



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

Undergraduate Research  
**CHRONICLE**

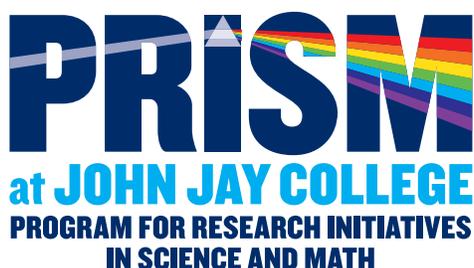
2019

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challenge yourself

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engage



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inquire

examine

build connections

question

choose your future

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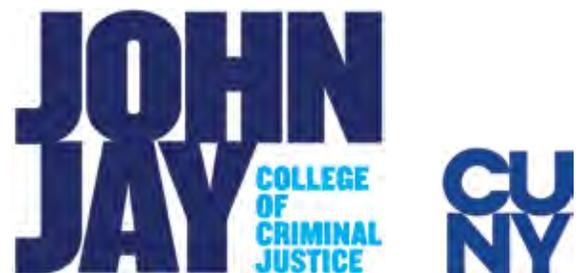
**Microscopic view of a compound eye and antennae of a green bottle fly (*Lucilia sericata*).  
Specimens was stored in ethyl alcohol before setting for photos.**

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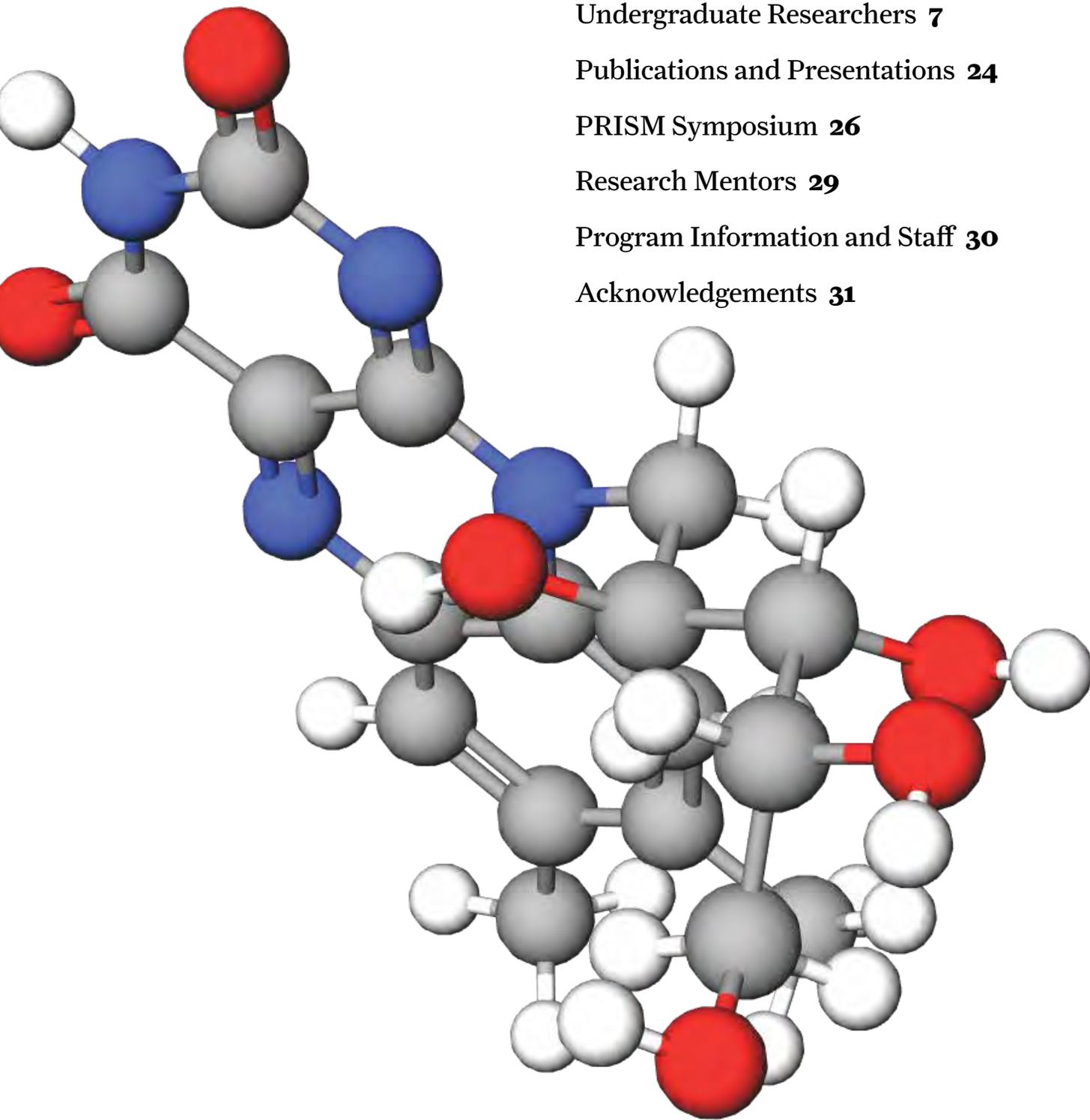
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**“ I love how eager my mentor and the PRISM staff are to support me in the pursuit of my career goals. ”**

**–John François (page 12)**





**ANTHONY CARPI**  
PRISM Director

“ **OUR FIRST**  
**100** ”



**EDGARDO SANABRIA-VALENTÍN**  
PRISM Associate Director

WHILE ENTRY INTO ANY NEW FIELD IS DIFFICULT, entry into science can be especially challenging. Becoming a scientist is not only a matter of learning a new language, it involves learning a new way of thinking about problems. It is a new way of approaching challenges that is better taught by a skilled mentor than a textbook. Knowing this, PRISM was founded twelve years ago to expose our students to the process of science beyond the classroom. Since that initial cohort of five students, more than five hundred John Jay students have now participated in our various initiatives. Our alumni have become researchers, entrepreneurs, communicators of science, crafters of public policy, healthcare providers, and many other things, each of them changing the world in their own way.

This year, we've hit a huge milestone: more than 100 PRISM undergraduate researchers and alumni (103 to be exact) have gained admission to post-graduate education programs in STEM (science, technology, engineering, and math) fields. Fifty of them are beginning, completing, or have finished their doctorates.

PRISM students have and are becoming scientific innovators that help fuel our economy. For example, Harrison Fernandez (page 20), our first undergraduate researcher in computer science to gain admission to a PhD program in that field, will be attending Michigan State University this fall. Our 2019 Outstanding Undergraduate Researcher, Marienela Heredia (page 14), was accepted to six different doctoral programs and will be pursuing studies in cell and molecular pathology at University of Wisconsin—Madison. Hannah Chu (page 9) and Maggie Zheng (page 17) also received multiple offers, and have chosen to begin their graduate education at University of California—Riverside and New York University in entomology and biomedical chemistry, respectively. And our alumni keep achieving and pursuing their dreams; like Darrien Maynard (Class of 2018) who is now enrolled in a Master's program in environmental chemistry at City College, Maria Albarracin (Class of 2018) who will be attending Veterinary School at Cornell University this fall, and O'Jay Stewart (Class of 2017) who will start an MD/PhD program at the Icahn School of Medicine at Mount Sinai.

We congratulate our students and alumni on their future success, and are proud of them for being **FIERCE ADVOCATES FOR DIVERSITY, INCLUSION AND JUSTICE IN SCIENCE.**



**“ PRISM has opened up my mind to how exciting discovering the answer to a research question is, and the impact I can have on the future of science.**

**– Marienela Heredia (page 14)**



**“ My favorite parts of PRISM are the monthly meetings, meeting alumni, and networking with professionals.**

**– Marjorie Gray (page 12)**



**“ I have grown as a scientist and a communicator of science through my research experience.**

**– Chanté Guy (page 13)**



**“ Performing undergraduate research has shown me that I can test out ideas and fill gaps in our knowledge.**

**– Yvonne Sandoval (page 10)**



# 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

Forensic scientists apply varied disciplines—including biology, chemistry, anthropology, and psychology—to investigate crimes related 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 are using the latest technologies to develop more sensitive methods for the detection of illicit substances and to analyze evidence found during criminal investigations.

### Rebecca Anson

#### Detecting Saliva and Skin in Forensic Contact Traces Using Tissue Specific Peptide Markers (Dr. Prinz)

As a kid, there was something about science that fascinated me. It was this fascination that ignited a passion in me to explore avenues of science different from the mainstream ones. When I discovered the field of forensic science, I realized that pursuing this for the rest of my life would make me more than happy. And here I am, 7,786 miles away from home, yet feeling more at home than I ever have. Being a part of PRISM has helped me re-establish my zeal for forensic science and has allowed me to gain real-life experiences from experts in the field.

My research uses the highly sensitive analytical technique, liquid chromatography mass spectrometry, to analyze biological material obtained from evidence to detect specific human proteins from skin and saliva. This can help forensic scientists interpret DNA results at crime scenes.





## Francheska Cadiz

### Analysis of Optical Properties of Soils using Polarized Light Microscopy for Forensic Applications (Dr. Reffner)

When I was younger, I was so intrigued by the different fields and topics that science has to offer; there was no limit to what you could explore! My experience in research has confirmed my love for exploration and has opened many new points of views to me. It has also influenced my goals for the future: I plan to go to graduate school and pursue a PhD environmental science. Through PRISM, I have been able to explore my career options and science ventures. Being part of PRISM has definitely been one of the major highlights of my undergraduate career.

My research explores the unique properties of earth materials such as minerals, rocks and other components of soil, in order to create an easier, more efficient procedure for working with soil evidence for forensic applications.

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## Molecular Biology

Molecular biology employs technologies that can detect and sequence minute amounts of DNA present in evidence in order to resolve aspects of a criminal case—like who might have perpetrated the crime or where the crime took place. At John Jay, our students are improving techniques to extract and analyze DNA from biological samples, and then using these techniques to develop methods that help solve criminal investigations.



## Tova Akerman

### Developing a Sample Processing Method for the Forensic DNA Analysis of Skeletal Remains (Dr. Li)

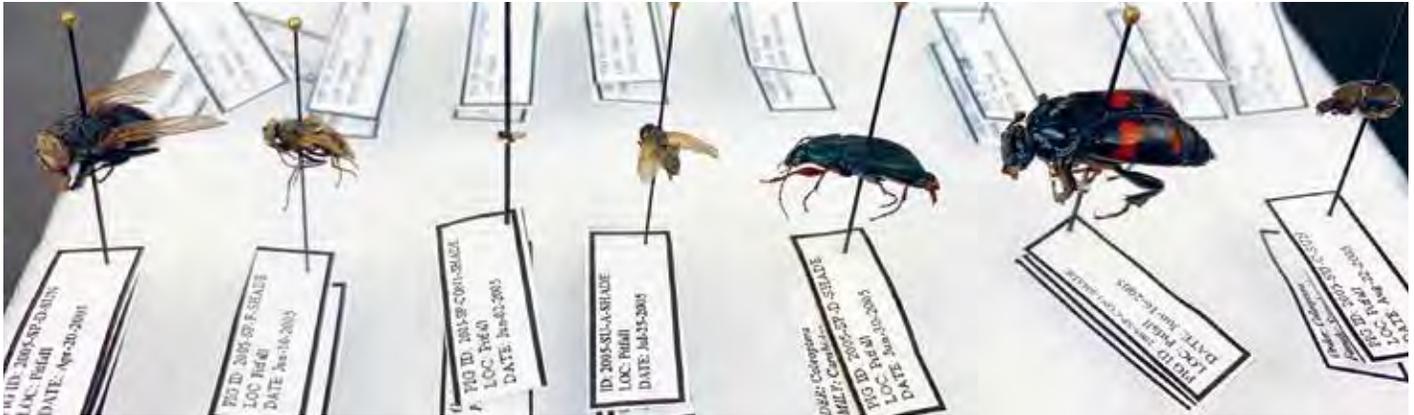
Science provides a window into the intricate functions of our bodies and the opportunity for innovation. Using forensic pathology, I hope to use science to help loved ones find answers. At John Jay and PRISM, I have the opportunity to learn among a supportive network of friends and mentors. My research has taught me that a hypothesis doesn't always result as expected, but through positive thinking and perseverance there are new possibilities achievable just beyond the horizon. At John Jay, I am developing skills that will prove invaluable to my life and career.

The speed of forensic DNA analysis is crucial to solving missing person cases. My research focuses on developing a potentially automated method for initial preparation of bone samples for DNA identification. My method, if successful, would be faster than the current methods used.



## Forensic Entomology

Entomology is the field 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 conducting a survey of forensically important insect species in NYC and studying how environmental factors can affect the determination of a victim's time of death.



### Hannah Chu

#### The Diversity of Forensically Important Flies in New York City (Dr. Rosati)

I have always had a peculiar fascination with the macabre. With this interest, I sought to find a home where I could explore the science behind death and decay. Luckily, I found my intellectual sanctuary at John Jay researching insect behavior and development in Dr. Rosati's forensic entomology lab. My research experiences have given me the confidence and motivation to pursue a career in science and study the effects of abiotic factors on insect development and evolution. Next year I will begin my PhD studies focusing on evolutionary biology to further fulfill my research curiosities.

My project aims to study the diversity of blow fly species in and around Central Park to create a database that forensic entomologists can reference in homicide cases involving insect evidence. This project will also examine how different habitats (park vs. urban) affect insect populations.



### Floralba Gjergjova

#### The Effect of Varying Morphine Concentrations on the Development of *Phormia regina* (Dr. Rosati)

Science has been the only topic to jolt me out of my comfort zone. As I began reading about the metabolization of drugs and chemical pathways, I realized my true interest is in the chemical processes associated with metabolization and elimination rates of biological systems. The uncertainties and challenges that arose while working on this project have strengthened my skills for innovation and creativity in problem-solving as well as preparation for potential issues. This research project solidified my plans to pursue a PhD in a field related to toxicology or biochemistry.

My project looks at the impact of morphine on the development of the fly *Phormia regina*. Understanding the development of this species of flies in decomposing bodies will provide information on its potential use in time of death determinations in criminal cases.





## Rixsi Herrera

### The Effect of Light Exposure on the Prepupal Wandering Behavior of the Common Green Bottle Fly, *Lucilia sericata* (Dr. Rosati)

In grade school, I was the strange girl that enjoyed playing with ants and “rollie pollies” when they appeared at recess. In middle school, I learned that bugs could be used in some sciences. In high school, I was shown how forensic scientists use these little guys to determine the post mortem interval of a cadaver. How could I not take the chance to work with bugs? Working in an entomology lab has taught me how insects can help in forensics and how their behaviors are affected by environmental factors. I plan on pursuing a career where I use entomology in future forensic applications.

Once maggots are done feeding on remains, they tend to “wander” away from the body in search for a place to complete their development. My research focuses on how light may affect this movement. The results of this study could direct investigators to better locate older stage insects, which are crucial for a forensic entomologist and time of death estimations.

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## 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. I have set out to pursue an MD/PhD to understand how the immune system functions and to discover how cannabinoids can be used as alternative medicine. 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.

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.

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## Madeline Viti

### Effect of *Lucilia sericata* Larvae Enzymes on Taphonomy and Morphology of Trauma in Bones (Dr. Corthals and Dr. Rosati)

I have always loved science, but never thought I would be able to handle the work and challenges that accompany learning about it. That changed when I got to college and decided to try and satisfy my endless curiosity. It was not long before I switched into the cell and molecular biology major, and now plan to pursue a career as a forensic pathologist. It's been a bumpy road, but I have learned so much about myself through my classes, from my peers, and the research I have had the opportunity to participate in.

My research project examines bone trauma under a microscope after it has been exposed and fed on by blow fly larvae. We are trying to see how the digestive enzymes of the larvae affect how a cadaver's bones look during examination and if these changes affect the “time of death” determination.

## Yoselin Paucar

### Diversity of Forensically Important Diptera in Manhattan (Dr. Rosati)

I have always been intrigued by science because it is filled with numerous unanswered questions and, thus, presents opportunities for research and for expanding my knowledge. I was privileged to begin conducting research with Dr. Rosati during my sophomore year. It has been an incredible learning experience being introduced to forensic entomology and becoming comfortable working with plenty of insects. I look forward to completing our current study and developing my own project as I prepare to become a better scientist. I know that my experience in PRISM is only the beginning of my research journey.

My research focuses on surveying the species of blow flies that are present in different regions of Manhattan. This data will create a database that will help forensic entomologists understand how blow fly communities may differ between the urban and park-like settings in Manhattan.



## BIOMEDICAL SCIENCES

Biomedical scientists apply observation 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 the evolution of metabolic processes.

## Nickolas Almodovar

### Analysis of mRNA Expression Changes in Breast Cancer Cells after Exposure to Mitomycins (Dr. Delgado-Cruzata)

From a very young age, my passion for science has been part of my identity. I have always been fascinated with understanding what things are made of, and how things work at the atomic level. As an undergraduate researcher, I have developed a deeper respect for the scientific field as a whole. PRISM has given me the necessary resources to expand my horizons by exposing me to new and exciting fields and practices. As time progresses, I believe the skills I have developed will help me reach what I consider two attainable goals: to earn a PhD and to use said PhD to improve the lives of many.

My research focuses on investigating changes in breast cancer cells after treatment with different members of a chemotherapeutic class of molecules named mytomycins. Our work will help us identify differences in molecular targets among this family of compounds and provide further knowledge on their biological mode of action and potential uses in the clinic.





## Carl Cirilli

### Effect of Methotrexate in the DNA Methylation Levels of the Dual Specificity Protein Phosphatase 22 (*DUSP22*) Promoter Region (Dr. Delgado-Cruzata)

I have always thought of DNA like the words that make up a book. Each book is written with a different combination of words, telling a unique story. Similar to a book, each organism contains a different DNA sequence, which makes them unique. PRISM has given me a platform in which I can conduct research learning about different aspects of DNA, such as the outside forces that can alter it, changing the story that it's trying to tell. I planned on pursuing a career in criminal DNA analysis, however, PRISM introduced me to careers in research/industry in which I am now also interested.

My research investigates if the rheumatoid arthritis medication, methotrexate, indirectly affects the genes associated with regulating inflammation in the body.

Understanding this effect will allow us to find how methotrexate functions, which is currently unknown.

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## 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 current sophomore at John Jay 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 plan to pursue a PhD in biological sciences and eventually conduct independent research on lymphoid malignancies in the human body. I am appreciative of 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.

My research looks at the quantities of multiple microRNAs in the blood serum of individuals suffering from rheumatoid arthritis. This work will allow us to determine if

there are specific microRNAs that are involved in the development of this autoimmune disease.

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## Marjorie Gray

### The Cellular Responses of MCF-7 to Mytomyacin C and its Analog (Dr. Cheng)

I was not exactly sure what I wanted to do when I came to John Jay - I love to debate and to solve puzzles. My interest in science began when I discovered the reality TV show, *Dr. G: Medical Examiner*, in middle school. I was intrigued by Dr. G, who was able to determine the cause of death of those who died under unusual circumstances. Conducting research has taught me how to become more organized and to be more attentive to details. Furthermore, it has reinforced my will to complete a doctorate in pharmacy. My experience with PRISM has helped me to focus more with my classes and start my application to graduate school. My favorite parts of PRISM are the monthly meetings, meeting alumni, and networking with professionals.

My research focuses on how various anticancer drugs regulate the activity of genes responsible for the growth of cancer cells in tumors. Understanding the mechanism of action of these drugs might help us develop more efficient treatments for cancers.

## Chanté Guy

### Effects of Epigallocatechin-3-Gallate (EGCG) in Triple Negative MDA-MB Breast Cancer Cells (Dr. Delgado-Cruzata)

Growing up, I always questioned the very existence of everything I encountered. Conducting research has quenched my thirst for investigating and finding the answers to my many questions. PRISM has allowed me to explore this side of myself, while developing skills I will employ in my future career. I have grown as a scientist and a communicator of science through my research experience. This experience has inspired me to pursue a PhD in biomedical sciences. As Carl Sagan, the late astronomer and science writer, would say, “Somewhere, something incredible is waiting to be known.” I want to be part of those discoveries.

My current research project investigates the effects of a green tea component, Epigallocatechin-3-gallate (EGCG), on breast cancer cells. EGCG shows great promise as a preventative measure for breast cancer.



## Anayatzinc Vargas

### Investigation of Signaling Pathways Involvement in p21 Activation Induced by Mitomycin C and 10-Decarbamoyl Mitomycin C in K562 Cells (Dr. Champeil and Dr. Cheng)

The paradox of science—of holding the questions and answers of the world—has always drawn me in. As I take more advanced science courses, I realize that the research done by past scientists allows one to learn more about the universe. It also allows one to be inquisitive about the world. During my time conducting research, I have learned the importance of resilience and inquisitiveness. These two traits have been important in everyday life as well. I plan to pursue a medical degree and become a forensic pathologist.

My research project investigates the possible signaling pathways—the group of reactions that control one or more cell functions—that lead to the activation of the tumor suppressor protein p21 by two potential chemotherapeutic agents in cancerous cell lines. This will help pinpoint where these treatments may be the most effective.



## Samantha Vee

### Understanding the Role of Diet and Proteins CPT1 and PPARs in the Longevity of Bats (Dr. Corthals)

I am a junior majoring in cell and molecular biology and minoring in gender studies. I have always been fascinated by the natural world around us, so choosing to study science was an easy choice. My experience at John Jay has truly been amazing with the support of PRISM and Macaulay Honors College. Not only have I been able to hone my skills as a research scientist with the guidance of my mentor, Dr. Corthals, but I have also been able to become a part of a community of students who are equally as passionate about science as I am. After graduation, I hope to pursue a PhD in evolutionary biology.

My research focuses on how the longevity of bats is influenced by diet and certain biomarkers related to lipid metabolism. Uncovering and understanding the naturally evolved mechanisms to fight aging in bats may provide insight into how we can extend healthy lifespans for humans.



## Microbiology

Microbiology studies the structure, function, and classification of microscopic organisms such as bacteria, fungi, and some parasites. They also aim 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.



### Marienela Heredia

#### Uncovering the Role of Stomatin-Like Protein 2 in the *Candida albicans* Stress Response (Dr. Rauceo)

I have always been captivated by science. Growing up, a weak immune system made me prone to infection. I was curious and wanted to understand how such tiny microbes could make me feel so sick. This curiosity quickly developed into a profound interest in microbiology. My participation in PRISM has greatly influenced my goal of obtaining a PhD and becoming a biomedical researcher specializing in infectious diseases. Conducting research as part of PRISM has opened up my mind to how exciting discovering the answer to a research question is, as well as the impact that research can have on the future of science.

My research focuses on studying the role of stomatins, proteins present in all life forms, in the cellular stress response of the disease-causing fungi *Candida albicans*. Understanding

how these proteins function will give more insight into how this fungal species can adapt to harsh conditions in the human body and cause infection.



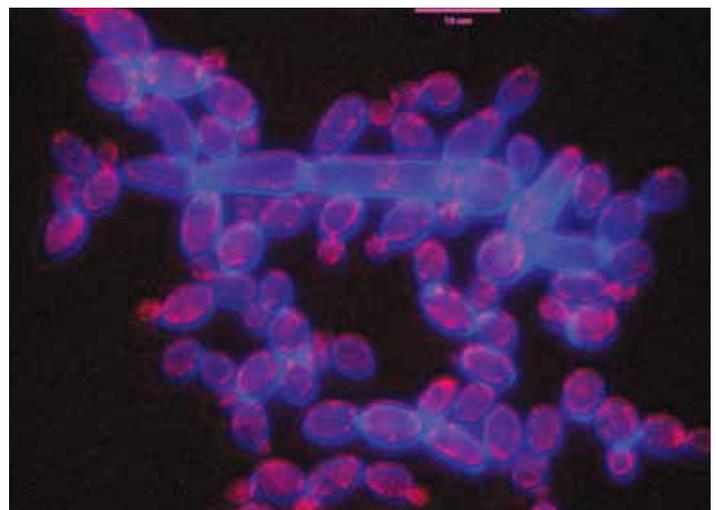
### Juan J. Mesa

#### Expression and Purification of the *Streptomyces coelicolor* Rhomboid Protease SC03855 (Dr. Trujillo—Queensborough Community College)

Ever since I was a child I was fascinated by great scientific discoveries. This fascination has inspired me to pursue studies in science. I believe that through science I can make an impact in society. As an undergrad research student, I have learned many principles. For instance, I have learned to be patient with my project because sometimes you do not get the results you expect. I desire

to become a forensic scientist. I want to use my knowledge in science to provide optimization when solving crimes. Through PRISM at John Jay, I enjoy being with other undergrad research students who have the same major as me.

My research studies the function of a protein produced by the bacterium *Streptomyces coelicolor* that belongs to a class of molecules named rhomboid proteases. Rhomboid proteases are found in all living organisms and are known to regulate many cellular processes in humans. Their function in bacteria like *S. coelicolor* is unknown, and our work seeks to elucidate it.



# 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

#### Analysis of Methylmercury Within Fish-Based Cat Food in Relation to Retail Price (Dr. Carpi)

It has always been an interest of mine to learn more about the world. I began my journey in high school when I researched chicken egg production and the potential effects of moon phases. My work there taught me how it's one thing to be wrong, but it is another to accept your failures and learn from them to become a better individual. What I enjoyed about PRISM was the exposure to a real lab and the process of science. All my work has helped me to understand what I love and that I want to share it with others. My goal is to become a science professor.

My work involves quantifying mercury levels in different brands of cat food that contain seafood, and correlating mercury content to their retail price. Our goal is to inform consumers about the potential risks of purchasing mercury-containing pet food.



### Elvin Colon

#### The Effect of Sterilization on the Reduction and Emission of Mercury from Soil (Dr. Carpi)

I was not exposed to the sciences during high school, though I had always been curious about them and this curiosity stuck with me. I decided to go for forensic science in my undergrad studies. In my experience conducting research, I have learned how to manage my time in the lab and how to think critically about my scientific project and approach. My goal is to continue my education in toxicology in a PhD or master's program. Doing undergraduate research has helped me become better equip to achieve my goal.

My research looks at the process of mercury emissions from soils, and whether some of the methods we use in lab affect our ability to measure these emissions. Our goal is to understand the possible variables that can affect the chemical process of mercury emissions.



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## 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 are looking at the presence of drugs in wastewater to find patterns of drug use in NYC. They are also developing more sensitive methods for drug detection in biological specimens.

### Marion Torres

#### Quantitative Determination of Antidepressant and Anxiolytic Drugs in Wastewater with Liquid Chromatography Tandem Mass Spectrometry (Dr. Concheiro-Guisan)

My love for chemistry began when a mixture of baking soda and vinegar caused a paper-mache volcano to erupt. As simple as that demonstration was, it was unforgettable. As I continue to pursue an education in chemistry, my interest has not waned. My research experience has taught me multiple applications to toxicology which are not limited to just forensics. After graduation, I plan to enroll in a certification program that will allow me to pursue a career in clinical toxicology in New York.

My project analyzes wastewater in New York City to investigate the presence and trends of commonly prescribed antidepressant and anti-anxiety drugs. The concentrations of these drugs and their breakdown products in wastewater may provide relevant information about lifestyle habits and public health.



### Steven Towler

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

Growing up, I never imagined pursuing a career in science. 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 increased the next 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 degree 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 the synthetic cathinones MDPV. Our work will provide insights into how these drugs are processed by the body.

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## 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.



## Nicole Centazzo

### Pharmacokinetics and Pharmacodynamics of Synthetic Cathinones in Male Rats (Dr. Concheiro-Guisan)

As a native Italian majoring in environmental sciences, I never thought about moving to New York City to pursue a degree in forensic science at John Jay College. As a freshman in a foreign country, I had various ideas concerning my future career. Fortunately, PRISM gave me an opportunity to start my next venture in the Concheiro-Guisan Lab, and this experience influenced me to become an independent scientist. Through working as a research assistant, I developed interest in and found my passion for forensic pathology.

My research focuses on studying how methylenedioxymethamphetamine (MDMA) and MDPV, two drugs with similar pharmacological effects as amphetamines, are distributed throughout the body, and what effects they have in the nervous system. Understanding how these drugs work might provide clues that will help combat the recent rise in drug abuse.



## Raider Rodriguez

### Analytical Determination of Methylenedioxymethamphetamine and its Metabolites in Brain Tissue by Liquid Chromatography Tandem Mass Spectrometry (Dr. Concheiro-Guisan)

Early in my childhood, I read one of those prescription bottle labels that say, “Keep out of reach of children.” Since then, I have been interested in the effects of drugs on the body and I decided to pursue a degree in toxicology. Under the guidance of Dr. Concheiro-Guisan, I have learned what paths to take when it comes to solving scientific problems. Being part of my lab has taught me the value of teamwork, of persistence, and of being passionate for what you do. My experience as a PRISM researcher has enriched my curiosity for science, and it has encouraged me to pursue a PhD in pharmacology.

My research involves the development and validation of an analytical method to identify and quantify the psychoactive drug methylenedioxymethamphetamine and its breakdown products in rat brain tissue. This project will give us a new way to study how this drug works in the brain.



## Maggie Zheng

### In Vitro Cytotoxicity Study of a New Anti-Tumor Derivative of Mitomycin C (Dr. Champeil and Dr. Cheng)

I was influenced at an early age by my grandmother, who was a science professor. This established an interest towards science at a young age and inspired me to follow my grandmother's path. The research experience in PRISM taught me the value of a strong work ethic, the importance of collaboration and of perseverance. Through my research experience, I developed a love for science and hope to make contributions in scientific discovery. My career goal is to pursue a PhD, teach in college, and pursue clinical research.

My research focuses on the interaction between a chemical derivative of a currently used chemotherapeutic drug, decarbamoylmitomycin C, and DNA. Studying this interaction will allow us to understand how this chemical works in cancer cells.



# 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 improving approaches used to synthesize fingerprinting dyes, developing new reagents for environmentally-friendly chemical reactions, and elucidating the chemistry of chemotherapeutic agents.



## Sean A. Cass

### Organic Chemical Syntheses based on Highly Efficient Earth-Abundant Metal Catalyst Systems (Dr. Zhang)

Growing up, I always questioned and investigated the world around me to try and find answers to my questions. It was in middle school that, with the help of an amazing chemistry teacher, I was able to realize that science was the ultimate way to explore and understand my curiosity about the natural world. Pursuing science and participating in research showed me that science is a passion of mine that I intend to follow for the rest of my career and life.

My research is focused on designing compounds from non-precious metals, like iron or copper, that can be used to make industrial chemical reactions occur more efficiently. Using Earth-abundant metals is critical to develop 'green' chemical reactions that produce less waste and are more cost-effective.



## Brianna Harrell

### Analysis of the Adduct Between Lawsonsone (A Fingerprint Detection Reagent) and Cadaverine (Dr. Proni)

My love for science began just as many others have—watching crime shows like CSI. I grew up watching true crime documentaries/dramas with my family and always wondered why people committed crimes. A passion slowly grew inside of me, and I yearned to understand why things were the way they were and how I could help bring justice. My fascination and curiosity for science snowballed from there. After taking forensic science in high school, I knew it was for me. Research has helped me improve my problem-solving skills as well as solidify my future career in forensic science.

My project focuses on developing better fingerprint detection reagents. I am characterizing a new reagent derived from lawsonone, a commonly used fingerprinting reagent.

Understanding how this reaction occurs can help future researchers create a more efficient reagent used for latent fingerprints.



## Abdul Khan

### Catalytic Oxidation of Alcohols to Aldehydes Using Multinuclear Non-Precious Metal Complexes (Dr. Zhang)

Prior to taking my first chemistry course in high school, I was nervous that I would not be successful at it. I was right, but this did not stop me. During my freshman year in college, I decided to give it another chance, and I hit a groove. I was fascinated with the complexity of how different elements or molecules react with each other or their surroundings. The concepts started making sense to me, and I was set on learning more. Now I want to continue research in a chemistry-related field and pursue a graduate level education in pharmaceutical science.

My research project focuses on using non-precious metals to speed up useful chemical reactions. A better understanding of these reactions will aid the discovery of more efficient ways to synthesize highly demanded medicinal drugs. This could lead to faster and more environmentally friendly production at industrial levels.



## Chelsea Lawrence

### Stereochemical Determination and Analysis of the Organophosphate Ethyl p-Nitrophenyl Benzenethiophosphonate (Dr. Proni)

I always enjoyed science growing up. I remember flipping through my grandfather's nursing school textbooks and being fascinated by the biochemical processes mentioned. Just like that, I wanted to become a scientist. My PRISM experience has taught me how to work independently in the lab and remain organized. I've also learned extensively about the instrumentation and analysis techniques used in chemistry research. I thank God every day for being a part of such a wonderful program. I know that the experiences that I've obtained here will help me achieve my goal of becoming a clinical toxicologist.

My research focuses on analyzing the placement of chemical groups in the pesticide Ethyl p-Nitrophenyl Benzenethiophosphonate, which can exist in two different forms. Separating these two forms can allow us to determine which form poses the greatest environmental risk.



## Nicholas Towler

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

I 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 antitumor 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

Computer scientists develop technologies that play critical roles in our modern lives. From smart phones to the “internet of things”, they make our lives easier. At John Jay, our students are improving the safety of computer networks and developing new ways to use smart technology in our everyday lives.



## Harrison Fernandez

### Towards Vulnerable Binary Code Clone Detection through Firmware Lineage (Dr. Dietrich)

With the rapid adoption of new of technologies, security should be a top priority. From my computer security research, I have learned how to manage my time effectively, multitasking, and conveying complex topics to a wide audience. After graduation, I will continue my education in a cybersecurity-focused computer science PhD program at Michigan State University. PRISM solidified my plan to attend graduate school. It also gave me the skills to excel and widen my academic and professional network, making me a confident and competitive candidate. The best parts of PRISM have been the great one-on-one mentorship and working on an intense research project.

For our project, we identify vulnerabilities in programs that can develop between upgrades and ensuing versions, as different programmers, compilers, and computer architectures are involved in this multi-step process. This is important to improve coding practices, software integrity, and security of Internet of Things.



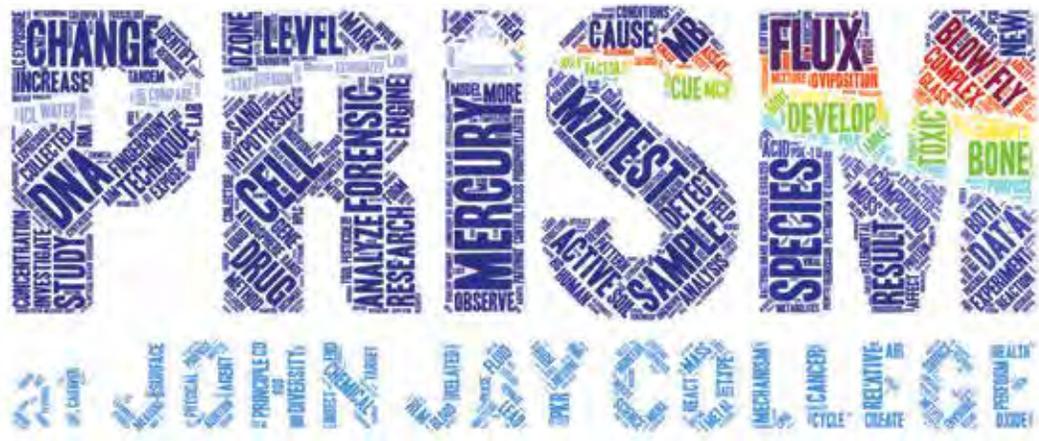
## Kristy Li

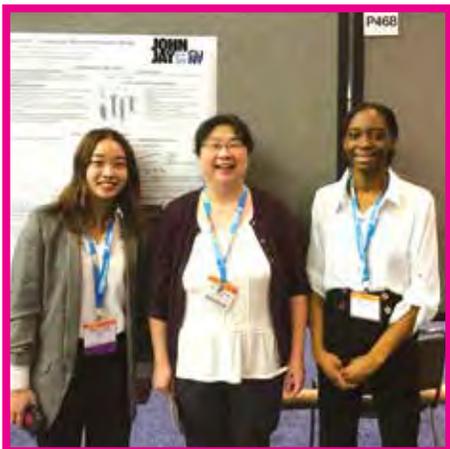
### Verifying the Authenticity of a Student's Diploma through Ethereum Smart Contracts (Dr. Johnson)

During my freshmen year of college, I took an introductory programming course to C++. When I first opened up *code::Blocks* (a software development platform) and typed, “Hello World!,” I was amazed at how lines of code could be displayed onto the screen. It felt as if a whole new world had been opened right before my very own eyes. My research work developing “smart contracts” has taught me how we can verify transactions using blockchain. I now plan to pursue a career in software development and to later pursue a master’s degree in computer science.

My project focuses on developing a smart contract diploma, which will be used by employers to verify a student’s academic records. Our “smart diploma” system will help institutions that use paper contracts verify transactions in a secure, easy, scalable, and adaptable way at a low cost.







**“ I have been able to become a part of a community of students who are equally as passionate about science as I am. ”**  
– Samantha Vee (page 13)

**“ In my experience conducting research, I have learned how to manage my time in the lab and how to think critically about my scientific project and approach. ”**  
– Elvin Colon (page 15)



**“ I know that my experience in PRISM is only the beginning of my research journey. ”**  
– Yoselin Paucar (page 10)





“ At John Jay and PRISM, I have the opportunity to learn among a supportive network of friends and mentors.

– Tova Akerman (page 8)



“ The research experience in PRISM taught me the value of a strong work ethic, the importance of collaboration and of perseverance.

– Maggie Zheng (page 17)



# 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 (2017-2018).

## Publications

Aguilar\*, W., Paz, M. M., Vargas\*, A., Clement, C. C., Cheng, S. Y., & Champeil, E. (2018). Sequence-Dependent Diastereospecific and Diastereodivergent Crosslinking of DNA by Decarbamoylmitomycin C. *Chemistry—A European Journal*, 24(23), 6030-6035.

Aguilar\*, W., Paz, M. M., Vargas\*, A., Zheng\*, M., Cheng, S. Y., & Champeil, E. (2018). Interdependent Sequence Selectivity and Diastereoselectivity in the Alkylation of DNA by Decarbamoylmitomycin C. *Chemistry—A European Journal*, 24(50), 13278-13289.

Alvarez, M. R., Delgado-Cruzata, L., Guzman, E., Tavarez, W., Bliese\*, A., Sabirov, T., Jimenez, M.J., Hilario, C.A.O., Acosta, M.E., Albarracin\*, M. & Cirilli\*, C. (2018). DNA Methylation of the Dual Specificity Protein Phosphatase 22 (DUSP22) Gene Promoter in Plasma of Patients with Seropositive and Seronegative RA. *Arthritis & Rheumatology*, (Vol. 70).

Cheng, S. Y., Vargas\*, A., Lee\*, J. Y., Clement, C. C., & Champeil, E. (2018). Involvement of Akt in mitomycin C and its analog triggered cytotoxicity in MCF-7 and K562 cancer cells. *Chemical biology & drug design*, 92(6), 2022-2034.

Conrad\*, K. A., Rodriguez\*, R., Salcedo\*, E. C., & Rauceo, J. M. (2018). The *Candida albicans* stress response gene Stomatin-Like Protein 3 is implicated in ROS-induced apoptotic-like death of yeast phase cells. *PloS one*, 13(2), e0192250.

Domashevskiy, A. V., Williams\*, S., Kluge, C., & Cheng, S. Y. (2017). Plant Translation Initiation Complex eIF iso 4F Directs Pokeweed Antiviral Protein to Selectively Depurinate Uncapped Tobacco Etch Virus RNA. *Biochemistry*, 56(45), 5980-5990.

Kurti, M., He, Y., Silver, D., Giorgio, M., von Lampe, K., Macinko, J., Ye, H., Tan\*, F., & Mei\*, V. (2018). Presence of Counterfeit Marlboro Gold Packs in Licensed Retail Stores in New York City: Evidence From Test Purchases. *Nicotine & Tobacco Research*.

Srivastava, T., Wu\*, M., Kakhnovich\*, J., Waithaka, B., & Lents, N. H. (2018). A Three-Locus, PCR-based Method for Forensic Identification of Plant Material. *Journal of Forensic Sciences*, 63(4), 1252-1260.

Stewart\*, O. J., Domashevskiy, A. (2017). Biophysical Studies of Liposome Encapsulated Pokeweed Antiviral Protein and its use as a HIV Therapeutic. *Biophysical Journal*, 112, 72a.

Zacarias\*, O., Aguilar\*, W., Paz, M. M., Tsukanov, S., Zheng, M., Cheng, S. Y., Pradhan, P., & Champeil, E. (2018). Isolation and Rationale for the Formation of Isomeric Decarbamoylmitomycin C-N 6-deoxyadenosine Adducts in DNA. *Chemical research in toxicology*, 31(8), 762-771.

Zhang, G., Wu, J., Li, S., Cass\*, S., & Zheng, S. (2018). Markovnikov-Selective Hydroboration of Vinylarenes Catalyzed by a Cobalt (II) Coordination Polymer. *Organic letters*.

## Presentations

### 2017 SACNAS National Diversity in STEM Conference, Salt Lake City, CA

DeJesus\*, A., Proni, G. "Development of New Reagents for the Detection of Latent Fingerprints on Porous Surfaces," 2017 Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) National Diversity STEM Conference, Salt Lake City, UT; October 19-21, 2017.

Duran\*, L., Delgado-Cruzata, L. "Effect of DNA Methyltransferase 1, DNMT1, Knockdown and Inhibition of *BRCA1* Expression in MCF-7 Breast Cancer Cells," 2017 Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) National Diversity STEM Conference, Salt Lake City, UT; October 19-21, 2017.

Javed\*, R., Cheng, S. "Thymoquinone Attenuates Maneb and Mancozeb Induced Cytotoxicity and Reactive Oxygen Species Generation," 2017 Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) National Diversity STEM Conference, Salt Lake City, UT; October 19-21, 2017

Zacarias\*, O., Champeil, E. "Investigation of a New DMC-DNA Monoadduct," 2017 Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) National Diversity STEM Conference, Salt Lake City, UT; October 19-21, 2017

### 2017 Annual Biomedical Research Conference for Minority Students, Phoenix, AZ

Aguilar\*, W., Champeil, E., "New Insights into the Formation of Stereoisomeric DNA Adducts Generated by Decarbamoyl Mitomycin C, a Bifunctional Derivative of Mitomycin C: Base Sequence Specificity for the DMC B-Interstrand Cross Link," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Cush, D. A., Burn, C., & Herold, B. "Complement Mediated Cell Death in Mice Vaccinated with  $\Delta$ gD—a Candidate Vaccine against the Herpes Simplex Virus," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Heredia\*, M.Y., Rauceo, J.M. "Phenotypic Analysis of Stomatin Constructs in the Fungus *Candida albicans*," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Kosakouski, A., Guo, J., Mann, E., Carpi, A. "The Effect of Water on Mercury Flux from Mercury (II) Chloride Spiked Substrates and Soil Samples," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Maynard, D., Urbano-Molina, K., Mann, E., Carpi, A. "The Effect of Light on Mercury Flux From Mercury (II) Oxide Spiked Samples," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Vargas\*, A., Lee\*, J., Champeil, E., Cheng, S. "AKT Inhibition Dependence on p53 When Triggered by MC and DMC," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

Yakovishina, V., Cheng, S. Y. "Involvement of p53 and p21 in Maneb and Mancozeb Induced Senescence," Annual Biomedical Research Conference for Minority Students, Phoenix, AZ; November 1-4, 2017.

### Other Conferences

Centazzo\*, N., Frederick\*, B., Jacox, A., Cheng, S., Concheiro, M. "A Wastewater Analysis for Tobacco and Drug Detection in New York City," AAFS, Seattle, WA; February 22-24, 2018

Centazzo\*, N., Frederick\*, B., Jacox, A., Cheng, S., Concheiro, M. "Wastewater-based Epidemiology of Tobacco, Prescription Opioids and Drugs of Abuse in New York City," American Chemical Society Meeting, Boston, MA; August 21-23, 2018

Chu\*, H., Paucar\*, Y., Rosati, J. "The Diversity of Forensically Important Flies in New York City," The Entomological Society of America, Denver, CO; November 5-8, 2017.

Fernandez\*, H., Tu, G. "The Design and Implementation of a Low-Cost Bitcoin Vending Machine," Mid-Michigan Symposium for Undergraduate Research Experiences, East Lansing, MI; July 24, 2018.

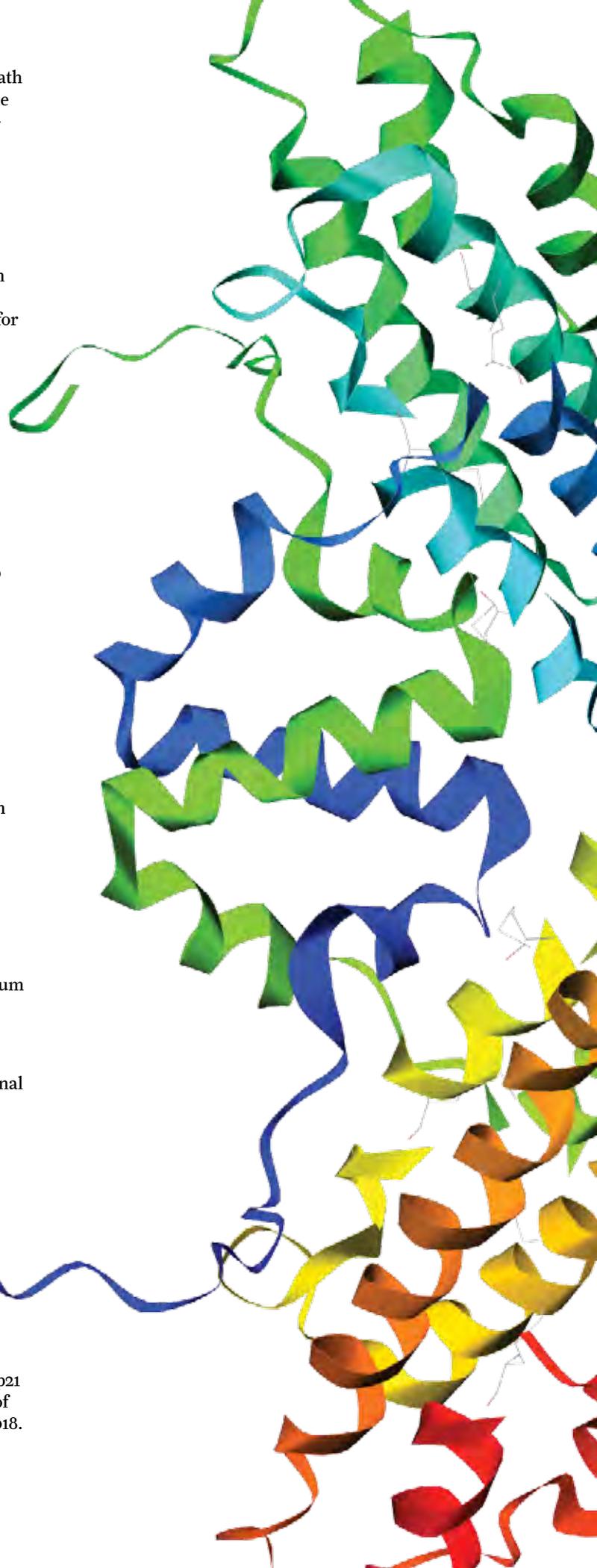
Lawrence\*, C., Serrano\*, J., Meija, M. Proni, G. "Chiral Separation and Stereochemical Identification of Ruelene," C/STEP Regional Research Expo, Manhattan, NY; March 11, 2018.

Mehta\*, V., Fragale\*, J., Chu\*, H., Rosati, J. "The effect of tissue type on the development of two forensically important blow fly species, *Phormia regina* (Meigen) and *Lucilia sericata* (Meigen)," The Entomological Society of America, Denver, CO; November 10-14, 2018.

Paucar\*, Y., Levy, D., Brambilla, L. "Evaluating the Metabolic Functions of STAT3 and the Mechanism of Action of OPB in a Non-Small Cell Lung Cancer Model (A549)," The Leadership Alliance National Symposium, Hartford, CT; July 27-29, 2018.

Vargas\*, A., Lee\*, J., Champeil, E., Cheng, S. "AKT Involvement in p21 Activation Induced by Mitomycin C and its Analog," Society of Toxicology Annual Meeting, San Antonio, TX; March 11-15, 2018.

\*Denotes PRISM student or alumnus.



# 2019 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.

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

## 2019 PRISM Keynote Speaker: **Dr. Roselynn Cordero**



**DR. ROSELYNN CORDERO** graduated cum laude from John Jay College in 2012, earning a Bachelor's Degree in forensic science with a concentration in toxicology. As part of John Jay's PRISM program, Dr. Cordero carried out research in the lab of Dr. Gloria Proni, where they synthesized and purified chiral organic molecules to determine their absolute configurations. Chiral molecules are carbon-based compounds that can exist as one of two non-superimposable mirror images of each other (similar to how your hands are identical, with a palm and five fingers, but if you put one above the other they do not "match"). To separate the two configurations, they used a technique called "molecular tweezers" which can separate molecules one-by-one based on chemical or physical properties.

After graduation, she attended Cornell University in Ithaca, New York, to pursue a doctorate in chemistry. In the lab of Dr. Christopher K. Ober, Dr. Cordero specialized in surface chemistry, the branch of chemistry concerned with chemical processes that occur on the surface of materials. She primarily focused on the development of a new environmentally-sustainable chemical process, called emulsion polymerization, to imprint surfaces with molecules that could confer these surfaces with special properties. This novel approach was used to produce polymer brushes, thin films of long molecules composed of repeating and identical subunits that can detect changes in temperature or the presence of specific biological molecules, that were then used to cover surfaces for various applications. Dr. Cordero is at the forefront of her field and her expertise in emulsion polymerization led to a grant from the U.S. Air Force Office of Scientific Research to use her method to develop flexible electronics and miniaturized sensors. She has also given many presentations at various national and international conferences on this topic, including an oral presentation at the *World Polymer Conference* in Cairns, Australia, during the summer of 2018.

Dr. Cordero is currently pursuing a career in the industrial sector as a Senior Product Development Chemist at 3M in Minnesota. There she is developing new formulas for pressure sensitive adhesives, expanding the use of the environment friendly techniques she developed in large-volume manufacturing. During her talk, Dr. Cordero will discuss her journey from New York to Minnesota, how her undergraduate research experience at John Jay College influenced her decision to attend graduate school, and opportunities available to our students to help them succeed in their post-graduate experiences.

## 2019 PRISM Outstanding Undergraduate Researcher: Marienela Heredia

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

Marienela joined PRISM's Junior Scholars Program as a freshman in the fall of 2015 and was selected to be part of our Undergraduate Research Program during the summer of 2017. Since then, she has been under the mentorship of Dr. Jason Rauceo. Her research project focuses on the major human fungal pathogen *Candida albicans*, which infects more than 60,000 people per year in the United States alone. In his nomination letter, Dr. Rauceo noted that Marienela's "choice to pursue doctoral training clearly reflects her perseverance to have a career in biomedical research. I can wholeheartedly say that Marienela's role in my lab has been vital. I am thrilled that she joined my group and was able to make a major contribution to my research agenda."

Marienela's work with *C. albicans* looks at the Stomatin-Prohibitin-Flotillin-HflK (SPFH) protein family, which is found in all living things, including humans. Because these proteins are present in the mitochondria (the cellular organelle responsible for providing energy to each one of our cells, among other functions) in other organisms, and because the mitochondria of *C. albicans* is involved in cellular processes that are crucial to its virulence, Marienela and Dr. Rauceo hypothesized that *Candida's* version of SPFH would localize to the mitochondria and that mutations to these proteins might reduce the ability of this fungi to cause disease. This year Marienela applied to various PhD programs in biomedical sciences to fulfill her career goal to be an independent scientist. She was accepted to six different doctoral programs in biomedical sciences, and selected the Cellular and Molecular Pathology Graduate Program at the University of Wisconsin-Madison, and she will begin her studies in the fall of 2019.

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 was not a simple task as all nominees demonstrated outstanding research skills. In addition, each mentor submits a nomination letter that is not only impressive but also heartfelt, showcasing the close working relationship between mentor and student. This year the Selection Committee was formed by Dr. Yaihara Fortis Santiago (Manager, Postdoctoral Affairs Office at Memorial Sloan Kettering), Dr. Kwame Osei-Sarfo (Director of the Bridges to the PhD Program at Columbia University), and Dr. Mary Ann Pohl (Associate Director, Antibody Generation at the Tri-Institutional Therapeutics Discovery Institute).





*Top left: PRISM Graduating class of 2018. Top right: Keynote Speaker Dr. Zuleyma Peralta addresses our students.  
Bottom right: PRISM Staff celebrates our 11th Symposium.*

**Former PRISM Symposium Speakers and Outstanding Undergraduate Researcher Award Recipients**

**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 Pittsburg  
 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, D.M.D  
 (Rutgers School of Dental Medicine)  
*John Jay Class of 2006*  
 Award Recipient: Yessenia Lopez,  
 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,  
 currently at University of  
 CA-San Francisco

**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,  
 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

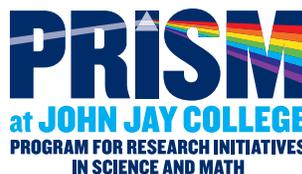
**2009**  
 Keynote: Bladimir Ovando, PhD  
 (SUNY—Buffalo)  
*John Jay Class of 2002*  
 Award Recipient: Kana Noro

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

# RESEARCH MENTORS

<b>Faculty Member</b>	<b>Area of Expertise</b>
<b>Aftab Ahmad, DSc</b>	Object-oriented programming, computer architecture, and data communications and forensic security
<b>Anthony Carpi, PhD</b>	Environmental chemistry and science education
<b>Leslie Chandrakantha, Ph.D.</b>	Statistics, Regression Analysis and Logistic Regression, Time Series Analysis, and Computer Simulation
<b>Elise Champeil, PhD</b>	Synthetic chemistry and bioorganic chemistry
<b>Shu-Yuan Cheng, PhD</b>	Toxicology, pharmacology, molecular biology, and neuroscience
<b>Marta Concheiro-Guisan, PhD</b>	Forensic and clinical toxicology
<b>Angelique Corthals, PhD</b>	Pathology, biomedical and physical anthropology, and archeology
<b>Lisette Delgado-Cruzata, PhD, MPH</b>	Epigenetics and cancer epidemiology
<b>Sven Dietrich, D.A.</b>	Security and privacy, applied cryptography, network security
<b>Artem Domashevskiy, PhD</b>	Biochemistry, biophysics, and molecular biology
<b>Sam Graff, Ph.D.</b>	Computer Science
<b>Yi He, PhD</b>	Analytical chemistry and environmental sciences
<b>Shweta Jain, Ph.D.</b>	Wireless and social networks, Delay tolerant networks
<b>Hunter Johnson, PhD</b>	Mathematical logic
<b>Ekaterina Korobkova, PhD</b>	Biochemistry, biophysics, and physical chemistry
<b>Ekaterina Korobkova, Ph.D.</b>	Biochemistry, biophysics, and physical chemistry
<b>Thomas Kubic, JD, PhD</b>	Light and electron microscopy, vibrational spectroscopy, and image analysis to physical evidence examinations
<b>Nathan Lents, PhD</b>	Cell biology, forensic biology, genetics, and bioinformatics
<b>Richard Li, PhD</b>	Forensic DNA analysis, forensic molecular biology, and forensic genetics
<b>Helen-Marie Maras, PhD</b>	Cybersecurity, surveillance, counterterrorism, and transnational security
<b>Mechthild Prinz, PhD</b>	Forensic Biology and forensic genetics
<b>Gloria Proni, PhD</b>	Supramolecular and molecular chirality, optical spectroscopy, and synthesis and characterization of small molecules
<b>Jason Rauceo, PhD</b>	Molecular biology, molecular genetics, and mycology
<b>John Reffner, PhD</b>	Microscopy, molecular spectroscopy, and materials science
<b>Marcel Roberts, PhD</b>	Electrochemistry, spectroscopy, and analytical chemistry
<b>Jennifer Rosati, PhD</b>	Forensic entomology, biology, entomology, ecology, entomotoxicology, and insect behavior
<b>Linda Rourke, MS, D-ABC</b>	Criminalistics
<b>Daniel Yaverbaum, MS, MPhil</b>	Physics education and cognition, Galilean and special relativity, and astronomy
<b>Guoqi Zhang, PhD</b>	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*



**Gabriella Sanguineti, PhD**  
*PRISM Research &  
Outreach Coordinator*



**Leslie Porter-Cabell**  
*Science Grants Manager*



**Patricia Samperi**  
*Science Grants Executive Assistant*



**Derek Sokolowski**  
*PRISM Assistant Coordinator*



**Erica Klafehn**  
*PRISM Academic Advisor*

## 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.

In the 12 years since its founding, 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](http://www.jjay.cuny.edu/PRISM)

Follow us on Twitter, Instagram, and Facebook @JJCPRISM

# ACKNOWLEDGEMENTS

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- A NYS Education Department Collegiate Science and Technology Entry Program (CSTEP) grant
- A US Department of Education Title V grant for Institutional Development
- A US Department of Education Title V grant for Collaborative Initiatives
- An S-STEM grant from the National Science Foundation
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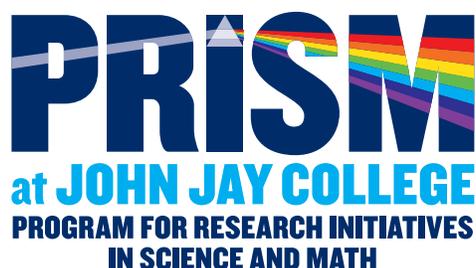


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