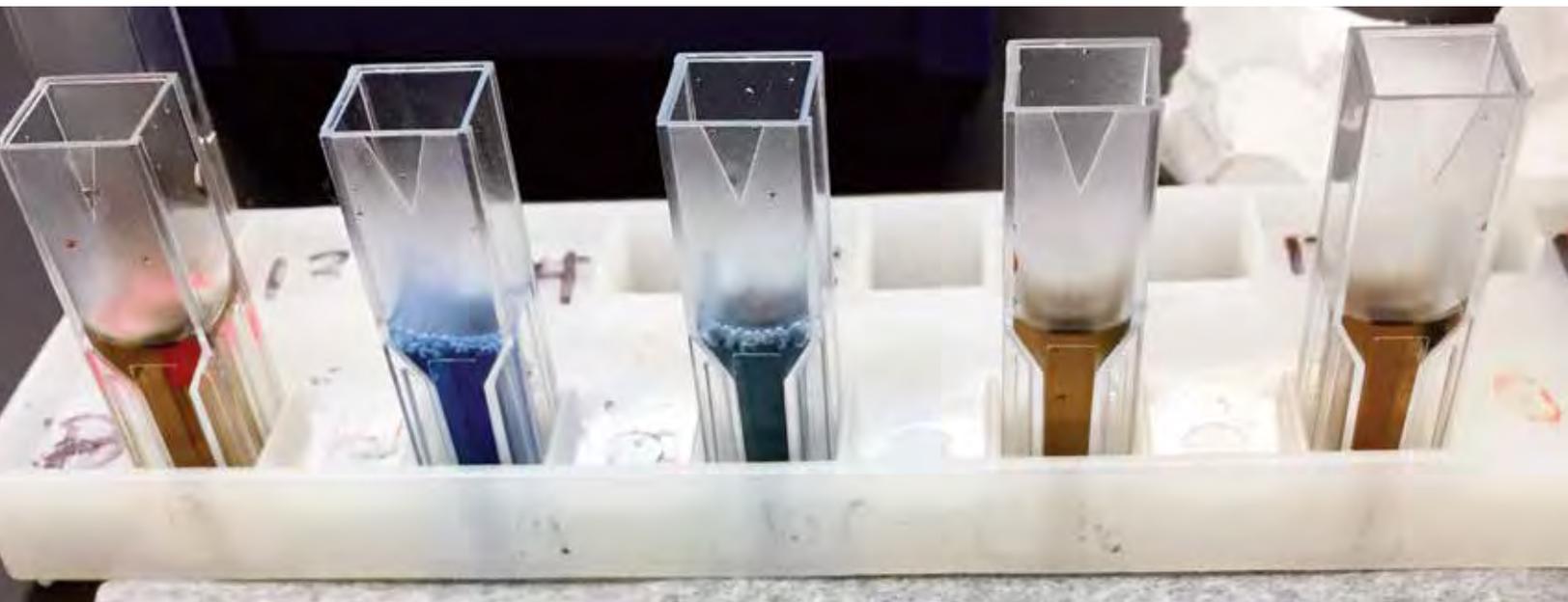


Ai (Aila) Inaba

Inhibition of Ricin Toxin: Development of a Novel Peptide Inhibitor, Derived from Potyvirus Genome-Linked Protein (VPg) (Dr. Domashevskiy)

When I first learned about viruses, I was amazed by their lifecycle, structure, and obligate-intracellular nature. Later when I learned about the Zika virus, I strongly felt the need to study virology to find a solution. Thus, I decided to pursue a career in science. My experience in PRISM broadened my perspectives and gave me the opportunities to be a part of the scientific community and to learn how research can make a positive impact on society. I hope to become a university professor to conduct my own research and mentor minority students including women, mothers, and international students.

Ricin is a toxin that is lethal to human beings in small amounts. My research focuses on understanding the inhibitory effect of a potyvirus-derived viral genome-linked protein (VPg) on ricin. The long-term goal of our project is to construct a synthetic version of VPg to act as an optimal inhibitor against the ricin toxin.



Evolutionary 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.

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. Lents and Dr. Johnson)

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 gene regulating RNAs may bring us closer to understanding what makes humans unique.



William Higgins

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

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.





Isaac Paredes

An Evolutionary and Bioinformatics Exploration of Vitamin B12 Absorption (Dr. Lents)

The individuality of members within and across species has always perplexed me. This is why I chose a career in science so that I could learn what lies behind every corner of life. Throughout my research in epigenetic and neuroscientific studies, what sticks out the most is the amount of patience necessary for any scientific process. I want to work in an environment that welcomes questions of all sorts; which is why I aspire to pursue a PhD in evolution and ecology with the intent to eventually become a professor and research conservation ecology.

Vitamin B12 is created by the bacteria in our gut. My research project focuses on finding out, evolutionarily, when humans became unable to absorb the vitamin B12 created by this bacteria. Our research goal is to better understand the dietary requirements of humans that can help them lead more healthy lifestyles.



Kelliana Seeraj

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

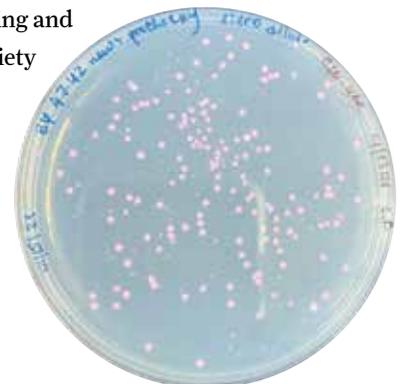


Sviatlana Filimonava

Construction of Fluorescent and Mating-Deficient *Saccharomyces cerevisiae* Strains for Biophysical Analysis of Yeast Mating (Dr. 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 to 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 for the treatment of infections caused by pathogens.



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.

Andrew Candia

Examination of Mercury Levels in Multiple Brands of Cat Food (Dr. Carpi)

Life can work in mysterious ways. For me, middle school science was the bane of my existence. That feeling stuck with me until high school. I found solace when I met both peers who shared their experiences, and my mentor who started my passion towards



understanding the unknown. My dream then was to follow my middle school teacher's words and try to enter the science realm, but John Jay did more. Now I am a passionate student of chemistry. The PRISM staff has encouraged and supported my academic journey and introduced me to my mentor who helped in my chemistry pursuits.



My work is centered on measuring the amount of mercury present in different fish-based brands of cat food. While fish are known to accumulate mercury, the level of contamination in cat food is not known and, if high, might represent a significant danger to household cats.

Kedwin Gabriel Melendez

Mechanism of the Inhibition of Mercury Emission from Soil by Humic Acid (Dr. Carpi)

Since I was a child, I have always been fascinated with how things work. I can remember always asking my parents how things worked and why. Through science, I am able to discover the answer to these questions that no one has been able to answer for me. Through my experience, I have learned that research takes time and dedication. Even after being in the lab for hours, I have barely scratched the surface and have more questions than answers. As a result of my experience with research, I want to get a PhD, and make discoveries of my own.

I am looking at how humic acid, an organic compound in the soil, can help prevent the release of mercury from the soil into the air. Since mercury is toxic to humans, learning how humic acid works can potentially help prevent the release of mercury from the soil.





Kimberly Nuñez

The Effect of pH on Soil Mercury Emissions (Dr. Carpi)

My fourth-grade science teacher made science incredibly fun for me, particularly when I dissected owl pellets and learned about seed dispersal. Because of her, I wanted to dedicate my life to science and learning more about the natural world. I also loved my high school ocean science teacher and wanted to continue exploring the different aspects of the environment, which is why I want to go into conservation ecology. 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 research project focuses on the effect of pH on the amount of mercury that is released from soil. By studying the factors and mechanisms that affect mercury emissions, we can decrease the amount of mercury released into the atmosphere, and minimize its

negative effects on humans and 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. 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 benzodiazapines, 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 min.



Frank Martin Gutierrez

Development of an Analytical Method for the Determination of Cannabis Exposure During Pregnancy (Dr. Concheiro-Guisan)

As a freshman at John Jay, I had dreams of becoming a forensic scientist, like those I had seen on television. However, through my undergraduate studies, I discovered a love for chemistry that changed my mindset regarding what a forensic scientist does. This new idea of what a forensic scientist is, combined with an interest in how drug use affects society, and a desire for change, trained my sights on forensic toxicology. Joining PRISM has allowed me to take the first steps towards my goal of becoming a forensic toxicologist, while giving me the experience to help me obtain a PhD after graduation.

The focus of my project is to determine whether or not we can detect marihuana consumption during pregnancy by examining the placenta. This information will be used to help evaluate whether the placenta is best for analyzing fetal marihuana exposure.

Keiann Simon

Investigation of Nicotine, Tetrahydrocannabinol (THC), and Vitamin E in E-Cigarette Liquids (Dr. Concheiro-Guisan)

I am dedicated to studying forensic science because of personal observations regarding the lack of proper evidence analysis, and the part it plays in the disruption of justice in my home country, Guyana. The procurement of a PhD in toxicology and pharmacology will allow me to achieve my full academic and professional ambitions to improve the forensic system of South America and the Caribbean. My PRISM experience and participation in undergraduate research allow not only for the acquisition of new knowledge in science, but also the application of science for the improvement of health and wellness in society.

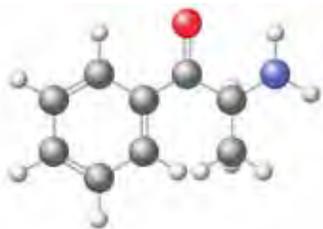
My research project develops a method to isolate and study the components of e-cigarette liquids, specifically Vitamin E, nicotine, and tetrahydrocannabinol (THC), a component of marijuana. Because vaping delivers higher concentrations of these components compared to traditional consumption methods, there is a greater likelihood that the components in e-cigarettes will increase the rate of degeneration of the brain and lungs.



Steven Towler

Development and Application of an Analytical Method for the Determination of MDPV and Metabolites in Rat Brain (Dr. Concheiro-Guisan)

I never imagined pursuing a career in science growing up. This all changed when I took a general chemistry class in high school. Not only did I do well in the class but I found myself wanting to learn more. This interest further piqued the following year upon taking a forensics course. After studying forensic science in college, my fascination with the application of



analytical methods guided me towards toxicology. My experience in PRISM has solidified my career path, and has vastly expanded my abilities in the lab. I plan to pursue a master's or PhD after my undergraduate studies.

In my project, we are developing a new method to measure the concentrations of synthetic cathinones, a category of drugs commonly known as “bath salts,” in brain tissue samples. To do this, we use brain tissue extracted from lab rats that were previously administered varying doses of a cathinone. Our work will provide insights into how these new types of drugs are processed by the body.



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.

Samara Pettie

Epigenetic Modification by Mancozeb in Astrocytes and PC12 Cells (Dr. Cheng)

I chose science as a major because of my fascination with the brain and all of its unknown properties and capabilities. From my research experience, I have learned that consistency and inquisitiveness are essential to the scientific process. In the future, I plan to attend medical school to pursue a career in neurosurgery. The most enjoyable part about my PRISM research experience is having a mentor who is passionate about her research and pushes me to think more critically.

My research examines the effects of low doses of the pesticide, mancozeb, on brain cells. This study will help us further understand how low doses of this pesticide leads to neurological disorders, such as Parkinson's Disease.



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.



Jahvon Johnson

Development of Non-Precious Metal Catalysts Using Organic Chemical Synthesis (Dr. Zhang)

My passion for science ironically started out of boredom in my elementary school science class. I made the decision to pick up a random textbook. I was immediately enthralled by the boundless ideas contained within, even though I could not understand most of the book. Driven to accumulate knowledge, I took more and more science classes until I found myself at John Jay, and eventually PRISM. PRISM has allowed me to use what I have learned to assist in my mentor's research, while also learning new things as well. I plan to pursue a PhD after my undergraduate studies.

My research project focuses on using non-precious metals to create compounds that increase the speed of chemical reactions. These compounds can then be used in industrial reactions to make them more efficient and environmentally friendly.



Zixuan Mo

Unusual Earth-Abundant Metal Complexes with Redox Acting Terpyridine Ligand for Reduction Catalysis (Dr. Zhang)

All things that exist in nature appeal to me. I love to think about and explore the reasons for the existence of things as minute as the flapping wings of butterflies, or as complex as the four seasons of the earth. Science is a process of continuous discovery and exploration.

In our laboratory, I repeat the procedures, refer to the works of others, and modify the details over and over. This valuable research experience has taught

me to think objectively and from multiple perspectives, and to pay attention to every detail. I believe that it will help me succeed in graduate school.

For my research, I am making a compound that will speed chemical reactions and can be used as a catalyst for drug production. This is important because it can make the discovery of new drugs faster.



Vishal D. Persaud

Analysis of ATP and Its Derivatives in Honey using High Performance Liquid Chromatography (Dr. Proni)

As a middle school student, I remember going to the interactive science museum and being able to complete a simple experiment of extracting DNA from a strawberry. At that time, I thought it was the coolest thing. Fast forward a few years, and I am earning a degree in forensic science. Through my research experience and PRISM, I have learned that science is not linear; ideas tend to circle back on themselves, and often used to understand the bigger picture. Once completing my undergraduate degree, I plan to continue my education by completing a doctoral degree.

Honey is a food that is known to have a long shelf life and knowing the shelf life of food is important for consumer safety. My goal is to identify and quantify the compounds found in honey to biochemically test its age. The methods we develop may be adapted for other foods.



Kevin J. Torres

Overview of Activity and Application of Carbon Monoxide Releasing Molecules Against Bacteria Biofilms (Dr. Zhang)

As I began my college experience as a STEM student like most, I took my first general chemistry course where I was reintroduced into the world of science. Ever since then, I have pondered thousands of questions about how can everything we see, touch, and feel be traced into something so small like atoms. How is it that everything we encounter daily derive from their interactions? Further, what are the limits of contemporary science and how can I build on such limits? I was intrigued and knew that my passion for science would only grow as would my curiosity as a scientist.

My research project aims to understand how Carbon Monoxide Releasing Molecules (CORM) can be used against clusters of bacteria (bacteria biofilm). By knowing and understanding how CORMs work, further CORM research can target antibiotic resistant bacteria.

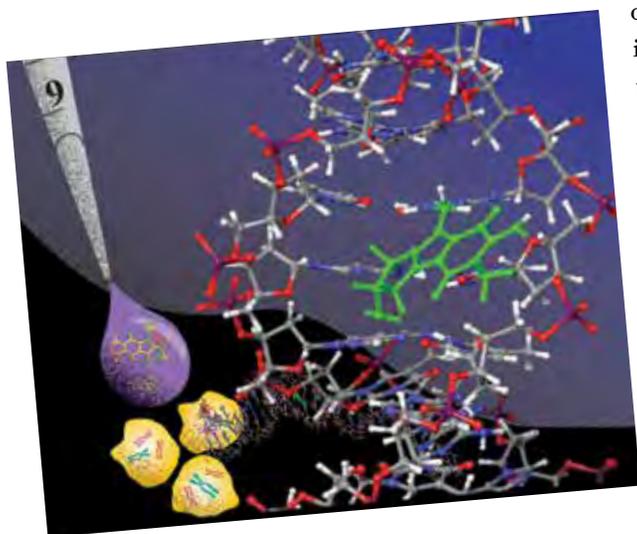


Nicholas Towler

Synthesis and Characterization of DNA Interstrand Crosslinks Formed by a Mitomycin C Derivative (Dr. Champeil)

I have always had a passion for science and understanding how things work. However, I did not know what career I wanted to pursue until my sophomore year at John Jay. Taking organic chemistry and biochemistry inspired me to pursue a career in toxicology. Joining PRISM and working in Dr. Champeil's lab helped me develop a strong interest in how drugs interact with the body and the environment, which has reinforced my decision to pursue a master's degree in toxicology.

My research focuses on understanding how a newly synthesized anti-tumor drug kills cancer cells. This drug is a derivative of Mitomycin C, a commonly used chemotherapeutic agent. Understanding how this new drug works to kill cancer cells may revolutionize the way we treat cancer and may save many lives.



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.



Jian Lim Choong

Secure Authentication and Access Control Scheme for CoAP-based IoT (Dr. Obaidat)

I chose to study computer science because I have always been interested and curious about protecting our machines. My research has taught me that technology needs to be consistently improved over time. My goal is to work in the cybersecurity field, where I can secure computer systems and prevent potential attacks. After I finished my bachelor's degree, I plan to go to graduate school in the digital forensic field.

My research focuses on securing the Constrained Application Protocol (CoAP). CoAP is used on the Internet of Things (IoT), which is widely used in our day-to-day life. It is important to keep it secure to prevent any malicious attacks.



Aaliyah M. John

Cyber Threat Intel Exchange: Exploration of STIX and TAXII Protocols (Dr. Ahmad)

Growing up, I always loved math. In high school, I really developed a love for the challenge and the rush that came when I finally solved math and coding problems. In the future, I intend to work in the cybersecurity sector, combining my passions for criminal justice—passed down from my parents who both work in the field—and computer science. I have noted the lack of women, especially women of color, in tech all over the world, and I want to be a role model for young women who look like me and encourage them join this male-dominated field.

My research project focuses on testing the performance of protocols that facilitate the exchange of cyber threat intelligence. Doing so will allow us to identify more efficient ways of protecting systems from cyber-attacks.



Hunter Kearney

Can Malware Infect a Host Operating System From a Virtual Network? (Dr. Ahmad)

I chose to study computer science and information security because computers and how they work have always fascinated me. So far in my research experience, I have expanded my knowledge on subjects I learned in courses such as operating systems and advanced data structures. Connecting what I have learned in class with my research has been an enlightening experience. After I earn my bachelor's degree and complete my research, I plan to go to graduate school to learn more about information security.

My research focuses on using a controlled network of virtual machines to understand if malicious software can potentially leak into a user's operating system. If the malicious software escapes the secure environment of the virtual machine, it could be disastrous for a network's infrastructure.



Zafar Seenauth

Reverse Engineering Rootkits (Dr. Ahmad)

I have always been curious about technology and how machines make decisions. My research has taught me that machines are still learning, just as I am. My goals include entering the workforce and becoming a leader in cybersecurity analytics. Doing undergraduate research



has taught me to begin thinking not only like myself, but as those trying to uncover what the world has to offer.

My favorite part of

PRISM is relating what my research has taught me and then bringing it back to my type of thinking to truly have my own unique view.

Rootkits are a type of computer virus that renders antiviral software useless. I want to understand how these rootkits disable the antivirus software. To do so, I am using a virtual machine, which allows me to study rootkits without

infecting the actual computer. If we can find out where the rootkits are located and how they work, we can render them useless.



Rose Wong

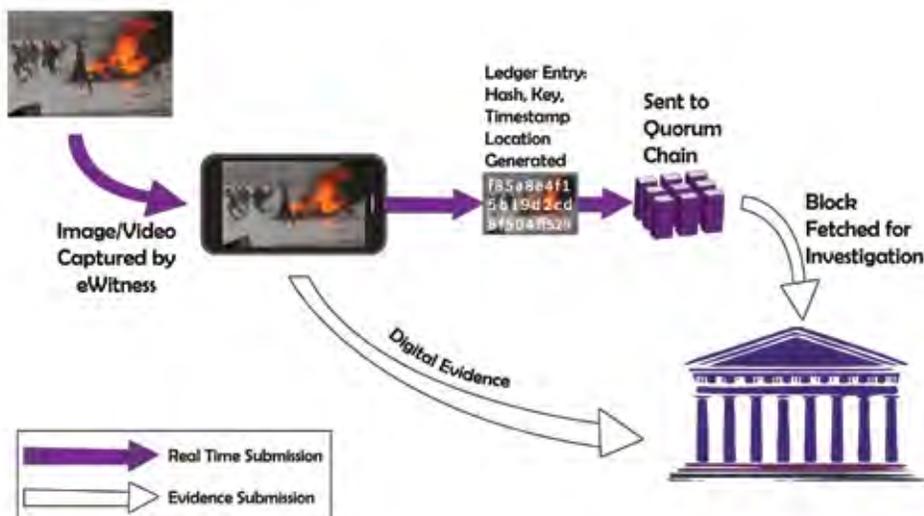
eWitness Blockchain: Proving Provenance of Digital Evidence (Dr. Jain)

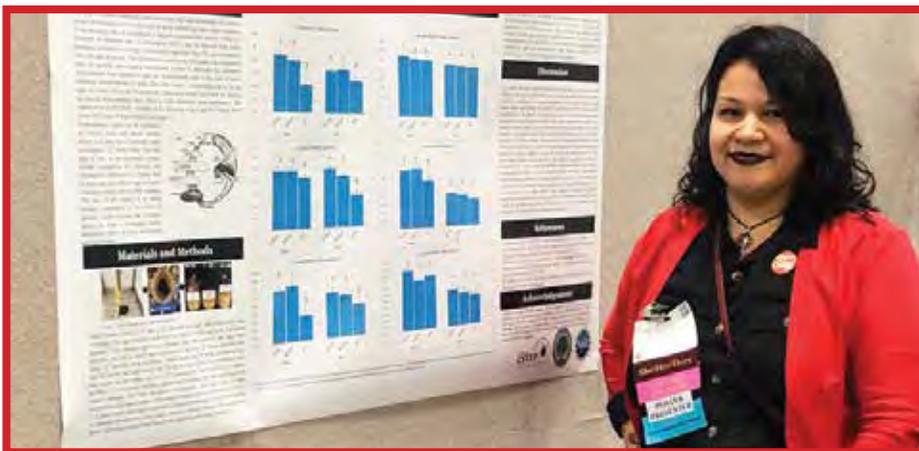
I am passionate about applied sciences because I believe that Research and Development (R&D) is the key to progress. I love indulging in scientific theories and conceptual thinking. The biggest payoff comes when the indulgence turns into something that benefits our world. Cybercriminals are dangerous threats to our world. They range from lone wolves to nation states that can bring mayhem and destruction without warning and from afar. My studies at John Jay have many possible applications, including protecting individuals, private and public institutions, and ultimately, our entire nation.

I work on digital evidence. With my mentor, I am developing an app, eWitness, that proves that the digital evidence captured by smart phones has not been altered. I will be doing research to optimize the efficiency and security of the app's blockchain.



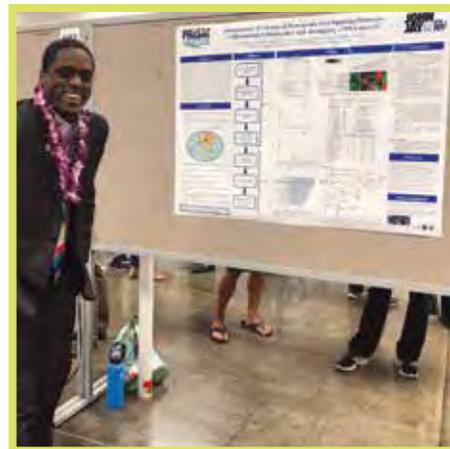
System Architecture





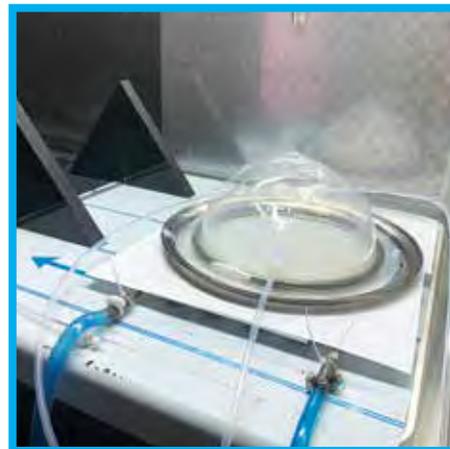
“ PRISM, along with my mentor and research partners, have encouraged me to exercise my scientific skills in a professional environment. ”

—Luis Barrera



“ My experience in PRISM has not only improved my communication and critical thinking skills, but it has made me feel like a true scientist! ”

—Kelliana Seeraj





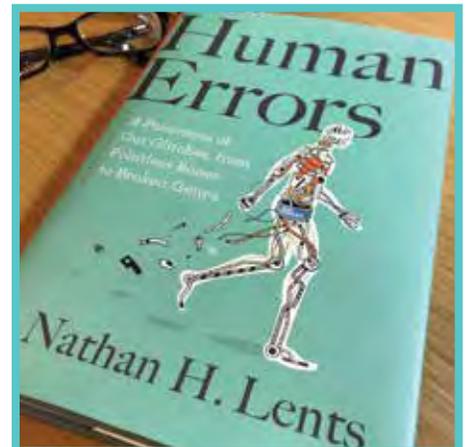
“ Through my research experience and PRISM, I have learned that science is not linear; ideas tend to circle back on themselves, and often used to understand the bigger picture. ”

—Vishal D. Persaud



“ My research has taught me that technology needs to be consistently improved over time. ”

—Jian Lim Choong



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 (2019-2020).

Publications

Aguilar, W.*, Zacarias, O.*, Romaine, M.*, Proni, G., Petrovic, A. G., Abzalimov, R., Paz, M. M. & Champeil, E. (2020). Synthesis of Oligonucleotides containing the cis-Interstrand Crosslink Produced by Mitomycins in their Reaction with DNA. *Chemistry a European Journal*, 26 (55), 12570-12578. Impact Factor: 5.16. Paper selected as HOT paper and selected for an inside cover. <https://doi.org/10.1002/chem.202003300>

Almodovar, N.*, Champeil, E., Delgado-Cruzata, L. miRNA Expression Changes After Decarbomoyl Mitomycin C (dmc) Exposure in the MCF7 Breast Cancer Cell Line. American Society for Cell Biology. 2019 ASCB Annual Meeting abstracts. *Mol Biol Cell*. 2019;30(26):3075. doi:10.1091/mbc.E19-11-0617

Almodovar, N.*, Delgado-Cruzata, L., Alvarez, M.R., Bravo, T.A.*, and Hinson, S. (2020), Associations of Plasma Extravesicular (EV) MicroRNA Levels in Seropositive and Seronegative Rheumatoid Arthritis (RA). *The FASEB Journal*, 34: 1-1. <https://doi.org/10.1096/fasebj.2020.34.s1.07159><https://doi.org/10.1096/fasebj.2020.34.s1.07159>

Obaidat, M., and Brown, J.*, “Two Factor Hash Verification (TFHV): A Novel Paradigm for Remote Authentication”, IEEE International Symposium on Networks, Computers and Communications, October 2020. Montreal, Canada.

Centazzo, N.*, Concheiro-Guisan, M., “Analytical Techniques for the Identification and Quantification of Drugs and Metabolites in Wastewater Samples”. Chapter 2 (28 pages) in “Wastewater-Based Epidemiology: Estimation of Community Consumption of Drugs and Diets”. Editors: Subedi B., Burgard D.A., Loganathan B.G. Publisher: ACS Symposium Series; American Chemical Society, 2019, ISBN 9780841234406 | ISBN 9780841234413.

Delgado-Cruzata L, Rodriguez Alvarez, M., Almodovar, N.*, Bravo, T.*, Hinson, S. Associations of Plasma Extravesicular (EV) MicroRNA Levels in Seropositive and Seronegative Rheumatoid Arthritis (RA). *Arthritis Rheumatol*. 2019; 71 (suppl 10)

Francois, J.A.*, Delgado-Cruzata, L., Alvarez, M.R., and Almodovar, N.*. (2020), Bioinformatic Prediction of Neuropathic Pain Signaling Pathways in Rheumatoid Arthritis after high throughput miRNA analysis. *The FASEB Journal*, 34: 1-1. <https://doi.org/10.1096/fasebj.2020.34.s1.07046><https://doi.org/10.1096/fasebj.2020.34.s1.07046>

Delgado-Cruzata L, Rodriguez Alvarez, M., Amarnani, A., Guzman, E., Bliese, A.*, Albarracin, B.*, Cirilli, C.*, Hinson, S. DNA Methylation of the Dual Specificity Phosphatase 22 (*DUSP22*) Gene Promoter in Plasma and Medication Use in Rheumatoid Arthritis (RA). *Arthritis Rheumatol*. 2019; 71 (suppl 10)

Heredia, M.Y.*, Gunasekaran, D., Ikeh MAC, Gunasekaran D, Nobile CJ, and Rauceo, JM (2020). Transcriptional regulation of the caspofungin-induced cell wall damage response in *Candida albicans*. *Current Genetics*. PMID: 32876716. <https://doi.org/10.1007/s00294-020-01105-8>. Invited Review

Heredia, M.Y.*, Ikeh, MAC, Gunasekaran D, Conrad, K.A.*, Filimonava, S.*, Marotta, DH, Nobile, CJ, and Rauceo, JM (2020). An expanded cell wall damage signaling network is comprised of the transcription factors Rlm1 and Sko1 in *Candida albicans*. *PLoS Genetics* 16(7): e1008908. PMID: 326399995. <https://doi.org/10.1371/journal.pgen.1008908>

Presentations

2019 SACNAS National Diversity in STEM Conference, Honolulu, HI

Guy, C.*, Kafondo, F., Bakhown, N., Delgado-Cruzata, L., Rodriguez, Y. (2019). Epigallocatechin-3-gallate, catechin gallate and catechin hydrate and *miR-182* in triple negative breast cancer cells. The 2019 SACNAS National Diversity in STEM Conference.

Almodovar, N.*, Delgado-Cruzata, L., Alvarez, M.R., Bravo, T.A.*, and Hinson, S. (2019), Associations of Plasma Extravesicular (EV) MicroRNA Levels in Seropositive and Seronegative Rheumatoid Arthritis (RA). The 2019 SACNAS National Diversity in STEM Conference.

Francois, J.A.*, Delgado-Cruzata, L., Alvarez, M.R. and Almodovar, N.* (2020), Bioinformatic Prediction of Neuropathic Pain Signaling Pathways in Rheumatoid Arthritis after high throughput miRNA analysis. The 2019 SACNAS National Diversity in STEM Conference. *Best Presentation Award*.

2019 Annual Biomedical Research Conference for Minority Students (ABRCMS), Anaheim, CA

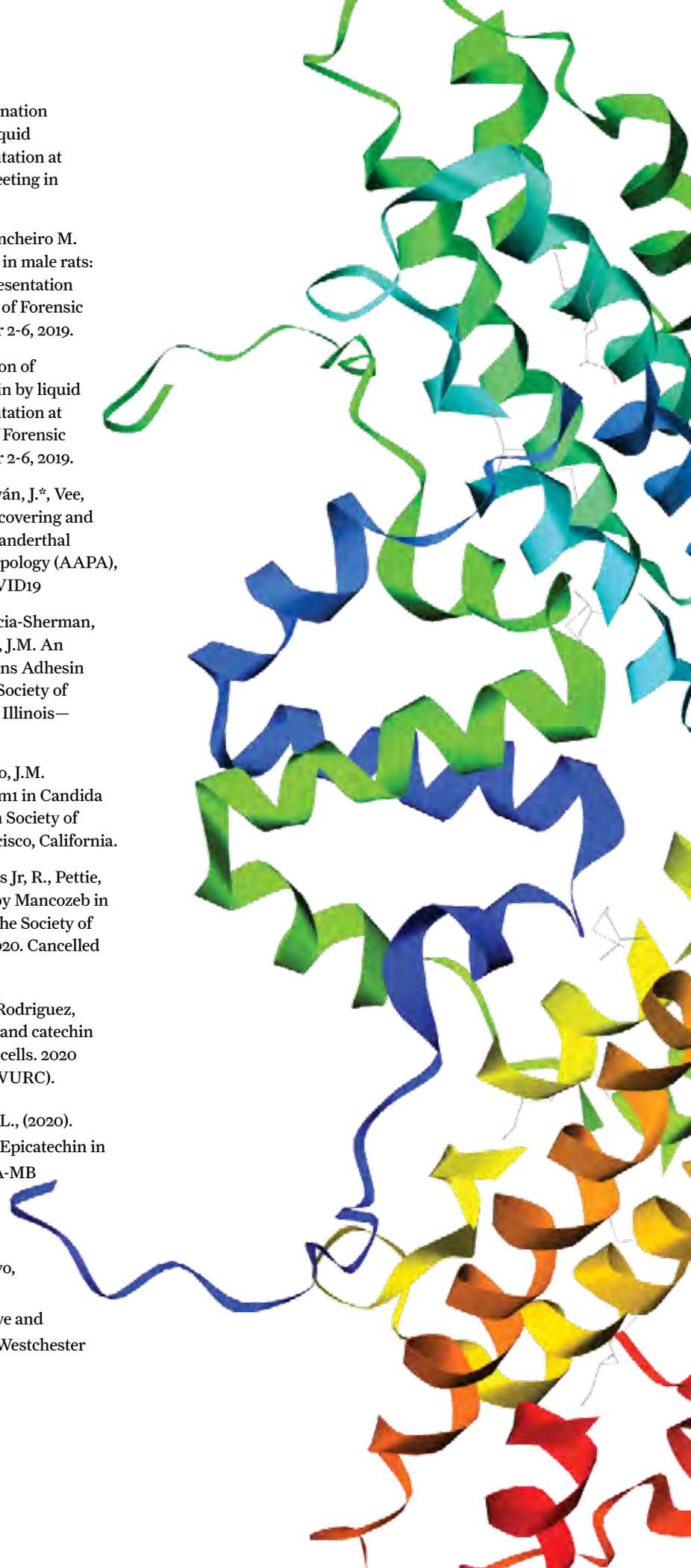
Mercado, B.* and Lents, NH. Discovery and Classification of a Human Unique microRNA. Annual Biomedical Research Conference for Minority Students (ABRCMS), Anaheim, CA; 14-Nov 2019.

Galván, J.* & Lents, NH. Analysis of microRNA Gene Evolution in the Neanderthal and Human Genomes. Annual Biomedical Research Conference for Minority Students (ABRCMS), Anaheim, CA; 14-Nov 2019.

Other Conferences

- Towler, S.*[†], Centazzo, N.*[†], Concheiro-Guisan M. “Determination of MDPV and its major metabolites in rat brain by liquid chromatography-mass spectrometry”. Poster presentation at the 2019 Society of Forensic Toxicologists (SOFT) meeting in San Antonio, TX, October 14-18, 2019.
- Centazzo, N.*[†], Rodriguez, R.*[†], Acosta T., Baumann M., Concheiro M. “Pharmacokinetics of methylone and its metabolites in male rats: relationship to brain serotonin depletion”. Poster presentation at the 2019 meeting of The International Association of Forensic Toxicologists (TIAFT), Birmingham, UK, September 2-6, 2019.
- Rodriguez, R.*[†], Centazzo, N.*[†], Concheiro M. “Determination of methylone and its three major metabolites in rat brain by liquid chromatography-mass spectrometry”. Poster presentation at the 2019 meeting of The International Association of Forensic Toxicologists (TIAFT), Birmingham, UK, September 2-6, 2019.
- Lents, N.H., Johnson, H.J., Mercado, B.*[†], Blandino, J., Galván, J.*[†], Vee, S.*[†], and Wiggins, W*. A New Approach Toward Discovering and Characterizing Orphan Genes in the Human and Neanderthal Genomes. American Association of Physical Anthropology (AAPA), Los Angeles, CA; 18-Apr 2020. Cancelled due to COVID19
- Ho, V.*[†], Herman-Bausier, P., Shaw, C., Conrad, K.A.*[†], Garcia-Sherman, M.C., Draghi, J., Dufrene, Y.F., Lipke, P.N., & Rauceo, J.M. An Amyloid Core Sequence in the Major *Candida albicans* Adhesin Als1p Mediates Cell-Cell Adhesion. 2020 American Society of Microbiology (ASM) Microbe Conference. *Chicago, Illinois—held virtually due to COVID-19 pandemic
- Marotta, D.H., Chalouh-Hara, B., Heredia, M.Y.*[†], & Rauceo, J.M. Interaction of the Transcription Factors Sko1 and Rlm1 in *Candida albicans* Cell Wall Damage Signaling. 2019 American Society of Microbiology (ASM) Microbe Conference. San Francisco, California.
- Alejanzales, J.*[†], Galante, B., Kaplan, A., Mannan, J., Mieses Jr, R., Pettie, S.*[†], Zhang, V., Cheng, S.-Y. Epigenetic Modification by Mancozeb in Astrocytes and PC12 Cells. 59th Annual Meeting of the Society of Toxicology, Abs#2322, Anaheim, CA, March 15-19, 2020. Cancelled due to COVID.
- Guy, C.*[†], Kafondo, F., Bakhown, N., Delgado-Cruzata, L., Rodriguez, Y. (2019). Epigallocatechin-3-gallate, catechin gallate and catechin hydrate and miR-182 in triple negative breast cancer cells. 2020 Westchester Undergraduate Research Conference (WURC).
- Ramirez-Medrano, L.*[†], Mahadeo, A., & Delgado-Cruzata, L., (2020). Effect of Exposure to Epigallocatechin-3-gallate and Epicatechin in the Proliferation in the Breast Cancer Cell Line MDA-MB 468. The 2020 Westchester Undergraduate Research Conference (WURC).
- Almodovar, N.*[†], Delgado-Cruzata, L., Alvarez, M.R., Bravo, T.A.*[†], and Hinson, S. (2020), Associations of Plasma Extravesicular (EV) MicroRNA Levels in Seropositive and Seronegative Rheumatoid Arthritis (RA). The 2020 Westchester Undergraduate Research Conference (WURC).

*Denotes PRISM student or alumnus.



2021 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 100 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.

2021 PRISM Keynote Speaker: **Dr. Eugene Gonzalez-Lopez**



DR. EUGENE GONZALEZ-LOPEZ was a PRISM undergraduate researcher from 2010 to 2012. Under the mentorship of Dr. Shu-Yuan (Demi) Cheng, Dr. Gonzalez-Lopez focused on clarifying the effects of environmental factors, such as pesticides, on the development of the neurological disorder Parkinson's disease. During these years, he was funded by the Louis Stokes Alliances for Minority Participation and was named to the Dean's List for two consecutive years.

In 2012, after graduating from John Jay with a bachelor of science in forensic science and a concentration in toxicology, Dr. Gonzalez-Lopez stayed at John Jay to pursue his master's of science in molecular biology. That same year, he won the prestigious National Science Foundation: Bridge to the Doctorate Fellowship, which recognizes the top 6% of applicants and funded his John Jay graduate studies. Under the continued mentorship of Dr. Cheng, he explored the effect of chemotherapeutics, like Taxol, on preventing pesticide-induced cell damage.

Throughout his undergraduate and graduate studies, Dr. Gonzalez-Lopez won four prestigious International Research Experience awards. These allowed him to obtain interdisciplinary research experience in material science at KTH, Royal Institute of Technology (Stockholm, Sweden), in neurobiology at the Karolinska Institute (Stockholm, Sweden), in environmental toxicology at Universidad del Valle (Cali, Colombia), and in neurobiology at Maastricht University's School for Mental Health and Neuroscience (Maastricht, The Netherlands). His research experience to that point solidified his interest in disease intervention with therapeutics.

After obtaining his master's from John Jay, Dr. Gonzalez-Lopez went on to Penn State University, College of Medicine, where he earned a Ph.D. in neuroscience. For his doctoral work, he joined Dr. Kent Vrana's lab seeking to understand the many factors that contribute to the development of Parkinson's disease. Towards that goal, he identified, characterized, and grouped the disease's genetic indicators to enhance patients' quality of life through targeted therapeutic intervention. In a natural progression of his doctoral work, Dr. Gonzalez-Lopez joined Dr. Matthew Coates' lab. Here, he characterized and grouped the genetic indicators associated with pain perception in the gut of patients diagnosed with inflammatory bowel disease. From a technical standpoint, Dr. Gonzalez-Lopez's work has been instrumental in developing and disseminating tools for analyzing gene and protein expression, as well as characterizing normal and various disease processes.

Currently, Dr. Gonzalez-Lopez works as the Analytics and Bioassays Lead in the Global Gene Therapy Research department of Takeda Pharmaceuticals in Cambridge, MA. As a project lead, he safeguards the quality of modified virus vectors used to treat diseases. In five years, Dr. Gonzalez-Lopez sees himself becoming a department head in the industrial sector.

Throughout his career, Dr. Gonzalez-Lopez has presented his research at more than 60 conferences and has several first-author scientific publications. In 2019, the Tri-State Consortium of Opportunity Programs in Higher Education awarded him its Outstanding Alumni Award for Achievement and Leadership.

2021 PRISM Outstanding Undergraduate Researchers



This year, we have been especially humbled by the dedication of all our PRISM Undergraduate Researchers. Having faced the challenges of working remotely in their projects, our students persevered, exhibiting a level of commitment to research and development that is both admirable and praiseworthy. In recognition of their fortitude, we are proud to present our annual Outstanding Undergraduate Research award to the entire 2020-21 PRISM Undergraduate Research Program (URP) cohort.

Our student researchers pushed the boundaries of scientific research from their homes or by going to campus to continue their projects while socially distancing. Some of their projects include the movement of heavy metals through the environment, the development of new security protocols that will improve the safety of the “Internet of Things,” the exploration of the mechanisms of action of novel cancer drugs, and the detection of novel drugs in clinical specimens. Other URP students are transforming how we think about criminal investigations by studying new ways to test ballistics and understanding the effect that drug exposure has on insects used for time of death estimations. Our students bring grit, inspiration, and a personal

commitment to their work with their faculty mentors.

Drs. Anthony Carpi and Edgardo Sanabria-Valentín noted, “Our students did not and have not let the current crisis stand in the way of their development as scientists. When college officials announced that we would continue to be off-campus last summer, we worried about what this change would mean for our students and how we could continue to foster their development remotely. They rose to the challenge demonstrating their commitment to scientific research, and creativity as they overcame the unavoidable obstacles of research during the pandemic. The future of scientific research is safe in their hands.”

Dr. Gabriella Sanguinetti adds, “PRISM URP students have continued their relentless pursuit of knowledge despite the circumstances. They are resilient, driven, and passionate. It is our pleasure to recognize PRISM URP students for their dedication to their professional development and scientific discovery.”

The decision to recognize the entire cohort was a simple one. The 2020-21 cohort of the PRISM Undergraduate Research Program reflects the progress as scientists and commitment to research this award is meant to recognize.



Top left: PRISM Graduating class of 2018. Top Right: 2018 Keynote Speaker Dr. Zuleyma Peralta addresses our students. PRISM Staff celebrates our eleventh anniversary in 2018.

Former PRISM Symposium Speakers and Outstanding Undergraduate Researcher Award Recipients

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 (CA Inst. of Tech)
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

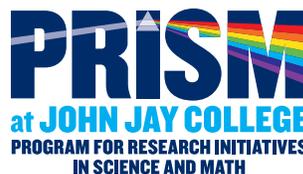
2009
 Keynote: Bladimir Ovando, PhD (SUNY—Buffalo)
John Jay Class of 2002
 Award Recipient: Kana Noro

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
Lisette 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
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
*PRISM Director &
John Jay's Dean of Research*



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



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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 300 students have participated in PRISM, of whom more than 99% graduate. More than 100 students have moved on to post-graduate programs, almost half from underrepresented minority groups and the majority of whom are women. And 50 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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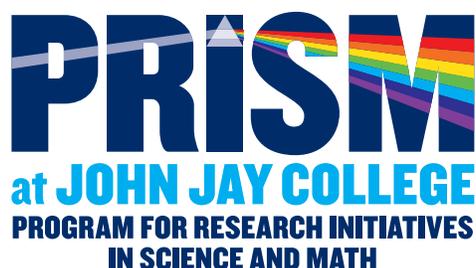


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For information about the Program for Research Initiatives in Math and Science, please email the staff at PRISM@jjay.cuny.edu or visit www.jjay.cuny.edu/PRISM

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